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Psychological Engagement in Choice and Judgment Under Risk and Uncertainty

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Abstracts
of the Psychonomic Society

Volume 23 • November 2018

59TH ANNUAL MEETING

Hyatt Regency New Orleans
New Orleans, Louisiana, USA
Thursday, November 15-Sunday, November 18, 2018

REGISTRATION

Elite Foyer, First Floor

Wednesday, November 14 .. 4:00 p.m.-8:00 p.m.
Thursday, November 15 ..... 7:30 a.m.-8:30 p.m.
Friday, November 16 ..... 7:30 a.m.-6:00 p.m.
Saturday, November 17 ..... 7:30 a.m.-5:00 p.m.
Sunday, November 18 ..... 7:30 a.m.-12:00 p.m.

OPENING SESSION/KEYNOTE ADDRESS

Celestin D/E, Third Floor
Thursday, November 15 ..... 8:00 p.m.-9:30 p.m.

- **Psychonomic Society 2018 Early Career and Mid-Career Awards**
- **Psychonomic Society/Women in Cognitive Science Travel and Networking Award for Junior Scientists**
- **Building a More Replicable Experimental Psychology: Key Challenges**
  Hal Pashler, *University of California, San Diego*

OPENING RECEPTION

Elite A/B, First Floor
Thursday, November 15 .. Immediately Following Keynote Address

SYMPOSIA

Celestin E, Third Floor
Friday, November 16, 10:00 a.m.-12:00 p.m.
Symposium I: Generalization in Language and Memory

Celestin E, Third Floor
Friday, November 16, 1:30 p.m.-3:30 p.m.
Symposium II: Should Statistics Determine the Practice of Science, or Science Determine the Practice of Statistics?

Celestin D, Third Floor
Friday, November 16, 3:50 p.m.-5:50 p.m.
Symposium III: Leading Edge Workshop–Time for Action: Reaching for a Better Understanding of the Dynamics of Cognition

SYMPOSIA - CONTINUED

Celestin E, Third Floor
Saturday, November 17, 10:00 a.m.-12:00 p.m.
Symposium IV: Medical Image Perception and Decision Making

Celestin E, Third Floor
Saturday, November 17, 1:30 p.m.-3:30 p.m.
Symposium V: What Speech Prosody Can Tell Us About Cognition

POSTER SESSIONS

Elite A/B, First Floor

Session I
Thursday, November 15 ..... 6:00 p.m.-7:30 p.m.
Session II
Friday, November 16 ..... 12:00 p.m.-1:30 p.m.
Session III
Friday, November 16 ..... 6:00 p.m.-7:30 p.m.
Session IV
Saturday, November 17 ..... 12:00 p.m.-1:30 p.m.
Session V
Saturday, November 17 ..... 6:00 p.m.-7:30 p.m.

BUSINESS MEETING

Bolden 6, Second Floor
Saturday, November 17 ..... 5:10 p.m.-6:00 p.m.

- **Presentation of the Psychonomic Society 2018 Clifford T. Morgan Best Article Awards, Graduate Travel Awards, and J. Frank Yates Student Travel Awards**
- **Business of the Psychonomic Society**

FUTURE MEETINGS

2019 – Montréal, QC – November 14-17

2020 – Austin, TX – November 19-22

2021 – San Diego, CA – November 18-21

2022 – Washington, DC – November 17-20

2023 – San Francisco, CA – November 16-19

2024 – New York City, NY – November 21-24

PSYCHONOMIC SOCIETY®

A PSYCHONOMIC SOCIETY PUBLICATION
www.psychonomic.org

OPENING SESSION/KEYNOTE ADDRESS

Building a More Replicable Experimental Psychology: Key Challenges

Hal Pashler, ***University of California, San Diego***
Thursday, November 15, 2018, 8:00 p.m.
Celestin D/E, 3rd Floor

OPENING RECEPTION
Thursday, November 15, immediately following Keynote Address
Elite Hall, 1st Floor

TABLE OF CONTENTS

General Information ii
Hotel Maps vii
2018 Mid-Career Awards xi
2018 Early Career Awards xii
2018 Graduate Travel Awards xiii
2018 J. Frank Yates Student Travel Awards xiv
2018 Clifford T. Morgan Best Article Awards xv
Special Events xvi
In Memoriam xvii
Condensed Schedule A, sessions by time xxix
Condensed Schedule B, sessions by room xxxii
Condensed Schedule C, abstracts by time xxxiv
Spoken Sessions, Friday morning 1
Spoken Sessions, Friday afternoon 15
Spoken Sessions, Saturday morning 29
Spoken Sessions, Saturday afternoon 44
Spoken Sessions, Sunday morning 58
Poster Session I, Thursday evening 75
Poster Session II, Friday noon 127
Poster Session III, Friday evening 181
Poster Session IV, Saturday noon 235
Poster Session V, Saturday evening 289
Author Index 343
Keyword Index 365

NOTICES

Designation of Psychonomic Society Award Winners: One asterisk (*) by an author's name indicates a recipient of the Psychonomic Society's Early Career Award for 2018. Two asterisks (**) indicate a recipient of the Mid-Career Award for 2018.

VENUE/HOTEL/MEETING ROOMS

All sessions (spoken and poster) for the 2018 Psychonomic Society Annual Meeting will be held at the Hyatt Regency New Orleans, 601 Loyola Avenue, New Orleans, LA 70113, USA.

To maintain the Society's practice of no registration fee for members, it is essential that all hotel rooms reserved for the Annual Meeting be identified as such at the time of booking. To ensure you receive the specially negotiated room rate, please contact:

Hyatt Regency New Orleans
$209 USD + tax/fees (single/double) per night

Hotel Link: https://book.passkey.com/event/49000983/owner/2787/home
Phone: +1-888-421-1442

Please make your reservations no later than October 16, 2018. There is a limited number of rooms available at the hotel, so book early to secure your sleeping room reservations (rooms may be sold out well before this date). Visit the Psychonomic Society website (www.psychonomic.org/2018hotels) to make online reservations.

REGISTRATION

Registration is free to members of the Psychonomic Society and all members must register. Registration for non-members is $75. There is no registration fee for undergraduate students. Membership in the Society is inexpensive and strongly encouraged.

Registration will be located in at the Elite Registration Desk main tower, 1st floor during the following times:

Wednesday, November 14..... 4:00 p.m.-8:00 p.m.
Thursday, November 15..... 7:30 a.m.-8:30 p.m.
Friday, November 16 ..... 7:30 a.m.-6:00 p.m.
Saturday, November 17..... 7:30 a.m.-5:00 p.m.
Sunday, November 18..... 7:30 a.m.-12:00 p.m.

All attendees must register. To avoid lines onsite, you are strongly encouraged to preregister through the Psychonomic Society website (www.psychonomic.org/2018registration).

ABSTRACT AND PROGRAM BOOK

Programs will be available in print at the registration desk and as a PDF at www.psychonomic.org/2018AnnualMeeting.

MOBILE APP

A free mobile app for this year's meeting will be available for download in the Apple App Store and Google Play Store a few weeks prior to the Annual Meeting. All versions include the full program and abstracts. It is recommended that you download the mobile app before you come to the Annual Meeting. Internet service may not be available, or slow to download, in the meeting space at the Hyatt Regency New Orleans.

SPEAKER READY ROOM

Session chairs are encouraged to solicit papers from individuals in their sessions prior to the meeting and load presentations prior to the session in the speaker ready room, located in Bolden 1, on the 2nd floor.

Audiovisual support will be available in the speaker ready room to help with loading presentations during the following hours:

Friday, November 16 ..... 7:00 a.m.-8:00 p.m.
Saturday, November 17..... 7:00 a.m.-5:00 p.m.
Sunday, November 18..... 7:00 a.m.-12:00 p.m.

TRAVEL TO THE UNITED STATES

A foreign national or alien entering the U.S. is generally required to present a passport and valid visa issued by a U.S. Consular Official, unless they are a citizen of a country eligible for the Visa Waiver Program, or are a lawful permanent resident of the U.S. or a citizen of Canada.

The Visa Waiver Program allows foreign nationals from certain countries to be admitted to the U.S. under limited conditions and for a limited time without obtaining a visa. The foreign national must arrive on an approved carrier (if coming by air or sea), staying no more than 90 days, for pleasure/medical purposes/business, and be able to prove they are not inadmissible. The foreign national is still required to have a passport.

To obtain a list of countries eligible and VWP passport requirements for the Visa Waiver Program, please visit https://www.dhs.gov/visa-waiver-program-requirements.

For complete information on requirements to enter the United States, go to: https://www.usa.gov/enter-us

Citizens of Canada
Citizens of Canada traveling to the United States do not require a nonimmigrant visa if they are traveling directly from Canada for the purposes of visiting, tourism, and temporary business travel purposes. However, all Canadians entering the United States by air are required to have a valid passport. Canadians entering the United States by land or sea must have a Western Hemisphere Travel Initiative (WHTI)-compliant travel document. Additional resources for Canadian visitors to the United States can be found on the United States Embassy and Consulates in Canada website.

Requesting a Letter of Invitation from the Psychonomic Society
To request a Letter of Invitation from the Psychonomic Society, please email us at info@psychonomic.org.

TRAVEL TO NEW ORLEANS

Transportation Centers (distance to hotel)
- Union Passenger Terminal (Amtrak) – 0.3 miles
- Port of New Orleans – 3 miles
- Louis Armstrong New Orleans International Airport – 15 miles

Local Information
Information about New Orleans and the meeting can be found online at https://www.psychonomic.org/page/2018explore

Parking
For your convenience, the Hyatt Regency New Orleans offers valet services.

Short-Term Hourly Valet Rates (subject to change)
0-1 Hour - $10 USD
1-2 Hours - $15 USD
2-4 Hours - $22 USD
4-10 Hours - $30 USD
10+ Hours - $40 USD
Standard Overnight Parking - $40 + tax
Fuel Economy Vehicles Overnight - $30 +tax

In addition to the hotel's valet, there are also several nearby parking lots (fees apply), including the 1301 Girod Parking Garage that connects directly to the hotel. Contact Merit Parking at +1-504-561-0575 for confirmed pricing.

Taxis
Passengers traveling from the airport must wait in line at a taxi stand for taxi service. Taxi rides cost approximately $36 USD from the airport to the Central Business District (CBD) or French Quarter (west of Elysian Fields) for up to two (2) passengers. For three (3) or more passengers, the fare will be $15 USD per passenger.

Shared Ride Services
New Orleans has many options for Uber, Lyft, or shared shuttle services. We recommend you download all applicable apps ahead of time.

POSTER SESSIONS

All poster sessions will take place in the Elite Hall on the first floor of the Hyatt Regency New Orleans. The three evening sessions will be held in conjunction with a general reception. Authors of posters are asked to make their posters available for viewing on the following schedule:

Session	Set-up	Viewing	Author Present	Poster Teardown
I: Thursday Evening	**3:15 p.m.-3:45 p.m.**	4:00 p.m.-7:30 p.m.	6:00 p.m.-7:30 p.m.	7:30 p.m.-8:00 p.m.
II: Friday Noon	**10:15 a.m.-10:45 a.m.**	11:00 a.m.-1:30 p.m.	12:00 p.m.-1:30 p.m.	1:30 p.m.-2:00 p.m.
III: Friday Evening	**3:15 p.m.-3:45 p.m.**	4:00 p.m.-7:30 p.m.	6:00 p.m.-7:30 p.m.	7:30 p.m.-8:00 p.m.
IV: Saturday Noon	**10:15 a.m.-10:45 a.m.**	11:00 a.m.-1:30 p.m.	12:00 p.m.-1:30 p.m.	1:30 p.m.-2:00 p.m.
V: Saturday Evening	**3:15 p.m.-3:45 p.m.**	4:00 p.m.-7:30 p.m.	6:00 p.m.-7:30 p.m.	7:30 p.m.-8:00 p.m.

NOTE: Each poster must fit on one side of a 4 feet high X 8 feet wide (with a 1-inch frame around the perimeter) poster board. Posters may be electronically submitted to the FedEx office at the Hyatt Regency New Orleans at an additional cost. Visit www.psychonomic.org/page/posters for details, and suggestions on preparing your poster.

The extended viewing time will allow all interested persons to see posters of their choice and hopefully reduce the crowded conditions we have sometimes had at the poster sessions. All posters must be removed as soon as the poster session is concluded. Posters that are not removed will be discarded.

The numbering of posters this year uses the same system as last year. Abstract numbers assigned to posters are not in sequence with the numbers assigned to talks. Rather, each poster is assigned a six-digit abstract number. The first digit codes the session to which the poster has been assigned; the last three digits code the location of the poster within its session (i.e., 001-243).

EXHIBITORS

Attendees are encouraged to visit our exhibitors located in the Elite Hall at the Hyatt Regency New Orleans. Exhibit hours are:

Thursday, November 15 . . . 3:30 p.m.-10:30 p.m.

Friday, November 16 . . . . 10:00 a.m.-2:00 p.m., 4:00 p.m.-8:00 p.m.

Saturday, November 17. . . 10:00 a.m.-2:00 p.m., 4:00 p.m.-8:00 p.m.

RECEPTIONS

Opening Reception
Thursday, November 15 (immediately following the Keynote Address): approximately 9:15 p.m.-10:30 p.m.
Elite Hall A/B, 1st Floor

Diversity & Inclusion Reception
Friday, November 16: 4:30 p.m.-5:30 p.m.
Strand 10 A/B, 2nd Floor

Friday Reception & Poster Session
Friday, November 16: 5:30 p.m.-7:30 p.m. (Cash bar only)
Elite Hall, 1st Floor

Saturday Reception & Poster Session
Saturday, November 17: 5:30 p.m.-7:30 p.m. (Cash bar only)
Elite Hall, 1st Floor

COFFEE BREAKS

Complimentary coffee and tea will be available from 9:30 a.m. to 10:30 a.m. in the Celestin Foyer on Friday, Saturday, and the Strand Foyer on Sunday.

NURSING MOTHER'S ROOM

The nursing mother's room at the Hyatt Regency New Orleans is located on the fourth floor; the key is available at the main PS registration desk. The room is equipped with comfortable furniture and a private area for nursing, but no refrigerator. Attendees may not use this room for babysitting purposes.

JOGONOMICS

Join your fellow Psychonomes on a 5-mile or 5K fun run/walk. The group will meet in the lobby of the Hyatt Regency at 6:00 a.m. on Saturday, November 17, and the run will leave promptly at 6:15 a.m. Again, this year we have added a low-key route that will run lower mileage at a more relaxed rate. Organizers: Jeff Zacks and Marianne Lloyd. There is no fee, but you will be required to sign a waiver. Register and sign your waiver in advance to save time in the morning

PSYCHONOMIC TIME

Persons chairing sessions this year will be asked to keep the spoken papers schedule on times standardized against a clock at the Psychonomic Society Registration Desk. All attendees are asked to synchronize their watches to Psychonomic time.

AUDIOVISUAL EQUIPMENT FOR TALKS

LCD projectors (e.g., for PowerPoint presentations) and laptop computers (PC) will be provided in all rooms where spoken sessions are scheduled. Please bring your presentation on a USB drive. Presenters and session chairs are strongly encouraged to visit the speaker ready room in Bolden 1, 2nd floor, well in advance of their talks to review and upload presentations. Alternatively, you are encouraged to be in your session room 30 minutes prior to the beginning of that session to load your presentation. We recommend bringing two copies of your presentation in case of media failure.

Presentations must be created in **16:9** format to fit formatting of projectors used. Visit www.psychonomic.org/presentations for more information.

PHOTOGRAPHIC RELEASE

As part of your registration for the 2018 Annual Meeting, the Psychonomic Society reserves the right to use photographs and video taken during the meeting for future marketing purposes. If you do not wish to have your photograph or video used for such purposes, please contact us at the Psychonomic Society Registration Desk, located in Elite Registration Desk Main Tower, 1st Floor.

AFFILIATE MEETINGS

17th Annual Auditory Perception, Cognition, and Action Meeting (APCAM)
Thursday, November 15, 2018
8:30 a.m.-5:30 p.m.
Strand 11B, 2nd Floor
Website: www.apcam.us

Configural Processing Consortium (CPC)
Wednesday, November 14, 2018
8:00 a.m.-4:00 p.m.
Imperial 5A, 4th Floor
Website: www.configural.org

International Association for Metacognition (IAM)
Thursday, November 15, 2018
12:00 p.m.-4:00 p.m.
Strand 12 A/B, 2nd Floor
Website: http://iametacognition.wix.com/metacognition

Object Perception, Attention, and Memory (OPAM) 26th Anniversary Workshop
Thursday, November 15, 2018: 8:00 a.m.-5:00 p.m.
Celestin F/G, 3rd Floor
Website: www.opam.net

Society for Computers in Psychology (SCiP) 48th Annual Meeting
Thursday, November 15, 2018
7:30 a.m.-6:00 p.m.
Strand 7, Strand 8, and Strand 11A, 2nd Floor
Website: http://scip.ws

Society for Judgment and Decision-Making Annual Meeting (SJDM)
Friday, November 16 - Monday, November 19, 2018
Empire Ballrooms, 2nd Floor
Website: www.sjdm.org

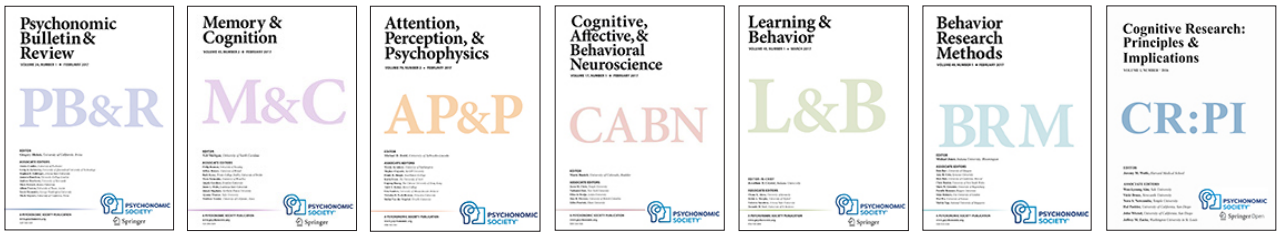
Society for Mathematical Psychology (SMP) Computational Approaches to Memory and Decision Making
Thursday, November 15, 2018
9:00 a.m.-5:00 p.m.
Strand 10A, 2nd Floor
Website: www.mathpsych.org

SPARK Society
Thursday, November 15, 2018
2:00 p.m.-4:00 p.m.
Strand 3, 2nd Floor

Tactile Research Group (TRG) Annual Meeting
Thursday, November 15, 2018
9:00 a.m.-4:00 p.m.
Strand 4, 2nd Floor
Website: trg.objectis.net

Women in Cognitive Science (WiCS) 18th Annual Meeting
Thursday, November 15, 2018
4:00 p.m.-7:00 p.m. (Reception at 6:00 p.m.)
Celestin H for meeting; Celestin Foyer for reception & mentoring sessions
Website: www.womenincogsci.org/

PSYCHONOMIC SOCIETY JOURNALS



The Psychonomic Society publishes seven highly respected, peer-reviewed journals covering all aspects of cognitive and experimental psychology. Select a Psychonomic Society journal to showcase your science and to ensure that your research delivers the maximum impact to the global scientific community. Members receive free online access to all seven Psychonomic Society journals. *https://www.psychonomic.org/page/journals*

2018 PROGRAM

There were 1,543 total submissions and 1,523 valid submissions. Of the 1,523 papers that were placed on the program, 300 are spoken papers and 1,223 are posters. In addition, there were four invited symposia, and one symposium that resulted from the Psychonomic Society Leading Edge Workshop program.

PROGRAM HISTORY

Year – Site	Valid Submissions
2018 – New Orleans	1,523
2017 – Vancouver	1,438
2016 – Boston	1,514
2015 – Chicago	1,306
2014 – Long Beach	1,300
2013 – Toronto	1,264
2012 – Minneapolis	1,054
2011 – Seattle	1,037
2010 – St. Louis	928

2018 PROGRAM COMMITTEE

- Edward Awh, Chair, University of Chicago
- Marc Brysbaert, USA Ghent University
- Laura Carlson, University of Notre Dame
- Stephen Mitroff, George Washington University
- Kristi Multhaup, Davidson College
- Duane Watson, Vanderbilt University
- R. Reed Hunt, University of Mississippi, ex officio

PROGRAM AND CONFERENCE ORGANIZATION

The Secretary, R. Reed Hunt, has the responsibility for organizing the program and the Program Committee reviews the schedule. They do so with the indispensable help of Lou Shomette, Executive Director; Amy Bucaida, Meeting Planner; Brian Weaver, Communications & Marketing Manager; Nan Knuteson, Membership Coordinator and Registrar; Kathy Kuehn, Production Director; Cynthia Coates, Graphic Artist; Erica Koconis, Accountant; and Bill Stoeffler, Account Director.

OFFICERS OF THE SOCIETY

Chair	John Dunlosky, Kent State University
Past Chair	Aaron Benjamin, University of Illinois
Chair-Elect	Laura Carlson, University of Notre Dame
Secretary	R. Reed Hunt, University of Mississippi
Treasurer	Marianne Lloyd, Seton Hall University
Executive Director	Louis Shomette, Psychonomic Society

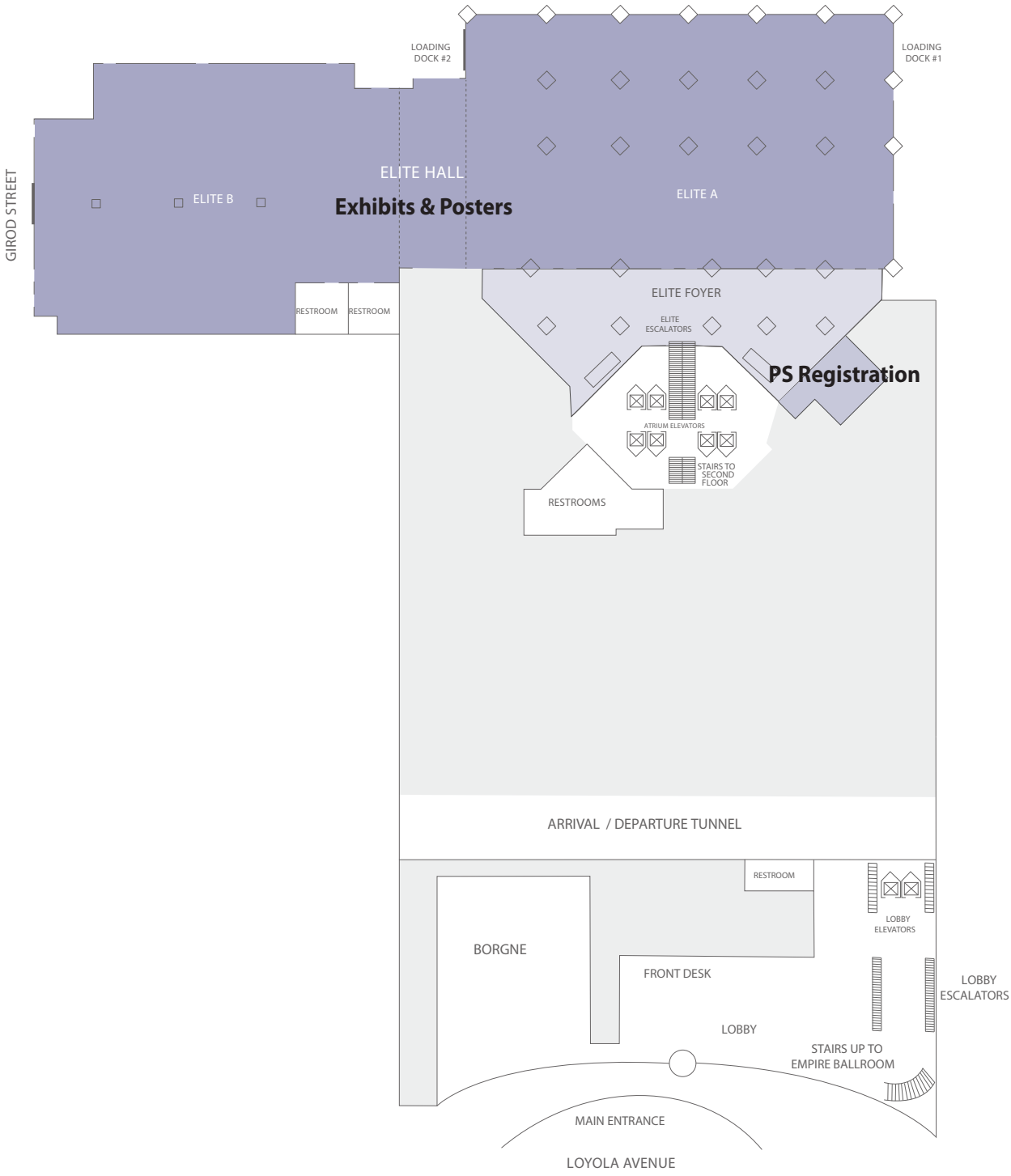
2018 GOVERNING BOARD

- Edward Awh, University of Chicago
- Teresa Bajo, University of Granada
- Aaron Benjamin, University of Illinois at Urbana-Champaign
- Marc Brysbaert, Ghent University
- Laura Carlson, University of Notre Dame
- John Dunlosky, Kent State University
- Fernanda Ferreira, University of California, Davis
- Penny M. Pexman, University of Calgary
- James Pomerantz, Rice University
- Patricia Reuter-Lorenz, University of Michigan
- Valerie Reyna, Cornell University
- Duane Watson, Vanderbilt University
- R. Reed Hunt, University of Mississippi, ex officio
- Marianne Lloyd, Seton Hall University, ex officio
- Louis Shomette, Executive Director, ex officio

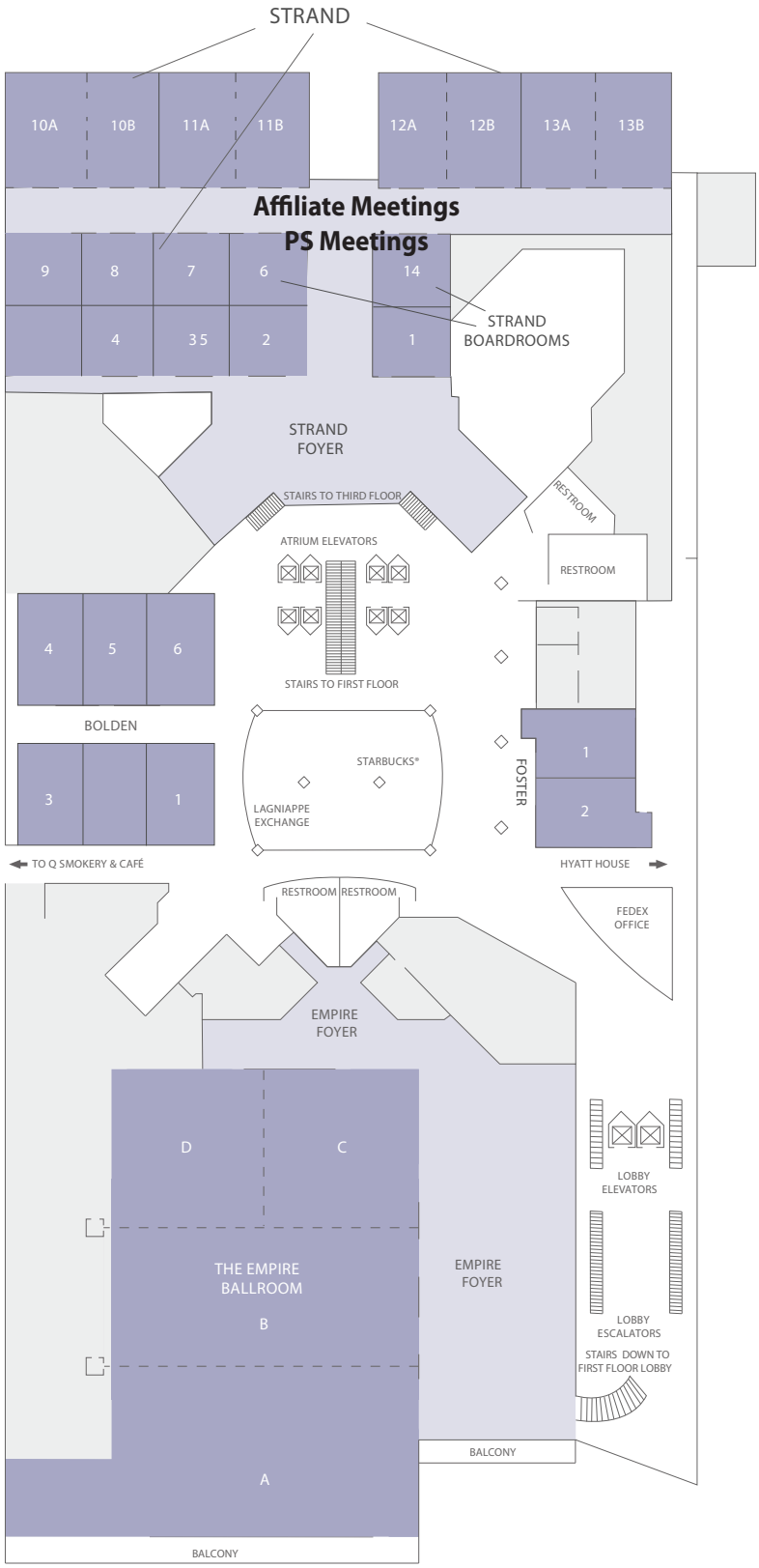
PSYCHONOMIC SOCIETY STATEMENT ON HARASSMENT

The Psychonomic Society is an inclusive and welcoming organization, and our meeting should reflect those values. Conference attendees and visitors should enjoy freedom of speech, freedom of thought, and freedom from harassment of all kinds. Recent events in the media remind us that academic settings are ones where we must be especially vigilant. As a scientific society, we do not want to police behavior, nor do we wish to dampen the professional and personal interactions that are so important to our meeting. But we do encourage members to take into account others' perspectives and consider how a question, comment, or invitation might be received when there is a power differential between parties. No attendee should feel vulnerable to harassment at our meetings, or feel that they are enduring a climate of fear or hostility. Let's all work together to ensure that our values of inclusion, respect, and professionalism are ones that are enjoyed by all of our members and attendees.

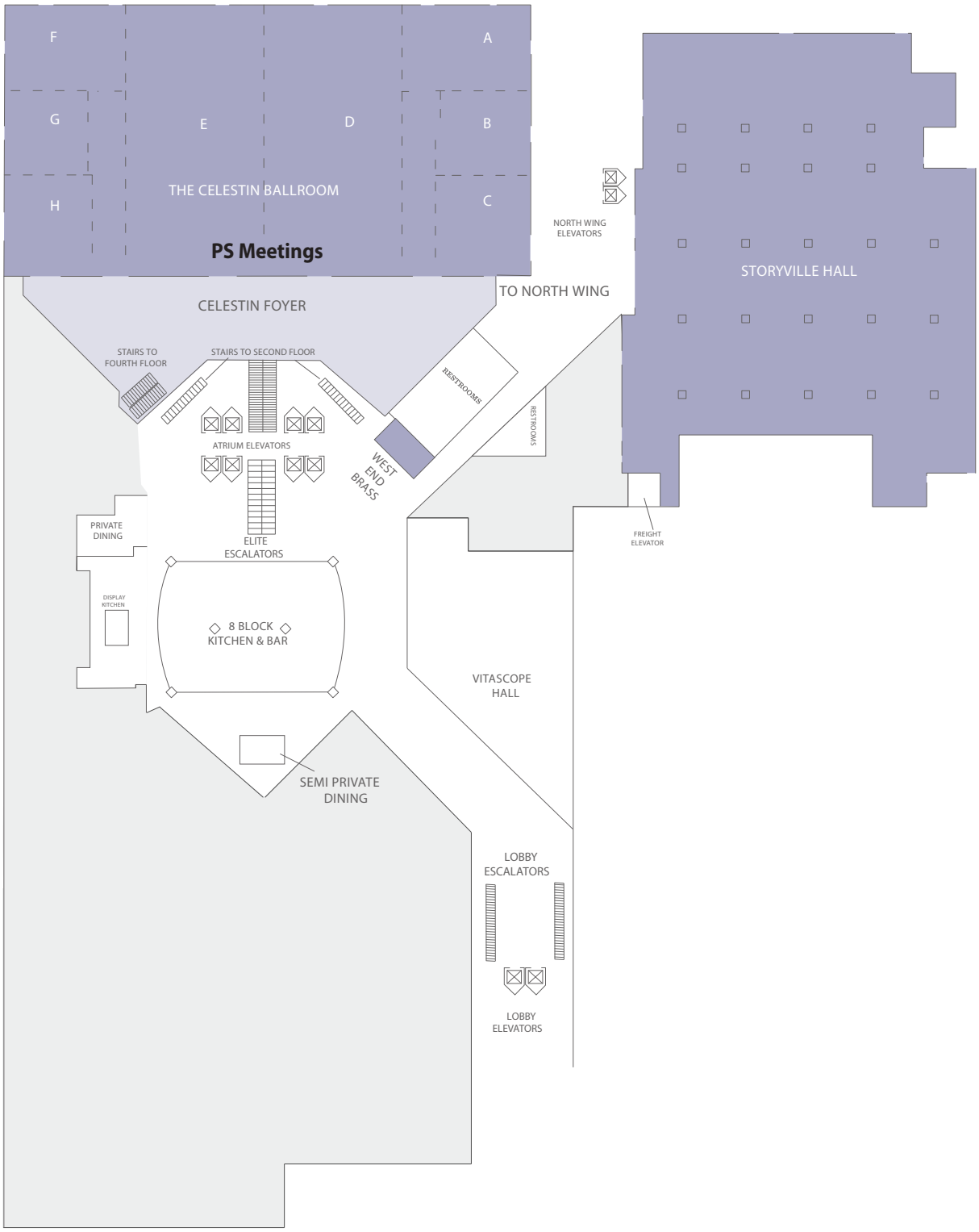
HYATT REGENCY NEW ORLEANS HOTEL: FLOOR PLAN LEVEL ONE



HYATT REGENCY NEW ORLEANS HOTEL: FLOOR PLAN LEVEL TWO



HYATT REGENCY NEW ORLEANS HOTEL: FLOOR PLAN LEVEL THREE



HYATT REGENCY NEW ORLEANS HOTEL: FLOOR PLAN LEVEL FOUR

The Psychonomic Society Announces the Recipients of the

INAUGURAL 2018 MID-CAREER AWARD

The newly created Psychonomic Society Mid-Career Award is given for exceptional contributions to the field of experimental and cognitive psychology and related areas by an individual who is currently in the middle of their career. The purpose is to raise the visibility of our science and of our very best mid-career scientists within the field, within the awardees' institutions, in the press, and in the larger community. Many universities are carefully scrutinizing departments and programs in deciding upon the deployment of limited resources, and among the most important criteria are those that indicate academic and scientific quality.

2018 Awards Committee:
Penny M. Pexman, chair; Teresa Bajo, Aaron Benjamin, Marc Brysbaert, Tania Lombrozo, Evan Risko, Duane Watson, and Jessica Witt.

Michael Jacob Kahana

University of Pennsylvania, USA

Michael Jacob Kahana is a professor of psychology and director of the Computational Memory Lab at the University of Pennsylvania. His work combines behavioral, neural, and computational approaches to the study of human memory. Kahana received a PhD from the University of Toronto in 1993 under the mentorship of Bennet B. Murdock and Endel Tulving who inspired his work to develop a computational framework that could explain Tulving's conception of mental time travel using a distributed, associative memory model. His postdoctoral training at Harvard University was under the mentorship of William K. Estes. Before joining the faculty at Penn in 2004, Kahana was a member of the psychology department at Brandeis University. He is the recipient of the Troland Research Award and Howard Crosby Warren Medal. His 2012 *Foundations of Human Memory* provides an introduction to the interplay between theory and data in the laboratory study of human memory.

Sharon L. Thompson-Schill

University of Pennsylvania, USA

Sharon L. Thompson-Schill is the Christopher H. Browne Distinguished Professor of Psychology at the University of Pennsylvania, where she is currently the chair of the Department of Psychology and the founding director of MindCORE, Penn's hub for the integrative study of the mind. Thompson-Schill's lab studies the biological bases of human cognitive systems in both healthy and brain-damaged individuals. She received her PhD from Stanford University in 1996 and is the recipient of the Searle Scholars Award, the Young Investigator Award from the Cognitive Neuroscience Society, the Women in Cognitive Science Mentorship Award, a James McKeen Cattell Fund Fellowship, the Trustees Council of Penn Women Advising Award, and Penn's highest teaching honors, the Lindback Award for Distinguished Teaching and the Provost's Award for Distinguished PhD Teaching and Mentoring.

The Psychonomic Society Announces the Recipients of the

2018 EARLY CAREER AWARD

The Psychonomic Society Early Career Award recognizes exceptional research accomplishments among our members. Nominees must have completed their terminal degree (typically PhD) within the last ten years and must be a Fellow or Member of the Society. Nominations are made by members of the Society, and each candidate must be endorsed by two members.

Up to four awards can be made each year. One nominee, whose research is closest to the areas of perception and attention, will receive the Steven Yantis Early Career Award. Selection of the awards is made by a committee consisting of members of the Governing Board and other members of the Society.

2018 Awards Committee:
Penny M. Pexman, chair; Teresa Bajo, Aaron Benjamin, Marc Brysbaert, Tania Lombrozo, Evan Risko, Duane Watson, and Jessica Witt.

Laura Mickes

Royal Holloway, University of London, United Kingdom

Dr. Mickes's research has focused on enhancing understanding of basic and applied aspects of recognition memory. Her basic research integrated dual process theory and signal detection theory, and her applied research successfully challenged longstanding and seemingly settled notions about the proper way to conduct police lineups and about the relationship between eyewitness confidence and accuracy. Her work has already had a significant influence on real-world policy, and it underscores the often-unrealized potential of bridging basic and applied research.

Karl Szpunar

University of Illinois at Chicago, USA

Dr. Szpunar's research program uses novel behavioral and neuroimaging techniques to identify adaptive uses on memory in future-oriented cognition and education. His research on future thinking aims to elucidate mechanisms that give rise to prospective cognitions about the personal and collective future. His educational research is focused on developing interventions that can reduce inattentive mind wandering and optimize learning from extended study sequences such as classroom lectures.

Edward Vul

University of California, San Diego, USA
STEVEN YANTIS EARLY CAREER AWARD RECIPIENT

Dr. Vul has been an associate professor at the University of California, San Diego Psychology Department since receiving his PhD in Cognitive Science at MIT. His research uses computational models and behavioral experiments to formally characterize how people can exhibit rich, adaptive behavior in the face of incomplete and uncertain information in everyday life.

Liane Young

Boston College, USA

Dr. Young uses methods from social psychology and neuroscience (i.e., functional neuroimaging and transcranial magnetic stimulation), to investigate moral judgment and social cognition. Recent research in Young's lab has focused on the psychological and neural basis of distinct moral norms (e.g., harm, purity) and the role of theory of mind across social contexts (e.g., cooperation, competition). Ongoing work examines human virtue and the role of reason in moral judgment and decision-making.

The Psychonomic Society Announces the Recipients of the

2018 GRADUATE TRAVEL AWARD

The Psychonomic Society Program Committee selected 20 Graduate Travel Awards based on the quality of the abstracts submitted by Graduate Student Members of the Society for the 2018 Annual Meeting in New Orleans, Louisiana, USA.

Each recipient receives a travel stipend of $1,000 USD and will be recognized at the Business Meeting in Bolden 6, 2nd Floor, on Saturday, November 17, 2018, at 5:00 p.m.

2018 Program Committee: Edward Awh, Marc Brysbaert, Laura Carlson, Stephen Mitroff, Kristi Multhaup, Duane Watson, and Reed Hunt.

Please join the Program Committee in congratulating these recipients. Visit www.psychonomic.org/awards for more information.

Melisa Akan
University of Illinois at Urbana-Champaign, USA
Abstract #4162: The Effect of Prior Familiarity and Conceptual Knowledge on Face Recognition Accuracy

Johnathan E. Avery
Indiana University, USA
Abstract #5156: Representation and Retrieval in Semantic Memory

Christina Bejjani
Duke University, USA
Abstract #5052: Causal Transfer of Specific Attentional Control States

Chloe Callahan-Flintoft
Pennsylvania State University, USA
Abstract #3020: Exploring the Influence of Feature Autocorrelation on Attentional Sampling

Shauna P. A. de Long
Kent State University, USA
Abstract #1025: Does Learning the Meaning of a Word Make Spelling Easier? Evidence from Incidental Word Learning During Reading

Blake L. Elliott
Arizona State University, USA
Abstract #2205: Neural Correlates Underlying the Effect of Value on Recognition Memory Encoding

Anna Foerster
University of Würzburg, Germany
Abstract #5051: Better Safe Than Sorry: Response Monitoring in Dishonesty

Nathaniel R. Greene
University of Missouri, USA
Abstract #5093: Age-Related Changes Across Time in Verbatim and Gist Memory for Face-Scene Pairs

Chun-Yuan Huang
National Cheng Kung University, Taiwan
Abstract #5042: System Factorial Technology Provides New Insights on Hybrid Search

Pascal J. Kieslich
University of Mannheim, Germany
Abstract #1234: Design Factors in Mouse-Tracking: What Makes a Difference?

Haena Kim
Texas A&M University, USA
Abstract #2100: Neural Mechanisms of Reduced Inhibitory Control Following Associative Reward Learning

Krista D. Manley
Iowa State University, USA
Abstract #4161: When Less Is More: Showing Masked Faces in a Lineup Enhances Identification of a Masked Face

Matthew P. McCurdy
University of Illinois at Chicago, USA
Abstract #1055: Theories of the Generation Effect and the Impact of Generation Constraint: A Meta-Analytic Review

Casey L. Roark
Carnegie Mellon University, USA
Abstract #3175: Factors Influencing Incidental Category Learning

Tomer Sahar
Tel-Aviv University, Israel
Abstract #5024: Modeling Posner's Validity Effect Reveals Less Guessing, but Not Enhanced Precision

Julia S. Soares
University of California, Santa Cruz, USA
Abstract #4238: Volitional Photography Inflates Metamemory Confidence but Still Causes an Impairment in Memory

Chunyue Teng
The George Washington University, USA
Abstract #1215: Uncovering the Shared Representation Between Visual Working Memory (VWM) and Perception: Neural Tuning Curves

Ngoc-Han Tran
University of Amsterdam, The Netherlands
Abstract #1108: Empirical Priors for Evidence Accumulation Models

Christine E. Weber
University of South Carolina, USA
Abstract #2117: The Role of Liking in Evaluative Conditioning of Affective States

Laura Werner
University of Nevada, Las Vegas, USA
Abstract #4215: Forgetting Distractors: Evidence of Inhibition and Decay in Working Memory Depends on Test Type

The Psychonomic Society Announces the Recipients of the

2018 J. FRANK YATES STUDENT TRAVEL AWARD

SUPPORTING DIVERSITY & INCLUSION IN COGNITIVE PSYCHOLOGY

The Psychonomic Society Diversity & Inclusion Committee selected six J. Frank Yates Student Travel Awards based on the quality of the abstracts submitted by Graduate Student Members of the Society for the 2018 Annual Meeting in New Orleans, LA, USA. Each recipient receives a travel stipend of $1,000 USD and will be recognized at the Business Meeting in Bolden 6, 3rd Floor, on Saturday, November 17, 2018 at 5:00 p.m.

Diversity and Inclusion Committee: Valerie Reyna, chair; Laura Carlson, Ivy Defoe, Jean Fox Tree, Alejandro Lleras, Penny M. Pexman, and Travis Seymour.

Please join the Diversity & Inclusion Committee in congratulating these recipients. Visit www.psychonomic.org/awards for more information.

Breanna Crane
Vanderbilt University, USA
Abstract #3046: Does Time Pressure Increase Myopic Choice?

Babak Hemmatian
Brown University, USA
Abstract #3078: Explaining Without Information: The Role of Label Entrenchment

Reina Mizrahi
University of California, San Diego, USA
Abstract #1084: Two Languages or One: Language as a Cue for Talker Identification in 3- To 5-Year Old Children

Jonathan Rann
University of South Carolina, USA
Abstract #2228: Effects of Conversation on Driving Simulator Performance

José A. Rodas
University College Dublin, United Kingdom/ University of Guayquil, Ecuador
Abstract #1002: Supporting Evidence that Response and Attentional Inhibition Are Not Sharing the Same Capacity in an Ecuadorian Sample

Tanja C. Roembke
University of Iowa, USA
Abstract #1031: Modeling the Effects of Similarity and Variability in a Complex Task: Effects of Blocking Without Attention?

Psychonomic Society

2018 CLIFFORD T. MORGAN BEST ARTICLE AWARD RECIPIENTS

Sponsored by Springer

The Psychonomic Society Clifford T. Morgan Best Article Award recognizes the best article published in each of the Psychonomic Society's journals in 2018. Selections are made by the editorial team of each journal. Award recipients (the lead author) will receive a certificate and honorarium of $1,000 USD and will be recognized at the Business Meeting in Bolden 6, 2nd Floor, on Saturday, November 17, 2018, at 5:00 p.m.

Attention, Perception, & Psychophysics (Editor: Michael Dodd)
Daryl Fougnie, Jurnell Cockhren, René Marois
"A common source of attention for auditory and visual tracking"
doi: 10.3758/s13414-018-1524-9

Behavior Research Methods (Editor: Michael Jones)
Geoff Hollis, Chris Westbury
"When is best-worst best? A comparison of best-worst scaling, numeric estimation, and rating scales for collection of semantic norms"
doi.org/10.3758/s13428-017-1009-0

Cognitive, Affective, & Behavioral Neuroscience (Editor: Marie Banich)
Elisabeth Schreuders, Eduard T. Klapwijk, Geet-Jan Will, Berna Güroglu
"Friend versus foe: Neural correlates of prosocial decisions for liked and disliked peers"
doi.org/10.3758/s13415-017-0557-1

Cognitive Research: Principles & Implications (Editor: Jeremy Wolfe)
Jet G. Sanders, Rob Jenkins
"Individual differences in hyper-realistic mask detection"
doi.org/10.1186/s41235-018-0118-3

Learning & Behavior (Editor: Jonathon Crystal)
Ludwig Huber, Natálie Popavová, Sabine Riener, Kaja Salobir, Giulia Cimarelli (in press, 2018)
"Would dogs copy irrelevant actions from their human caregiver?"
doi: 10.3758/s13420-018-0336-z

Memory & Cognition (Editor: Neil Mulligan)
Caoimhe Harrington Stack, Arie N. James, Duane G. Watson
"A failure to replicate rapid syntactic adaptation in comprehension"
doi.org/10.3758/s13421-018-0808-6

Psychonomic Bulletin & Review (Editor: Gregory Hickok)
Nadine Lavan, A. Mike Burton, Sophie K. Scott, Carolyn McGettigan
"Flexible voices: Identity perception from variable vocal signals"
doi: 10.3758/s13423-018-1497-7

Visit *https://www.psychonomic.org/page/clifford_t_morgan* for more information and previous recipients.

The Psychonomic Society

2018 SPECIAL EVENTS

Encouraging Future Scientists: Supporting Undergraduates at Psychonomics (UP)
Chaired by Ruthann Thomas, Hendrix College; Sharda Umanath, Claremont McKenna College; Jen Coane, Colby College; Katherine White, Rhodes College; Brooke Lea, Macalester College
Friday, November 16, 12:00 p.m.-1:30 p.m.
Bring your lunch to Strand 12 A/B, 2nd floor

This lunchtime workshop will welcome and support undergraduate students as they navigate the conference and explore potential careers in cognitive psychology. This session includes (a) "Psychonomics 101", an overview of the conference with a focus on networking at coffee, drinks, dinners, and other opportunities, (b) a career development panel with a question and answer session, and (c) networking time with panelists, recent recipients of graduate fellowships, and icons in the field. The career development panel will feature speakers and panelists from a variety of backgrounds and at different stages in their careers, including graduate students, postdoctoral fellows, academic faculty, and cognitive psychologists working in industry and policy. This session is designed for undergraduates and for faculty who mentor undergraduates. Early graduate students and recent recipients of graduate fellowships are also welcome and encouraged to attend.

Diversity & Inclusion Reception
Supported by the Psychonomic Society Diversity & Inclusion Committee
Friday, November 16, 4:30 p.m.-5:30 p.m.
Strand 10 A/B, 2nd Floor

As the preeminent society for the experimental study of cognition, the Psychonomic Society celebrates scientific merit and the diversity of researchers in the field and the Society. Please join members of the Governing Board and the Diversity & Inclusion Committee for a wine and cheese reception open to all scientists, including graduate students, early- and mid-career investigators, and senior researchers.

Psychonomics Digital Activities
Chaired by Stephan Lewandowski, University of Bristol, and Cassandra Jacobs, University of California, Irvine
Saturday, November 17, 12:00 p.m.-1:30 p.m.
Bring your lunch to Strand 12 A/B, 2nd floor

The Psychonomic Society has been committed to enhancing its online digital profile through social media, in particular Twitter and the Society's Featured Content blog (featuredcontent.psychonomic.org). Although those initiatives have resulted in considerable scholarly discussion, for example through the series of "digital events" (http://featuredcontent.psychonomic.org/digital-events/), the power of social media is perhaps underappreciated by the membership. The purpose of this workshop is to expand the Society's social-media engagement and to acquaint the membership with web-based or app-based applications that can facilitate public engagement, scholarly presentations, and teaching. Most of the workshop will involve hands-on exposure to a number of smart online apps and websites that provide productivity tools and opportunities for audience engagement. The workshop should broaden attendees' understanding of the many free (or at least affordable) tools that are offered by the internet for scholars, teachers, and communicators.

Graduate Student Social
Supported by the Psychonomic Society
Friday, November 16, 9:00 p.m.-12:00 midnight
Dave & Buster's, 1200 Poydras St, Unit 601, New Orleans, LA 70113

Kick back and relax as you meet other graduate students at Dave & Buster's, where you'll enjoy light hors d'oeuvres and one drink ticket will be handed out per person (limited availability). Bring appropriate ID and PS name badge. You must be 21 years old to consume alcoholic beverages in New Orleans.

IN MEMORIAM

Psychonomic Society Members
July 1, 2017 - July 1, 2018

Anne Treisman (1935-2018)

Anne Treisman died February 9, 2018, at age 82; she had been in declining health for the past few years. Anne was a towering figure in the field of attention. Anne taught at Oxford, University of British Columbia, Berkeley, and Princeton. Her early work shaped our understanding of auditory attention with her dichotic listening experiments and Attenuation Theory. When she turned to visual attention, her visual search experiments and her seminal Feature Integration Theory propelled decades of research. Treisman was elected to the Royal Society of London in 1989, the US National Academy of Sciences in 1994, and was the recipient of the 2009 Grawemeyer Award. In 2013, Treisman received the National Medal of Science from President Obama. She was at once a rigorous and a generous colleague and mentor and will be greatly missed. Anne is survived by her husband, Daniel Kahneman, and her children and grandchildren. • *written by Jeremy Wolfe*

Jerry Fodor (1935-2017)

Jerry Fodor passed away on November 29, 2017, at age 82. Across his career, as a faculty member first at MIT, then at CUNY, and, finally, at Rutgers, Jerry consistently offered up seminal thinking that spanned and greatly impacted both philosophy and cognitive science. Among his many contributions, his 1975 The Language of Thought continues to shape how we understand mental representations and his 1983 The Modularity of Mind is a landmark for articulating fundamental questions about the functional architecture of the mind and brain. In addition to his outsized influence on modern cognitive science and cognitive neuroscience, Jerry had a wit and personality to match: He was a very engaging speaker and his writing is highly readable. Jerry once famously remarked "On my bad days, I sometimes wonder what philosophers are for." On his good days, which were many, Jerry demonstrated exactly what philosophers are for: challenging our assumptions and providing insight into the big questions. • *written by Michael Tarr*

Elizabeth Deutsch Capaldi Phillips (1945-2017)

Betty Capaldi Phillips passed away on September 23, 2017, at 72. Betty enjoyed a remarkable career. After receiving her PhD at the University of Texas, she rose through the ranks to professor at Purdue University, becoming department head and associate dean of the graduate school. She later served as provost of three universities (Florida, Buffalo, and Arizona State). Betty's research centered on motivational effects in eating, studied in rats and humans. She served on the Psychonomic Society governing board (1992-1997), and as president of the Association for Psychological Science and the Midwestern Psychological Association. Betty was a highly effective administrator wherever she went. When she retired as provost at ASU, she created an entertaining and educational PBS TV show, Eating Psychology with Betty. • *written by Henry L. Roediger, III*

To read the obituaries of the members above, please visit our website at www.psychonomic.org/obituaries.

The Psychonomic Society would like to honor members by listing obituaries on its website.

If you know of a member of our community who has recently passed away,
please contact Colin MacLeod at cmacleod@uwaterloo.ca with information.

The 17th Annual Auditory Perception, Cognition, and Action Meeting

Join Us

Date:	Thursday, November 15, 2018
Location:	Hyatt Regency New Orleans Strand 11B, 2nd Floor
Registration:	8:00 a.m. outside room entrance
Time:	8:30 a.m. - 5:30 p.m.

Organizers

Timothy Hubbard (chair)
Laura Getz (co-chair)
Devin McAuley
Kristopher Patten
Peter Pfordresher
Julia Strand

Who We Are

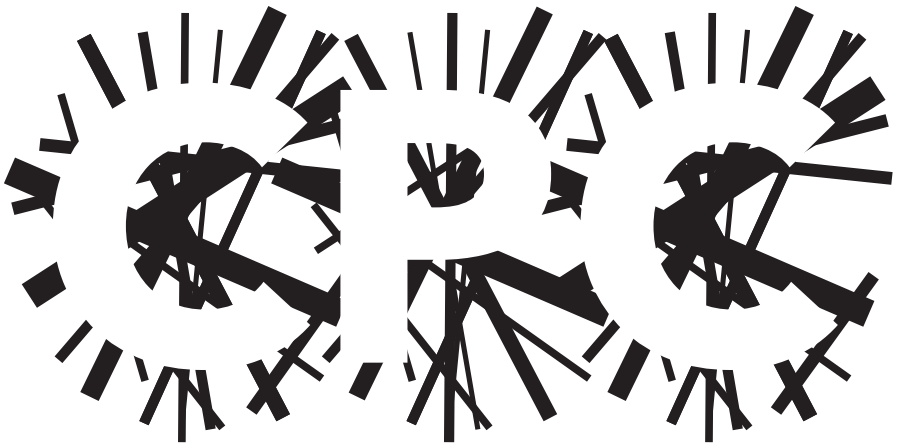
The goal of APCAM is to bring together researchers from various theoretical perspectives to present focused research on auditory cognition, perception, and aurally guided action. APCAM is a unique meeting in its broad inclusion of basic and applied research that targets multiple levels of processing, theoretical perspectives, and methodologies.

APCAM is supported in part by the Auditory Perception, Cognition, and Action Research Foundation, and accepted abstracts will receive consideration for invitation to submit a manuscript for the following year's annual issue of *Auditory Perception & Cognition* highlighting work from APCAM.

For more information, including a call for abstracts, see www.apcam.us
Abstract Submission Deadline: September 17, 2018

HYATT REGENCY NEW ORLEANS

New Orleans, Louisiana, USA



2018 Configural Processing Consortium

www.configural.org

Wednesday, November 14, 2018
8:30 a.m. - 5:30 p.m.

The Configural Processing Consortium (CPC) is an annual workshop bringing together researchers in configural processing. We aim to tackle deep issues underpinning perceptual organization, cognition, and action, as well as the most cutting edge theoretical and experimental research on configural topics. Although vision typically dominates, our interests include all modalities.

Each year, we seek to both define the major problems underlying the field of configural processing and to develop more unified ways of approaching these problems.

Organizing Committee

Mary Peterson (President 2016-2019)
Karen Schloss (Secretary/Treasurer)
Julie Markant (Local Host)

Leslie Blaha, Ami Eidels, Joseph Houpt, Ruth Kimchi, James Pomerantz, James Townsend

Funding and Support

PSYCHONOMIC SOCIETY®

Tulane University
Department of Psychology

Contact: Karen Schloss (kschloss@wisc.edu)

International Association of Metacognition

2018 BIANNUAL MEETING

Join Us

Date: Thursday, November 15, 2018

Location: Hyatt Regency New Orleans
Strand 12 A/B, 2nd Floor

Time: 12:00 p.m. - 4:00 p.m.

Keynote: Aaron S. Benjamin
University of Illinois at Urbana-Champaign

The Study of Metacognition

Research on metacognition involves the study of what people know about their own cognition. Approaches to investigating metacognition include cognitive experiments, the study of individual differences, neuroimaging, educational applications, and computational modeling, and includes special populations defined by neuropsychological, clinical, life-span, and developmental dimensions.

Within cognitive psychology, the field of metacognition research has grown substantially in recent years. A scientific understanding of "cognition in the wild" will ultimately require an appreciation not just of the abilities and proclivities of cognitive agents, but also the metacognitive monitoring and control processes that guide the development and refinement of those skills and behaviors.

Organizers

Colleen Kelley
Nate Kornell

opam:26

New Orleans, Louisiana

Join us in New Orleans to celebrate outstanding research by graduate and post-doctoral scientists at the annual workshop for Object Perception, Attention, and Memory.

Thursday, November 15, 2018
Hyatt Regency New Orleans
Celestin F & G, 3rd Floor
7:30 a.m. - 5:00 p.m.

Keynote address by
Dr. Wei Ji Ma

Visit www.opam.net for more details.

Organizers:
Caitlin Mullin
Briana Kennedy
Steve Walenchok
Yelda Semizer

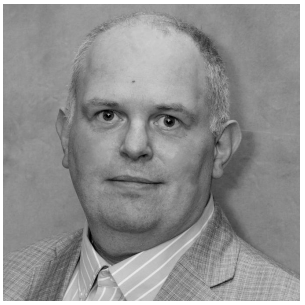
The 48th Annual Meeting of the Society for Computers in Psychology

2018 Presidential Symposium Theme: *One Law to Rule Them All: Statistical Learning as Psychological Explanation*
Thursday, November 15, 2018, 9am – 6pm, Room Strand 11A
Hyatt Regency New Orleans • New Orleans, Louisiana

Keynote:

Dr. Harald Baayen
Department of Linguistics
University of Tübingen
Throwing off the shackles of the morpheme with simple linear mappings

President's symposium:



Dr. Marc Brysbaert
Department of Experimental Psychology
Ghent University
Big data in language research: New findings, new challenges

Dr. Paul Thagard
Department of Philosophy
University of Waterloo
How does current AI measure up to human intelligence?

For more information, visit: www.scip.ws

SOCIETY FOR JUDGMENT AND DECISION MAKING

November 17-19, 2018 at the Hyatt Regency New Orleans

On-site registration November 17th at 8.00 am

The Society for Judgment and Decision Making is an interdisciplinary academic organization dedicated to the study of normative, descriptive, and prescriptive theories of judgments and decisions. Its members include psychologists, economists, organizational researchers, decision analysts, and other decision researchers. The Society's primary event is its Annual Meeting, at which Society members present their research. It also publishes the journal Judgment and Decision Making.

For more information, including registration fees and timetable, see www.sjdm.org

CURRENT TRENDS IN MATHEMATICAL PSYCHOLOGY

A symposium organized by the Society for Mathematical Psychology
Hosts: Clintin Davis-Stober, Pernille Hemmer

Thursday, November 15, 2018

The Society for Mathematical Psychology promotes the advancement and communication of research in mathematical psychology and related disciplines. Mathematical psychology is broadly defined to include work of a theoretical character that uses mathematical methods, formal logic, or computer simulation.

Symposium Schedule

9:00	*Opening remarks*
9:05-10:05	Session I: Modeling episodic memory
10:05	*Break until 10:35*
10:35-11:15	Session I continued: Modeling episodic memory
11:15	*Lunch until 13:00*
13:00	*Poster session until 14:15*
14:15-15:30	Session II: Modeling decision making

Inaugural Meeting of the SPARK Society

All Are Welcome

Date: Thursday, November 15, 2018

Time: 2:00 p.m. - 4:00 p.m.

Location: Hyatt Regency New Orleans
Strand 3, 2nd Floor

Panelists & Organizers:

Ayanna Thomas - Tufts University
Jean E. Fox Tree - University of California Santa Cruz
Alejandro Lleras - University of Illinois Urbana-Champaign
Duane Watson - Vanderbilt University

The aims of the SPARK Society are to increase the representation of people of African, Latinx, and Native American heritage in cognitive psychology, to educate the broader community about attracting and retaining underrepresented minority scholars in cognitive psychology, and to mentor members of these communities at all stages of their careers. This inaugural meeting of the SPARK Society will feature a panel on navigating academia as a scholar from an underrepresented minority group.

For more information, email duane.g.watson@vanderbilt.edu

Tactile Research Group

Join us for our annual meeting

to be held on

Thursday, November 15, 2018

at the Hyatt Regency New Orleans

Strand 4, 2nd Floor

from 9 a.m. to 5 p.m.

From its humble beginning as a handful of colleagues sitting on beds in a hotel room discussing research on the perception of touch, the TRG has become an international collection of over 100 people conducting research on a wide variety of topics related to tactile perception. Our members come from both academia and industry and span a wide range of exciting topics including tactile acuity in the blind, haptic interfaces for driving and aviation, simulation of object texture in VR, sensory integration, synesthesia and haptic space perception.

The purpose of the TRG is to facilitate interaction between tactile researchers and to provide a venue to share new research findings. This is primarily achieved through the TRG annual meeting held in conjunction with the meeting of the Psychonomic Society.

Your organizers,

Brendan Stanley and Kaian Unwalla

For more information or to be added to our mailing list,
email: tactileresearchgroup@gmail.com

The Whys and Hows of Sexual Harassment: What Organizations Should be Doing

Vicki Magley
vicki.magley@uconn.edu
University of Connecticut

Sponsored by Women in Cognitive Science*

Thursday, November 15, 2018

Meeting: 4-6 pm; Location: Celestin H
Social Hour & Speed Mentoring: 6-7 pm; Location: Celestin Foyer D-H

Sexual harassment is more likely to occur within an organizational context in which women are in the minority and are in less powerful positions (*job-gender context*) and in which sexual harassment is tolerated (*organizational climate*; c.f., Fitzgerald, Drasgow, Hulin, Gelfand & Magley, 1997). Understanding why sexual harassment occurs is of great importance for how organizations might prevent sexual harassment, as well as how they can (and should) appropriately respond to reports of harassment in an effort to alleviate the negative consequences of such mistreatment.

Reference

Fitzgerald, L.F., Drasgow, F., Hulin, C.L., Gelfand, M.J., & Magley, V.J. (1997). The antecedents and consequences of sexual harassment in organizations: A test of an integrated model. *Journal of Applied Psychology, 82*, 578-589.

Discussion and Audience Q&A to Follow Until 6 pm
Social Hour and Speed Mentoring from 6-7 pm

*** WiCS is affiliated with the Psychonomic Society and its activities are funded by the Perception Action and Cognition program at the National Science Foundation.**

Find us on:
http://www.womenincogsci.org/
Twitter @WomenInCogSci
https://www.facebook.com/WomenInCognitiveScience/

THURSDAY EVENING, NOVEMBER 15, 2018

POSTER SESSION I ..... 4:00 PM-7:30 PM Elite A
(Author present between 6:00 PM-7:30 PM)

Attention I (1001-1020)
Reading (1021-1044)
Human Learning and Instruction I (1045-1068)
Bilingualism I (1069-1090)
Decision Making (1091-1112)
Discourse Processes (1113-1125)
Emotion and Cognition I (1126-1147)
Letter/Word Processing I (1148-1167)
False Memory I (1168-1183)
Recall I (1184-1200)
Working Memory I (1201-1223)
Sensation and Perception I (1224-1231)
Statistics and Methodology I (1232-1241)

FRIDAY MORNING, NOVEMBER 16, 2018

Automatic Processing (1-5) ..... 8:00 AM-9:40 AM Celestin D
Judgment (6-10) ..... 8:00 AM-9:40 AM Strand 13 AB
Discourse Processes (11-16) ..... 8:00 AM-10:00 AM Celestin A
Embodied Cognition (17-21) ..... 8:00 AM-9:40 AM Celestin F
Forensic Science and Eyewitness Identification (22-27) ..... 8:00 AM-10:00 AM Celestin BC
Statistics and Methodology (28-33) ..... 8:00 AM-10:00 AM Celestin GH
SYMPOSIUM I: Generalization in Language and Memory (34-39) ..... 10:00 AM-12:00 PM Celestin E
Bilingualism I (40-44) ..... 10:20 AM-12:00 PM Celestin A
Associative Learning and Recall (45-49) ..... 10:20 AM-12:00 PM Celestin BC
Working Memory I (50-54) ..... 10:20 AM-12:00 PM Celestin GH
Concepts and Categories (55-60) ..... 10:00 AM-12:00 PM Celestin F
Psycholinguistics (61-66) ..... 10:00 AM-12:00 PM Celestin D

FRIDAY NOON, NOVEMBER 16, 2018

POSTER SESSION II ..... 11:00 AM-1:30 PM Elite A
(Author present between 12:00 PM-1:30 PM)

Animal Learning & Cognition (2001-2013)
Automatic Processing (2014-2029)
Attention Capture (2030-2040)
Attention: Individual Differences and Divided Attention (2041-2062)
Music Cognition (2063-2077)
Reasoning & Problem Solving (2078-2098)
Reward, Motivation, and Decision Making (2099-2117)
Psycholinguistics I (2118-2143)
Letter/Word Processing II (2144-2163)
Test Effects (2164-2183)
Recognition Memory I (2184-2206)
Spatial Cognition (2207-2224)
Perception, Memory, and Action (2225-2247)

FRIDAY NOON, NOVEMBER 16, 2018

Lunchtime Workshop: Encouraging Future Scientists:
Supporting Undergraduates at Psychonomics (UP) ..... 12:00 PM-1:30 PM
Bring your lunch to Strand 12 A/B, 2nd floor

FRIDAY AFTERNOON, NOVEMBER 16, 2018

SYMPOSIUM II: Should Statistics Determine the Practice of Science, or Science Determine the Practice of Statistics? (67-72) ..... 1:30 PM-3:30 PM Celestin E
Recognition Memory (73-78) ..... 1:30 PM-3:30 PM Celestin BC
Decision Making I (79-83) ..... 1:30 PM-3:10 PM Celestin GH
Music Cognition (84-88) ..... 1:30 PM-3:10 PM Celestin A
Letter/Word Processing (89-94) ..... 1:30 PM-3:30 PM Celestin F
Attention Capture (95-99) ..... 1:30 PM-3:10 PM Celestin D
SYMPOSIUM III: Leading Edge Workshop—Time for Action: Reaching for a Better Understanding of the Dynamics of Cognition (100-105) ..... 3:30 PM-5:30 PM Celestin D
Cognition and Emotion (106-110) ..... 3:50 PM-5:30 PM Celestin F
Sensation and Perception I (111-116) ..... 3:30 PM-5:30 PM Celestin A

Recall and Recognition Memory (117-121) ..... 3:50 PM-5:30 PM Celestin E
Reading I (122-126) ..... 3:50 PM-5:30 PM Celestin BC
Problem Solving and Reasoning (127-132) ..... 3:30 PM-5:30 PM Celestin GH

FRIDAY EVENING, NOVEMBER 16, 2018

POSTER SESSION III ..... 4:00 PM-7:30 PM Elite A
(Author present between 6:00 PM-7:30 PM)

Attention II (3001-3018)
Attention: Features and Objects (3019-3032)
Consciousness (3033-3044)
Decision Making and Judgment (3045-3074)
Concepts and Categories (3075-3094)
Emotion and Cognition II (3095-3114)
Discourse Processes and Language Production (3115-3137)
Speech Perception (3138-3162)
Associative Learning and Memory (3163-3175)
Metamemory I (3176-3198)
Prospective Memory (3199-3213)
Recall II (3214-3238)
Sensation and Perception II (3239-3249)

SATURDAY MORNING, NOVEMBER 17, 2018

Human Learning and Instruction I (133-137) ..... 8:00 AM-9:40 AM Celestin GH
Attention: Control (138-143) ..... 8:00 AM-10:00 AM Celestin D
Decision Making II (144-148) ..... 8:00 AM-9:40 AM Celestin BC
Language Production (149-154) ..... 8:00 AM-10:00 AM Celestin F
Cognitive Aging (155-161) ..... 8:00 AM-10:20 AM Celestin A
Spatial Cognition (162-166) ..... 8:00 AM-9:40 AM Strand 13 AB
SYMPOSIUM IV: Medical Image Perception and Decision Making (167-172) ..... 10:00 AM-12:00 PM Celestin E
Metacognition (173-178) ..... 10:00 AM-12:00 PM Celestin BC
Event Cognition (179-184) ..... 10:00 AM-12:00 PM Celestin GH
Attention: Visual Search (185-189) ..... 10:20 AM-12:00 PM Celestin D
Numerical Cognition (190-193) ..... 10:40 AM-12:00 PM Celestin A
Learning and Memory (194-198) ..... 10:20 AM-12:00 PM Celestin F

SATURDAY NOON, NOVEMBER 17, 2018

POSTER SESSION IV ..... 11:00 AM-1:30 PM Elite A
(Author present between 12:00 PM-1:30 PM)

Attention III (4001-4020)
Bilingualism II (4021-4040)
Psycholinguistics II (4041-4062)
Embodied Cognition (4063-4082)
Numerical Cognition (4083-4095)
Spatial Memory and Cognition (4096-4108)
Acquisition of Cognitive Skills (4109-4122)
Human Learning and Instruction II (4123-4150)
Eyewitness Identification (4151-4170)
Autobiographical Memory (4171-4197)
Working Memory II (4198-4223)
Cognition and Technology (4224-4246)

SATURDAY NOON, NOVEMBER 17, 2018

Lunchtime Workshop: Psychonomics Digital Activities ..... 12:00 PM-1:30 PM
Bring your lunch to Strand 12 A/B, 2nd floor

SATURDAY AFTERNOON, NOVEMBER 17, 2018

SYMPOSIUM V: What Speech Prosody Can Tell Us About Cognition (199-203) ..... 1:30 PM-3:30 PM Celestin E
Collaborative Remembering and Collective Memory (204-208) ..... 1:30 PM-3:10 PM Celestin BC
Decision Making III (209-214) ..... 1:30 PM-3:30 PM Celestin F
Attention I (215-220) ..... 1:30 PM-3:30 PM Celestin D
Working Memory: Vision and Neural Mechanisms (221-225) ..... 1:30 PM-3:10 PM Celestin GH
Sensation and Perception II (226-230) ..... 1:30 PM-3:10 PM Celestin A
Consciousness (231-236) ..... 3:30 PM-5:30 PM Celestin BC
Human Learning and Instruction II (237-242) ..... 3:30 PM-5:30 PM Celestin GH
Speech Perception (243-248) ..... 3:30 PM-5:30 PM Celestin A

Conceptual Processes (249-253) ..... 3:50 PM-5:30 PM Strand 13 AB
Statistics: Reproducibility (254-258) ..... 3:50 PM-5:30 PM Celestin D
Perception, Memory, and Skilled Performance (259-263) ..... 3:50 PM-5:30 PM Celestin F

SATURDAY EVENING, NOVEMBER 17, 2018

POSTER SESSION V ..... 4:00 PM-7:30 PM Elite A
(Author present between 6:00 PM-7:30 PM)

Visual Perception (5001-5021)
Visual Search and Scene Processing (5022-5049)
Cognitive Control (5050-5069)
Cognitive Aging (5070-5099)
Reasoning and Judgment (5100-5128)
Event Cognition (5129-5144)
Language (5145-5163)
False Memory II (5164-5183)
Implicit Memory (5184-5195)
Metamemory II (5196-5213)
Recognition Memory II (5214-5233)
Statistics and Methodology II (5234-5246)

SUNDAY MORNING, NOVEMBER 18, 2018

Test Effects on Memory (265-270) ..... 8:00 AM-10:00 AM Strand 11 B
Bilingualism II (271-276) ..... 8:00 AM-10:00 AM Strand 11 A
Cognitive Control (277-281) ..... 8:00 AM-9:45 AM Strand 12 B
Decision Making IV (282-286) ..... 8:00 AM-9:40 AM Strand 10 B
Recognition and Recall (287-291) ..... 8:00 AM-9:40 AM Strand 12 A
Statistics and Methodology II (292-295) ..... 8:00 AM-9:20 AM Strand 13 A
Working Memory II (296-301) ..... 10:00 AM-12:00 PM Strand 10 B
Prospective Memory (302-306) ..... 10:20 AM-12:00 PM Strand 11 B
Attention II (307-312) ..... 10:00 AM-12:00 PM Strand 12 A
Language Comprehension and Production (313-319) ..... 9:40 AM-12:00 PM Strand 13 A
Reasoning and Judgment (320-324) ..... 10:20 AM-12:00 PM Strand 11 A
Reading II (325-329) ..... 10:20 AM-12:00 PM Strand 12 B

Elite Foyer	Elite A/B 1st Floor	Celestin A 3rd Floor	Celestin B/C 3rd Floor	Celestin D 3rd Floor	Celestin E 3rd Floor
Thursday, November 15, 2018					
Registration Open 7:30 a.m.-8:30 p.m.	Poster Session I Viewing 4:00 p.m.-7:30 p.m. Hospitality 5:30 p.m.-7:30 p.m. Author Present 6:00 p.m.-7:30 p.m. Exhibits Open 5:30 p.m.-10:30 p.m. Opening Reception Immediately following Keynote			Keynote Address 8:00 p.m.-9:00 p.m.	
Friday, November 16, 2018					
Registration Open 7:30 a.m.-6:00 p.m.	Exhibits Open 9:30 a.m.-6:00 p.m. Poster Session II Viewing 11:00 a.m.-1:30 p.m. Author Present 12:00 p.m.-1:30 p.m. Poster Session III Viewing 4:00 p.m.-7:30 p.m. Hospitality 5:30 p.m.-7:30 p.m. Author Present 6:00 p.m.-7:30 p.m.	Discourse Processes 8:00 a.m.-10:00 a.m. Bilingualism I 10:20 a.m.-12:00 p.m. Music Cognition 1:30 p.m.-3:10 p.m. Sensation and Perception I 3:30 p.m.-5:30 p.m.	Forensic Science and Eyewitness Identification 8:00 a.m.-10:00 a.m. Associative Learning and Recall 10:20 a.m.-12:00 p.m. Recognition Memory 1:30 p.m.-3:30 p.m. Reading I 3:50 p.m.-5:30 p.m.	Automatic Processing 8:00 a.m.-9:40 a.m. Psycholinguistics 10:00 a.m.-12:00 p.m. Attention Capture 1:30 p.m.-3:10 p.m. SYMPOSIUM III: Leading Edge Workshop-Time for Action: Reaching for a Better Understanding of the Dynamics of Cognition 3:30 p.m.-5:30 p.m.	SYMPOSIUM I: Generalization in Language and Memory 10:00 a.m.-12:00 p.m. SYMPOSIUM II: Should Statistics Determine the Practice of Science, or Science Determine the Practice of Statistics? 1:30 p.m.-3:30 p.m. Recall and Recognition Memory 3:50 p.m.-5:30 p.m.
Saturday, November 17, 2018					
Registration Open 7:30 a.m.-5:00 p.m.	Exhibits Open 9:30 a.m.-4:00 p.m. Poster Session IV Viewing 11:00 a.m.-1:30 p.m. Author Present 12:00 p.m.-1:30 p.m. Poster Session V Viewing 4:00 p.m.-7:30 p.m. Hospitality 5:30 p.m.-7:30 p.m. Author Present 6:00 p.m.-7:30 p.m.	Cognitive Aging 8:00 a.m.-10:20 a.m. Numerical Cognition 10:40 a.m.-12:00 p.m. Sensation and Perception II 1:30 p.m.-3:10 p.m. Speech Perception 3:30 p.m.-5:30 p.m.	Decision Making II 8:00 a.m.-9:40 a.m. Metacognition 10:00 a.m.-12:00 p.m. Collaborative Remembering and Collective Memory 1:30 p.m.-3:10 p.m. Consciousness 3:30 p.m.-5:30 p.m.	Attention: Control 8:00 a.m.-10:00 a.m. Attention: Visual Search 10:20 a.m.-12:00 p.m. Attention I 1:30 p.m.-3:30 p.m. Statistics: Reproducibility 3:50 p.m.-5:30 p.m.	SYMPOSIUM IV: Medical Image Perception and Decision Making 10:00 a.m.-12:00 p.m. SYMPOSIUM V: What Speech Prosody Can Tell Us About Cognition 1:30 p.m.-3:30 p.m.

Elite Foyer	Strand 10B 2nd Floor	Strand 11A 2nd Floor	Strand 11B 2nd Floor	Strand 12A 2nd Floor
Sunday, November 18, 2018				
Registration Open 7:30 a.m.-12:00 p.m.	Decision Making IV 8:00 a.m.-9:40 a.m. Working Memory II 10:00 a.m.-12:00 p.m.	Bilingualism II 8:00 a.m.-10:00 a.m. Reasoning and Judgment 10:20 a.m.-12:00 p.m.	Test Effects on Memory 8:00 a.m.-10:00 a.m. Prospective Memory 10:20 a.m.-12:00 p.m.	Recognition and Recall 8:00 a.m.-9:40 a.m. Attention II 10:00 a.m.-12:00 p.m.

Celestin F 3rd Floor	Celestin G/H 3rd Floor	Celestin Foyer 3rd Floor	Strand 10 A/B 2nd Floor	Strand 12 A/B 2nd Floor	Strand 13 A/B 2nd Floor
Thursday, November 15, 2018					
Friday, November 16, 2018					
Embodied Cognition 8:00 a.m.-9:40 a.m. Concepts and Categories 10:00 a.m.-12:00 p.m. Letter/Word Processing 1:30 p.m.-3:30 p.m. Cognition and Emotion 3:50 p.m.-5:30 p.m.	Statistics and Methodology 8:00 a.m.-10:00 a.m. Working Memory I 10:20 a.m.-12:00 p.m. Decision Making I 1:30 p.m.-3:10 p.m. Problem Solving and Reasoning 3:30 p.m.-5:30 p.m.	Coffee Break 9:30 a.m.-10:30 a.m.	Diversity & Inclusion Reception 4:30 p.m.-5:30 p.m.	Encouraging Future Scientists: Supporting Undergraduates at Psychonomics (UP) 12:00 p.m.-1:30 p.m.	Judgment 8:00 a.m.-9:40 a.m.
Saturday, November 17, 2018					
Language Production 8:00 a.m.-10:00 a.m. Learning and Memory 10:20 a.m.-12:00 p.m. Decision Making III 1:30 p.m.-3:30 p.m. Perception, Memory, and Skilled Performance 3:50 p.m.-5:30 p.m.	Human Learning and Instruction I 8:00 a.m.-9:40 a.m. Event Cognition 10:00 a.m.-12:00 p.m. Working Memory: Vision and Neural Mechanisms 1:30 p.m.-3:10 p.m. Human Learning and Instruction II 3:30 p.m.-5:30 p.m.	Coffee Break 9:30 a.m.-10:30 a.m.		Psychonomics Digital Activities 12:00 p.m.-1:30 p.m.	Spatial Cognition 8:00 a.m.-9:40 a.m. Conceptual Processes 3:50 p.m.-5:30 p.m.

Strand 12B 2nd Floor	Strand 13A 2nd Floor
Sunday, November 18, 2018	
Cognitive Control 8:00 a.m.-10:00 a.m. Reading II 10:20 a.m.-12:00 p.m.	Statistics and Methodology II 8:00 a.m.-9:20 a.m. Language Comprehension and Production 9:40 a.m.-12:00 p.m.

PLEASE NOTE: All Sunday sessions will be held in the Strand Rooms on the 2nd floor of the Hyatt Regency New Orleans.

THURSDAY EVENING, NOVEMBER 15, 2018
4:00 PM-7:30 PM
POSTER SESSION I (1001-1241)
ELITE A

Attention I (1001-1020)
(1001) Van den Driessche; Sackur
(1002) Rodas; Greene
(1003) Hutcheon; Gibson; Sullivan; Fitzgerald
(1004) Huestegge; Herbort; Gosch; Kunde; Pieczykolan
(1005) Stephan; Koch
(1006) Tsukahara; Engle
(1007) Kim; Ptok; Shedden; Watter
(1008) Aguerre; Gomez-Ariza; Bajo
(1009) Ptok; Humphreys; Shedden; Watter
(1010) Krasich; Murray; Faber; Brockmole
(1011) Wiemers; Redick
(1012) Faust; Gowan; Nelson; Anderson; Granson; Multhaup
(1013) Ruiz Pardo; Minda
(1014) Samper; Morrison; Chein
(1015) Cookson; Grant; Weissman
(1016) Jim; Liefooghe; De Houwer
(1017) Fischer; Ventura-Brot; Hamm; Weymar
(1018) Ziaka; Protopapas
(1019) Samper; Morrison; Chein
(1020) Dreisbach; Fröber; Berger; Fischer

Reading (1021-1044)
(1021) Goring; Schmank; Kane; Conway
(1022) Steffens; Britt; Millis
(1023) Blair; Goldman
(1024) Gregg; D'Mello
(1025) de Long; Folk
(1026) Eskenazi; Campbell; Nix; Abraham; Folk
(1027) Abraham; Eskenazi; Folk
(1028) Ginestet; Phénix; Diard; Valdois
(1029) Warrington; White; Paterson
(1030) Donovan; Rapp
(1031) Roembke; Hazeltine; McMurray
(1032) Daley; Rawson
(1033) Jaeger; Black; Shipley
(1034) Guerrero; Griffin; Wiley
(1035) Thiede; Wright; Wenner; Hagenah
(1036) Myers; Jones; Winston-Lindeboom; De La Paz; Bonnell; Price
(1037) Wong; Moss
(1038) Deshaies; Christianson
(1039) Rich; Donovan; Rapp
(1040) White; Balcombe; Slattery
(1041) Parker; Slattery; Kirkby
(1042) Parker; Nikolova; Slattery; Liversedge; Kirkby
(1043) Norberg; Fraundorf
(1044) Martin-Arnal; León; Olmos

Human Learning and Instruction I (1045-1068)
(1045) Zamary; Rawson
(1046) Carvalho; Manke; Koedinger
(1047) Edelsbrunner; Singmann
(1048) Sana; Yan
(1049) Wissman; Peterson
(1050) Vest; Fyfe
(1051) Fox; Walker; Hollan
(1052) Hong; Fazio
(1053) Chow; Colagiuri; Goldwater; Rottman; Livesey
(1054) Foot; Sana; Wiseheart
(1055) McCurdy; Viechtbauer; Frankenstein; Sklenar; Leshikar
(1056) Miranda; Alden; Long; Zwenger; Boucher; Collins
(1057) Ghilic; Pachai; Shore
(1058) Dessenberger
(1059) Mena; Bjork
(1060) Ramlow; Little
(1061) Janes; Dunlosky; Jasnow; Rawson
(1062) St. Hilaire; Carpenter; Jennings
(1063) Barideaux Jr.
(1064) Eglington; Kang
(1065) Woodward; Butler; Corliss; Davidson
(1066) Overoye; Storm
(1067) James; Storm
(1068) Eberhard; Geller

Bilingualism I (1069-1090)
(1069) Navarro-Torres; Garcia; Chidambaram; Sorace; Kroll
(1070) Frid; Friesen
(1071) Segal; Gollan
(1072) Ezrin
(1073) Beatty-Martínez; Bruni; Navarro-Torres; Togato; Dussias
(1074) Cieslicka; García; Heredia; García
(1075) Guediche; de Bruin; Baart; Samuel
(1076) Vander Beken; Brysbaert
(1077) Shum; Chan; Hall; Rohaly; Wang; Zhao; Tse
(1079) López; Ramirez
(1080) Borodkin; Livny-Ezer; Tsarfaty; Faust
(1081) Blackburn; Aleman; Guerrero
(1082) Mech; Kazi; Ibrahim; Rodriguez Verdin; Palaganas; Bui; Mikhail; Ragozina; Yousefi-Rizi; Bajaj; Kroll
(1083) Schmidtke; Warriner; Moro
(1084) Mizrahi; Creel
(1085) Buffington; Morgan-Short
(1086) Gullifer; Titone
(1087) Takahesu Tabori; Wu; Kroll
(1088) Atagi; Mech; Macbeth; Bruni; Sarkis; Montag; Karan; Robbins; Chiarello
(1089) Macbeth; Atagi; Bruni; Mech; Sarkis; Karan; Robbins; Chiarello
(1090) Swaffer; Kole

Decision Making (1091-1112)
(1091) Aktunc; Baytimur; Uysal; Hazar; Erengin
(1092) Vanunu; Hotaling; Newell
(1093) Desender; Wilming; Donner; Verguts
(1094) Evans; Hawkins; Brown

(1095) West; Budde; Kirby; Malley
(1096) Konovalova; Pachur
(1097) Cruit; Volante; Hancock
(1098) Murphy; Cadogan; Dockray
(1099) Bridger; Mavritsaki; Aldrovandi
(1100) Konstantinidis; Speekenbrink; Shanks
(1101) Weiss-Cohen; Konstantinidis; Harvey
(1102) Ngo; Donkin
(1103) He; Zhao; Bhatia
(1104) Don; Cornwall; Otto; Davis; Worthy
(1105) Mason; Hurlstone; Ward; Brown; Farrell
(1106) Rheem; Verma; Becker
(1107) Palada; Searston; Persson; Thompson; Ballard
(1108) Tran; van Maanen; Matzke; Heathcote
(1109) Zhao; Bhatia
(1110) Kirkpatrick; Fenton; Weichart; Darby; Jacques; Turner; Sederberg
(1111) LoTemplio; Federmeier; Payne
(1112) Martin; Wilck; Kazanas; Altarriba

Discourse Processes (1113-1125)
(1113) Hernandez; Atiya; Anchondo; Ivanova
(1114) Allen; Likens; McNamara
(1115) Jyotishi; Naigles
(1116) Miller; Bernardo; Raney
(1117) Raines; Levine
(1118) Morett; Fraundorf; McPartland
(1119) Morett; Roche; Fraundorf; McParland
(1120) Sanford; Harmon; Spanos; Shaffer; Lea
(1121) Johnson; Kreuz
(1122) Kellner; Schober
(1123) Kolesari; Carlson
(1124) Asiala; Wiemer; Britt
(1125) Schneider; Franke; Schonard; Jäger; Janczyk

Emotion and Cognition I (1126-1147)
(1126) Tuft; McLennan
(1127) Saldivar; Glanc
(1128) Booy; Spalek
(1129) Chrysikou; Fowler; O'Donnell
(1130) Truong; Handy; Todd
(1131) Purcell; Twal; Stewart
(1132) Gallant; Durbin; Mather
(1133) Maraver; Steenbergen; Ricciardelli; Actis-Grosso; Colzato
(1134) Woo; Hong; Lee; Weldon; Sohn
(1135) Chesebrough; Wiley
(1136) Shevchenko; Bröder
(1137) Roy-Charland; Couturier; Gallant
(1138) Ishikawa; Kobayashi; Oyama; Suzuki; Okubo
(1139) Mangano; Marshall; Briones
(1140) Larson; Warren; Copeland
(1141) Hensley; Otani; Hamaker; Harrison
(1142) Brooks; Mashburn; Boggan
(1143) Ocampo; Leventon
(1144) Knight; Emery
(1145) Chen; Marian
(1146) Ercegil; Kapucu; Amado
(1147) Langston; Frosh

Letter/Word Processing I (1148-1167)
(1148) Phénix; Valdois; Diard
(1149) Phénix; Valdois; Diard
(1150) Valdois; Phénix; Fort; Diard
(1151) Stoops; Christianson; Ionin
(1152) Surber; Huff; Brown; Clark; Doyon; Hajnal
(1153) Edwards; Burke; McNorgan
(1154) Kim; Gregg; Inhoff
(1155) Ouyang; Xiang; Dien; Bolger
(1156) Ashby; Pagan Camacho; Shlanta; Agauas
(1157) Stone; Barnhart
(1158) Alexeeva
(1159) Yates; Slattery
(1160) Johnson; Oehrlein; Roche
(1161) Ulicheva; Rastle
(1162) Pambuccian; Raney
(1163) Fernández-López; Marcet; Perea
(1164) Colombo; Peressotti; Sulpizio
(1165) Juhasz
(1166) Luthra; You; Magnuson
(1167) Vidal; Crepaldi

False Memory I (1168-1183)
(1168) Nguyen; Seymour; Fox Tree
(1169) Hirsch; Gallo
(1170) DeCaro; Smith; Dijkstra; Gordon; Thomas
(1171) Gilet; Colombel; Evrard
(1172) Autry; Duarte; Aguirre
(1173) Carpenter; Schacter
(1174) Murphy; Loftus; Hofstein Grady; Levine; Greene
(1175) Buchli
(1176) Michael; Glorioso; Nguyen
(1177) MacGyvers; Francois; Hebert; Riley; Walsh; Cech
(1178) Ithisuphalap; Rich; Zaragoza
(1179) Henne; Braun; Handschke; Smith; Jensen; Chrobak
(1180) Whillock; Meade; Tsosie
(1181) Pérez-Mata; Moreno; Diges; Peláez
(1182) Wojcik; Díez; Alonso; Martín-Cillerosa; Guisuraga-Fernández; Fernández; Matilla; Magán-Maganto; Díez-Álamo; Canal-Bedia; Fernandez
(1183) Meeks; Rice; Taul; Fones; Posey; Harper

Recall I (1184-1200)
(1184) Fenn; Gabay; Sahakian
(1185) Bäuml; Kliegl
(1186) Gauer; Dutra; de Nonohay; de Souza
(1187) Halvorson; Hilverman
(1188) Cohen; Kahana**
(1189) Naparstek; Eisenberg; El-Said; O'Hara; Etkin
(1190) Russo; Karanian; Jeye; Slotnick
(1191) Aka; Kahana**
(1192) Liu; Umanath; Abel; Tsai
(1193) Zerr; McDermott
(1194) Jang; Lee
(1195) DeYoung; Serra
(1196) Sommer; Hemmer; Musolino
(1197) Lipowski; Canda; Pyc
(1198) Wilson; Criss
(1199) Pazdera; Kahana**
(1200) Li; Kahana**

Working Memory I (1201-1223)
(1201) Diaz; Vogel; Awh
(1202) Agrawal; Elliott; Calamia; Stanko; De Vito; Cherry
(1203) Chalmers; Freeman; Goodman
(1204) Williams; Pratt; Ferber
(1205) Debraise; Gauvrit; Lemaire; Portrat; Mathy
(1206) Glavan; Houpt; Camos; Barrouillet
(1207) Belletier; Barrouillet; Camos
(1208) Yang; Mo; Seger
(1209) Lintz; Dye; Johnson
(1210) Robison; Unsworth
(1211) Whitehead; Egner
(1212) Tanabe-Ishibashi; Ishibashi; Logie M; Logie R
(1213) Vu; Chiappe; Arreola; Bui; Su; Strybel
(1214) Hambrick; Altmann; Burgoyne
(1215) Teng; Kravitz
(1216) Cao; Busey; Nosofsky; Shiffrin; Woodman
(1217) Bartsch; Loaiza; Jäncke; Oberauer; Lewis-Peacock
(1218) Rajsic
(1219) Schwering; MacDonald
(1220) Hepner; Nozari
(1221) Peterson; Hanson; Strand
(1222) Parihar; Strejc; Walts; Kelley
(1223) Bae; Luck

Sensation and Perception I (1224-1231)
(1224) Olsen; Duff; Moser; Dickerson; Gerhardstein
(1225) Marchegiani; Barker; Mitchel
(1226) Ueda; Yakushijin; Ishiguchi
(1227) Wang Q; Wang J
(1228) Heald; Van Hedger; Nusbaum
(1229) Yuan; Lotto
(1230) Bratzke; Ulrich
(1231) Aday; Davoli; Bloesch

Statistics and Methodology I (1232-1241)
(1232) Draheim; Mashburn; Engle
(1233) Schweickert; Zheng
(1234) Kieslich; Schoemann; Grage; Scherbaum
(1235) Krefeld-Schwalb; Scheibehenne; Pachur
(1236) Henninger; Shevchenko; Mertens; Kieslich; Hilbig
(1237) Kramer; Cox; Kravitz; Mitroff
(1238) Botella; Suero; Privado; Durán
(1239) Janczyk; Liesefeld
(1240) Kessler; Kaplan; Brill; Hancock
(1241) Kaplan; Kessler; Brill; Hancock

FRIDAY MORNING, NOVEMBER 16, 2018

8:00 AM-9:40 AM
Spoken Sessions (1-66)

Automatic Processing (1-5) Celestin D
8:00-8:15 AM Protopapas; Katopodi; Altani; Georgiou
8:20-8:35 AM Watson; Pearson; Most; Le Pelley
8:40-8:55 AM Cole; Millett
9:00-9:15 AM Lee Jobson; Rubin; Eidels
9:20-9:35 AM Bertenthal; Harding

Judgment (6-10) Strand 13 AB
8:00-8:15 AM Marsh; De Los Reyes; Zeveney
8:20-8:35 AM Bruine de Bruin; Galesic; Parker; Vardavas
8:40-8:55 AM Mandel; Karvetski; Dhami
9:00-9:15 AM Cleary; Huebert; McNeely-White
9:20-9:35 AM Bröder; Undorf

Discourse Processes (11-16) Celestin A
8:00-8:15 AM Greene; Morris; Altshuler
8:20-8:35 AM Pardo; Bachert; Owczarek; Pauljohn; Trilone
8:40-8:55 AM Chambers; Baltaretu
9:00-9:15 AM Kaakinen; Holm
9:20-9:35 AM Dahan
9:40-9:55 AM Wolfe; Dandignac; Reyna

Embodied Cognition (17-21) Celestin F
8:00-8:15 AM Casasanto; Yap; Brookshire
8:20-8:35 AM Ma; Hommel
8:40-8:55 AM Zeelenberg; Pecher
9:00-9:15 AM Morey; Glenberg; Kaschak; Lakens; Zwaan
9:20-9:35 AM Maquestiaux; Boyer; Chauvel; Mazerolle; Didierjean

Forensic Science and Eyewitness Identification (22-27)

Celestin BC
8:00-8:15 AM Busey; Emerick; Carter; Vogelsang; Mannering W; Mannering F
8:20-8:35 AM Spellman; Eldridge
8:40-8:55 AM Carlson; Kennedy; Zeller; Busey
9:00-9:15 AM Dodson
9:20-9:35 AM Hyman; Pourpirali; Robinson
9:40-9:55 AM Carlson; Whittington; Jones; Lockamyeir; Carlson

Statistics and Methodology (28-33) Celestin GH
8:00-8:15 AM White
8:20-8:35 AM Mitroff; Kramer; Cox; Kravitz
8:40-8:55 AM Miller; Ulrich
9:00-9:15 AM Ulrich; Miller
9:20-9:35 AM Haaf; Rouder
9:40-9:55 AM Nathoo; Kilshaw; Masson

Symposium I: Generalization In Language and Memory (34-39) Celestin E
10:00-10:15 AM Rastle
10:20-10:35 AM Myers
10:40-10:55 AM Schapiro
11:00-11:15 AM Batterink
11:20-11:35 AM Armstrong; Dumay; Kim; Pitt
11:40-11:55 AM Gaskell; Mirkovic

Bilingualism I (40-44) Celestin A
10:20-10:35 AM Gollan; Stasenko; Li; Salmon
10:40-10:55 AM Mishra; Bhandari; Prasad
11:00-11:15 AM Paap; Anders-Jefferson; Mason; Zimiga
11:20-11:35 AM Ballesteros; Rieker

11:40-11:55 AM Hernandez

Associative Learning and Recall (45-49) Celestin BC
10:20-10:35 AM Vickery; Park; Berryhill; Beck
10:40-10:55 AM Livesey; Tran; Harris I; Harris J
11:00-11:15 AM Kilic; Yuksel; Dedetas
11:20-11:35 AM Healy; Schneider; Buck-Gengler; Kole; Barshi
11:40-11:55 AM Criss; Cox; Chen; Wilson; Aue

Working Memory I (50-54) Celestin GH
10:20-10:35 AM Logie
10:40-10:55 AM Barrouillet; Gorin; Camos
11:00-11:15 AM Matsukura
11:20-11:35 AM Smith; Bartlett; Krawczyk; Basak
11:40-11:55 AM Vergauwe; Langerock; Uittenhove

Concepts and Categories (55-60) Celestin F
10:00-10:15 AM Kurtz; Silliman
10:20-10:35 AM Nosofsky; Sanders
10:40-10:55 AM Sloutsky; Savic
11:00-11:15 AM Minda; Hatherley; Brashears
11:20-11:35 AM McDaniel; Gouravajhala
11:40-11:55 AM Thorstad; Wolff

Psycholinguistics (61-66) Celestin D
10:00-10:15 AM Galati; Symeonidou; Alviar; Dale; Avraamides
10:20-10:35 AM Kim; Christianson
10:40-10:55 AM Smith; Almor
11:00-11:15 AM Mousikou; Nüesch; Hasenäcker; Schroeder
11:20-11:35 AM Westbury; Hollis
11:40-11:55 AM Segerink; Ostarek; van Halm; Zwaan

FRIDAY NOON, NOVEMBER 16, 2018

11:00 AM-1:30 PM
POSTER SESSION II (2001-2247)
ELITE A

Animal Learning & Cognition (2001-2013)
(2001) Parrish; French; James; Creamer; Guild; Beran
(2002) Jackson; Shaw; Beran; Church; Smith
(2003) Metzger
(2004) Zamora-Arevalo; Perez-Calzada; Morales-Media; Chavez-de la Peña
(2005) Jensen; Alkan; Ferrera; Terrace
(2006) Wehe; Rayburn-Reeves; Nelson; Prescott; Smith
(2007) Mallikarjun; Newman
(2008) Mallikarjun; Newman
(2009) James; Smith; Menzel; Beran
(2010) Whitham; Salamanca; Washburn
(2011) Hataji; Kuroshima; Fujita
(2012) Thayer; Stevens
(2013) Hollis

Automatic Processing (2014-2029)
(2014) Wills; Ravizza
(2015) Marsh; Röer; Threadgold; Barker; Ball
(2016) Redden; Hurst; Klein
(2017) Hinkson; Lien; Proctor
(2018) Oyama; Okubo
(2019) Lompado; Stibolt; Hoffman
(2020) Mayr; Möller; Buchner
(2021) Lorentz; Milliken
(2022) Reyes; Santos; Rivas; Blackburn
(2023) González-García; Formica; Liefooghe; Brass
(2024) Blumenthal; Sivakumar; Snipes
(2025) Xiong; Proctor; Zelaznik
(2026) Schulz; Lien; Ruthruff
(2027) Carvalho; Marmurek
(2028) Dey; Colvett; Rodriguez; Frontera; Bugg
(2029) Yang; Worthy

Attention Capture (2030-2040)
(2030) Folk; Rocks; Remington
(2031) Tsal; Max
(2032) Burnham
(2033) Scheerer; Boucher; Birmingham; Iarocci
(2034) Park; Kim; Cho
(2035) Chang; Egeth
(2036) Nickel; Minor; Hannula
(2037) Maxwell; Ruthruff; Gaspelin
(2038) Stilwell; Bahle; Vecera
(2039) Kim; Hoffman
(2040) Suh; Abrams

Attention: Individual Differences and Divided Attention (2041-2062)
(2041) Allen; Kirsh
(2042) McWilliams; Brunyé; Hussey; Ward
(2043) Brown; Kaminske
(2044) Jones; Crozier; Strange
(2045) Zhang; Miller; Cortina
(2046) Broitman; Swallow
(2047) Smith; Forrin; Huynh; Smilek; MacLeod
(2048) Foster; Mantell; Azimi Vahdat
(2049) Shiffrin; Kumar; Harding
(2050) Welhaf; Smeekens; Kane
(2051) Kumar; Shiffrin
(2052) Rey-Mermet; Singmann; Gade; Oberauer
(2053) Kennedy; Mather
(2054) Koshino; O'Donnell; Macias
(2055) Spahr; Wickens; Clegg; Witt; Smith
(2056) Bruening; Manzey
(2057) Petty; Palmer; Moore; Boynton
(2058) Segal; Lolli; Patalano; Sanislow
(2059) Yang; Hsieh; Fific
(2060) Pappas; Kellen
(2061) White; Alshaiba
(2062) Siegel; Castel

Music Cognition (2063-2077)
(2063) Kleinsmith; Sheridan
(2064) Maturi; Sheridan
(2065) Beier

(2066) Eskine; Faggen; Griffin; Brown
(2067) Bosley; Kazanas
(2068) Killingly; Lacherez; Meuter
(2069) Boltz
(2070) Mantell; Faubion; Madden
(2071) Vuvan; Hughes
(2072) Van Hedger; Nusbaum
(2073) Ye; Wolters
(2074) McNeely-White; Cleary; Claxton
(2075) Gorin
(2076) Ho; Hickok; Chubb
(2077) Tobayama; Yokosawa

Reasoning & Problem Solving (2078-2098)
(2078) Gualtieri; McAuley; Denison
(2079) Reichelson; Zax; Williams; Patalano; Barth
(2080) Goralski; Hansen; Fific
(2081) Vasilyeva; Srinivasan; Ellwood-Lowe; Delaney-Rubin; Gopnik; Lombrozo
(2082) Vladimirov; Markina; Makarov
(2083) George; Wiley
(2084) Yamakawa; Kiyokawa
(2085) Kuzmak
(2086) Lazareva; Vladimirov; Chistopolskaya
(2087) Myers; Gentner
(2088) Majima; Nakamura
(2089) Arnold; Christian; Strudwicke; Prike; Ross
(2090) Grunewald; Paller; Beeman
(2091) Sovansky; Ohlsson
(2092) Beda; Hernandez; Smith
(2093) Gugerty; Shreeves
(2094) Ng; Beeman
(2095) Shreeves; Gugerty; Moore
(2096) Chin-Parker
(2097) Bye; Chuang; Cheng
(2098) Wilson; Grimshaw; Hedley

Reward, Motivation and Decision Making (2099-2117)
(2099) Gentile; Imbault; Rentfrow; Gosling; Potter; Kuperman
(2100) Kim; Anderson
(2101) Mieth; Buchner; Bell
(2102) Weldon; Le; Meyer
(2103) De Stefano; Rhoten; Wenger; Worth
(2104) Bakbani Elkayam; Zilcha Mano; Eitam
(2105) Sklenar; McCurdy; Frankenstein; Leshikar
(2106) Byrne
(2107) Choi; Noh; Cho
(2108) Solanki; Horne
(2109) Kelley; Van Allen; Davis
(2110) Boden; Kuo; Nokes-Malach; Wallace; Menekse; King-Shepard
(2111) Nam, Ryu J, Kang J, Kim, Ryu J, Kang K, Cho
(2112) Brunstein A; Brunstein J; Weiss; Martin
(2113) Hart; Schweitzer
(2114) Carsten; Bundt; Verbruggen; Krebs
(2115) Hemed; Karsh; Eitam
(2116) Vangsness; Young
(2117) Weber; Wedell; Shinkareva

Psycholinguistics I (2118-2143)
(2118) Meuter; Brassington
(2119) Hasak; Abrams
(2120) Wan; Caldwell-Harris
(2121) McDonald
(2122) Rossi; Eyer; Rangel; Tahir; Nakamura; Chiarello; Kroll
(2123) Pan; Jared
(2124) Tio; Lakshmanan
(2125) Hammerly; Staub; Dillon
(2126) Bąk; Altarriba
(2127) Krestar; Oller; Baker
(2128) Münster; Knoeferle
(2129) Foucart; Santamaría-García; Hartsuiker
(2130) Jonczyk; Kremer; Siddique; van Hell
(2131) Yoon; Brown-Schmidt
(2132) Andan; Bex; Berent
(2133) Terrazas; Tokowicz
(2134) Avcu; Han; Rhodes; Hestvik
(2135) Malone; Mauner
(2136) Constantine; Fraundorf
(2137) Giovannone; Fitzroy; Richie; Wood; Jasinska; Coppola; Landi; Breen
(2138) Yip
(2139) Taraban
(2140) Omar; Nir; Banai
(2141) Liu; van Hell
(2142) Sidhu; Athanasopoulou; Archer; Curtin; Pexman
(2143) Rehrig; Hayes; Henderson; Ferreira

Letter/Word Processing II (2144-2163)
(2144) Johnson; Schotter
(2145) Smith; Russo; Agarwal; Imbrigiotta
(2146) Barach; Sheridan
(2147) Nakayama; Yoshihara; Stephen
(2148) Lee; Seong; Choi
(2149) Tao; Healy
(2150) Yang; Lupker
(2151) Grossi; Olmstead; Lukaszewski; Stevens; Stoudt
(2152) Hino; Yoshihara; Xue
(2153) Kusunose; Hino
(2154) Chi; Pan; Lupker
(2155) Roelke; Hofmann; Radach
(2156) Veldre; Wong; Andrews
(2157) Fahey; Dien; Bolger
(2158) Steiner; Brown; Allopenna; McRae; Saltzman; Magnuson
(2159) Renaldi; Lian; Hung; Wu
(2160) Finley
(2161) Guerrero; Blackburn
(2162) Baciero; Gomez
(2163) Leinenger; Farrell

Test Effects (2164-2183)
(2164) Buchin; Mulligan
(2165) Vitrano; Crocco; Neely
(2166) Arndt; Valle Flores; Goodfriend; Smith Randle; Xu; Morris; Wu; Hogenhuis
(2167) Uner; Tekin; Roediger
(2168) Csik; Radvansky

(2169) Linderholm; Dobson
(2170) Corral; Carpenter; Clingan
(2171) Davis; Chan
(2172) Krueger; Schroeder; Sennette; Carlini
(2173) Vaughn; Fuegen; Goddard; Krull
(2174) Northern; Tauber; Witherby
(2175) Lovelett; Pan; Stoeckenius; Rickard
(2176) Hornburg; Aue; Karpicke
(2177) Brabec; Bjork E; Bjork R
(2178) Callender; Paneerselvam
(2179) Paneerselvam; Callender
(2180) Bobbitt; Kimball
(2181) Tekin; Roediger
(2182) Towner; Metcalfe
(2183) Saito; Niikuni; Wada; Muramoto

Recognition Memory I (2184-2206)
(2184) Davis; Hashemi; Bennett; Milliken
(2185) Noh; Love; Preston
(2186) McAdoo; Key; Gronlund
(2187) Koop; Cordell
(2188) Layher; Dixit; Miller
(2189) Fallow; Lindsay
(2190) Berry; Spanton
(2191) Quamme; Kurby; Marks
(2192) Wulff; Scharf
(2193) Gross; Dobbins
(2194) Porter; Fields; Moore; Gutchess
(2195) Jeanneret; Mallett; Lewis-Peacock
(2196) Juola; Caballero-Sanz; Muñoz-Garcia; Botella; Suero
(2197) Bell; Mieth; Buchner
(2198) Deffler; Druen; Shedlosky-Shoemaker
(2199) Schurgin; Brady
(2200) Kroneisen
(2201) Chiu; Wang; Beck; Lewis-Peacock; Sahakyan
(2202) Hanczakowski; Zawadzka; Beaman; Jones
(2203) Caulfield; Vogel; Coutinho; Kan
(2204) Harrison; Starns; Hicks
(2205) Elliott; Blais; McClure; Brewer
(2206) Banquer; Kim

Spatial Cognition (2207-2224)
(2207) Baess; Bermeitinger
(2208) Houck; Philbeck
(2209) Munger; Multhaup; Comi-Morag
(2210) Zhong; Xiong; Vu; Proctor
(2211) Kaszowska; Burte; Hutton; Taylor
(2212) Kleider-Offutt; Capodanno
(2213) Dudas-Thomas; Gardony; Kaszowska; Wolford; Taylor
(2214) Garcia; Faghihi; Febre; Vaid
(2215) Cheng; Hegarty; Chrastil
(2216) Barhorst-Cates; Creem-Regehr; Stefanucci
(2217) Burchardt; Roskos
(2218) Cherep; Kelly; McNamara
(2219) Capodanno; Kleider-Offutt
(2220) Cowen; Milbradt; McClure; Minear
(2221) Ryczek; Horne
(2222) Dai; Thomas; Taylor
(2223) Arduino; Caggiano; Mora; Veronelli; Maritato; Cocchini
(2224) Burte; Taylor; Hutton

Perception, Memory, and Action (2225-2248)
(2225) Durst; Janczyk
(2226) Laidlaw; Elashmouny; Goodale; Culham
(2227) Slifkin; Sim; Trinckes; Li
(2228) Rann; Almor
(2229) Radovic; Manzey
(2230) Liu F; Liu S
(2231) Cortesa; Shelton; Landau; Malpani; Hager
(2232) Griffin-Oliver; Proctor
(2233) Pettijohn; Peltier; Biggs
(2234) Huffman; Hilchey; Weilder; Mills; Pratt
(2235) Guo; Song
(2236) Teskey; Bub; Masson
(2237) Sim; Slifkin
(2238) Hodges; Kang; Rose; Lu; Lundberg
(2239) Greenspon; Pfordresher
(2240) Liu; Sun
(2241) Whitaker; Rand; Pointon
(2242) Miles
(2243) Chihak; Bordwell
(2244) Nagai; Yamada; Kanaya; Kawakami; Nishizaki
(2245) Pointon; Thompson; Creem-Regehr; Stefanucci; Joshi; Paris; Bodenheimer
(2246) Zhang; Tullis
(2247) Blush; Bangert; Schwartz
(2248) Dowell

FRIDAY NOON, NOVEMBER 16, 2018
12:00 PM-1:30 PM

Lunchtime Workshop: Encouraging Future Scientists: Supporting Undergraduates at Psychonomics (UP); Bring your lunch to Strand 12 A/B, 2nd floor

FRIDAY AFTERNOON, NOVEMBER 16, 2018
1:30 PM-3:30 PM
Spoken Sessions (67-132)

Symposium II: Should Statistics Determine the Practice of Science, or Science Determine the Practice of Statistics? (67-72) Celestin E
1:30-1:45 PM Shiffrin
1:50-2:05 PM Morey
2:10-2:25 PM Vandekerckhove; Baribault
2:30-2:45 PM Van Zandt; MacEachern
2:50-3:05 PM Davis-Stober

3:10-3:25 PM Donkin

Recognition Memory (73-78) Celestin BC
1:30-1:45 PM Kellen; Winiger; Dunn; Singmann
1:50-2:05 PM Miller
2:10-2:25 PM Oberauer
2:30-2:45 PM Chechile
2:50-3:05 PM Ben-Harosh; Magen
3:10-3:25 PM Johnson; McGhee; Leiker; Price

Decision Making I (79-83) Celestin GH
1:30-1:45 PM Heathcote; Holloway; Sauer
1:50-2:05 PM Worthy; Cornwall; Don; Davis
2:10-2:25 PM Zhao; Walasek; Bhatia
2:30-2:45 PM Dunn; Rao
2:50-3:05 PM Ratcliff

Music Cognition (84-88) Celestin A
1:30-1:45 PM Pfordresher; Chow
1:50-2:05 PM Fostick; Zekveld; Ben-David
2:10-2:25 PM Schwartz; Peynircioğlu; Tatz
2:30-2:45 PM Halpern; Pfordresher
2:50-3:05 PM Okada; Slevc

Letter/Word Processing (89-94) Celestin F
1:30-1:45 PM Revill
1:50-2:05 PM Kinoshita; Mills
2:10-2:25 PM Treiman; Rosales; Cusner; Kessler
2:30-2:45 PM Jared
2:50-3:05 PM Slattery; Parker
3:10-3:25 PM Gomez; Rouder

Attention Capture (95-99) Celestin D
1:30-1:45 PM Gaspelin; Gaspar; Luck
1:50-2:05 PM Kim; Britton; Anderson
2:10-2:25 PM Theeuwes; Wang
2:30-2:45 PM Luck; Gaspelin
2:50-3:05 PM Murphy; Dalton

Symposium III: Leading Edge Workshop—Time for Action: Reaching for a Better Understanding of the Dynamics of Cognition (100-105) Celestin D
3:30-3:45 PM Song; Welsh
3:50-4:05 PM Rosenbaum
4:10-4:25 PM Hommel; Wiers
4:30-4:45 PM Hamilton
4:50-5:05 PM Moher
5:10-5:25 PM Heinke

Cognition and Emotion (106-110) Celestin F
3:50-4:05 PM Laukkonen; Kaveladze; Schooler
4:10-4:25 PM Takarangi; Nayda
4:30-4:45 PM Dumay; Millar; Nash; Simpson; Shipley
4:50-5:05 PM Anaki; Tarder-Stoll; Moscovitch
5:10-5:25 PM Baart; Keetels; Vroomen

Sensation and Perception I (111-116) Celestin A
3:30-3:45 PM Peterson; Skocypec
3:50-4:05 PM Curby; Moerel; Huang
4:10-4:25 PM Biggs; Pettijohn; Roush; Blacker
4:30-4:45 PM Cain M; Cain S; Wendell
4:50-5:05 PM Frissen; Scherzer; Yao
5:10-5:25 PM Townsend; Zhang; Liu

Recall and Recognition Memory (117-121) Celestin E
3:50-4:05 PM Weidemann; Kragel; Lega; Worrell; Sperling; Sharan; Jobst; Khadjevand; Davis; Wanda; Kadel; Rizzuto; Kahana**
4:10-4:25 PM Yonelinas
4:30-4:45 PM Farrell
4:50-5:05 PM Lapa; Garcia-Marques
5:10-5:25 PM Tekin; DeSoto; Wixted; Roediger

Reading I (122-126) Celestin BC
3:50-4:05 PM Schotter
4:10-4:25 PM Rueckl; Zevin; Wolf
4:30-4:45 PM Drieghe; Veldre; Fitzsimmons; Ashby; Andrews
4:50-5:05 PM Luke; Nelson; Bown
5:10-5:25 PM Tamminen; Vinals; Cevoli; Rastle

Problem Solving and Reasoning (127-132) Celestin GH
3:30-3:45 PM Catrambone; Hoffman; Lingle
3:50-4:05 PM Starns; Cohen; Bosco; Hirst
4:10-4:25 PM Xing; Corter; Zahner
4:30-4:45 PM Lauterman; Ackerman
4:50-5:05 PM Elqayam
5:10-5:25 PM Colzato; Prochazkova; Lippelt; Sjoerds; Hommel

FRIDAY EVENING, NOVEMBER 16, 2018
4:00 PM-7:30 PM
POSTER SESSION III (3001-3249)
ELITE A

Attention II (3001-3018)
(3001) Sali; Egner
(3002) Wilson
(3003) Bednarek; Orzechowski; Przedniczek; Olszewska; Wujcik
(3004) Yamauchi; Leontyev
(3005) Bond; Love; Johnson; Washburn
(3006) Moffitt; Watson; Spahr; O'Toole-Fehlmann
(3007) Rubinstein
(3008) Arnicane; Souza; Oberauer
(3009) Dollois; Fenske; Fiacconi
(3010) Ware; Jong; Benitez; Clapper; Koshino
(3011) Monnier; Dell'Aqua; Doro; Wu; Jolicoeur
(3013) Hogeveen; Krug; Solomon

(3014) Spinelli; Lupker; Katz
(3015) Rizzi
(3016) Hoffmann; Pieczykolan; Huestegge
(3017) Shipstead; Martin; Nespodzany
(3018) Christensen

Attention: Features and Objects (3019-3032)
(3019) Dowd; Golomb
(3020) Callahan-Flintoft; Wyble
(3021) Imai; Sato; Tagai; Kawahara
(3022) Takayama; Saneyoshi; Michimata
(3023) Blalock; VanWormer; Nguyen
(3024) Weatherford; Esparza; Warford; Tedder; Hitchcock
(3025) Fu; Dodd
(3026) Heaton; Hummel
(3027) Nah; Malcolm; Shomstein
(3028) Weidler; Hilchey; Abrams; Pratt
(3029) Hilchey; Weidler; Rajsic; Pratt
(3030) Hakim; Feldmann-Wüstefeld; Awh; Vogel
(3031) Saneyoshi; Suzuki; Oyama; Okubo; Laeng
(3032) Yoruk; Boduroglu

Consciousness (3033-3044)
(3033) Guo; Dobkins
(3034) Nicosia; Balota
(3035) Zukosky; Wang
(3036) Morgan; Ozmen; Martin; Abrams
(3037) Prasad; Mishra
(3038) Steindorf; Hammerton; Rummel
(3039) Seli; Kane; Smallwood; Schacter; Maillet; Schooler; Smilek
(3040) Hood; Banks; Hutchison
(3041) Palfi; Parris; Dienes
(3042) Fort; Goodwin
(3043) Paolizzi; Potts; Carlson
(3044) Mills; Smith; Dowell; Ghattan; Christoff

Decision Making and Judgment (3045-3074)
(3045) Hayes; Wedell
(3046) Crane; Trueblood
(3047) Hartsough; Ginther; Marois
(3048) Leong; McKenzie
(3049) Li; Rao
(3050) Casteel
(3051) Galotti; Umscheid
(3052) Zak; Kareev; Avrahami
(3053) Aczel; Kovacs; Szaszi
(3054) Rao; Liu
(3055) Tsuzuki; Takeda; Chiba
(3056) Serafinski; Berman
(3057) Ramasubramanian; Cho; Allan; Garcia-Retamero; Feltz; Ybarra; Cokely
(3058) Zhang; Li; Liang
(3059) Yamagishi; Nishimura
(3060) Nakamura
(3061) Slane; Dodson
(3062) Cully; Stevens
(3063) Nesmith; Hancock; Jent
(3064) Herr; Frazer
(3065) Gulacsik; Joslyn; Robinson
(3066) John; Zhao
(3067) Corredor
(3068) Falkowski; Sidoruk-Blach; Olszewska; Jablonska
(3069) Kocsis; Farrell
(3072) Madison; Fulton; Whitfield; Singh
(3073) Horace; Roskos
(3074) Toi; Ishiguchi

Concepts and Categories (3075-3094)
(3075) Norris; Kondrad
(3076) Killingsworth; Kleider-Offutt; Meacham; Williams; Bohil
(3077) Seo; Kalish
(3078) Hemmatian; Sloman
(3079) Coley; George; Sabine; Acosta Lane; Zambrana
(3080) Davis; Ireland; Goldwater; Gaylord; Glass; Worthy
(3081) Wiemer; Neal
(3082) Kenett; Thompson-Schill**
(3083) Wetzel; Kurtz
(3084) Yang
(3085) Gouravajhala; Wahlheim; McDaniel
(3086) Smith; Deng; Driscoll; Savoie; Helie; Ell
(3087) Patterson; Andrews; Kurtz
(3088) Clapper; De Kock; Garthwaite; Ventura
(3089) Rago; Borbely; Szabo; Varga
(3090) Church; Valdez; Boomer; Smith
(3091) Hendel; Dickinson; Roy-Charland
(3092) Leffers; Coley
(3093) Tokita; Yang; Ishiguchi
(3094) Maiello; Treccani; Job; Mulatti

Emotion and Cognition II (3095-3114)
(3095) Graham
(3096) Chung; Arnell
(3097) Jamal-Orozco; Russo; Weaver; Nokes-Malach; Galla
(3098) Liu; Harris; Reed
(3099) Chirico; Cipresso; Gaggioli
(3100) Milshtein; Henik
(3101) Fernandes; Tuft; Incera; McLennan
(3102) Yang; Lee J; Lee D
(3103) Helfrich; Tooley
(3104) Maddox; Boyd-Rogers; Crutcher; White
(3105) Bilge; Telli
(3106) Iricinschi
(3107) Frank; Iordan; Mikels; Reuter-Lorenz
(3108) Han; Zhang; Sun
(3109) Berger; Anaki
(3110) Singh; Wang; Casasanto
(3111) Kim; Maximo; Kana
(3112) Letang; McDonough; Parmelee
(3113) Allen; MIller
(3114) Fujita; Kato

Discourse Processes and Language Production (3115-3137)
(3115) Seong; Lee; Choi; Gordon
(3116) D'Arcey; Oraby; Fox Tree
(3117) Scotto; Kacinik
(3118) Ryan; Costa
(3119) Singer; Spear; Rodrigo-Tamarit
(3120) Kim; Butterfuss; Kendeou

(3121) Perret; Likens; McNamara
(3122) McCarthy; Hinze; McCrudden; McNamara
(3123) White; Lohmar; Glick; Evans; Abrams
(3124) Pinet; Nozari
(3125) Kemp; McDonald
(3126) Yoshihara; Xue; Hino
(3127) Mathy; Meunier; Scheer
(3128) Herd; Cariño; Hilliard; Coggins; Sherman
(3129) Horne; Martin
(3130) Jacobs; Loucks; Watson; Dell
(3131) Chia; Kaschak
(3132) Biro; Olmstead; Viswanathan; Koesterer
(3133) Chen
(3134) Kelley; Dell
(3135) Kyröläinen; Ginter; Bertram; Kuperman
(3136) Sana; Park; Burry; Gagne; Spalding
(3137) Masoura; Chatziadamou; Dosi; Fyndanis

Speech Perception (3138-3162)
(3138) Mello; Rothermich; Bobb
(3139) Ward; Kelty-Stephen
(3140) Barker; van Heugten
(3141) Strand; Brown; Barbour
(3142) Gow; Li; Magnuson
(3143) McLaughlin; Van Engen
(3144) Cooper; Johnson
(3145) Tzeng; Russell; Nygaard
(3146) Su; Tsai
(3147) Kroger; Le; McAuley
(3148) Payne; Silcox; Lash; Ferguson; Lohani
(3150) Li; You; Luthra; Steiner; Magnuson
(3151) Fuhrmeister; Myers
(3152) Buxó-Lugo; Kurumada
(3153) Strori; Bradlow; Schwartzer; Souza
(3154) Tokaç; Mungan; Özsoy
(3155) Lehet; Dilley; Streicher; Ireland
(3156) Alexander; Ficarra; Farr; Irons
(3157) Ben-David; Nitsan; Wingfield; Lavie
(3158) Failes; Sommers
(3159) Heffner; Myers
(3160) Noe; Fischer-Baum
(3161) Gao; Pereira; Toscano
(3162) Shatzer; Pitt; Shahin

Associative Learning and Memory (3163-3175)
(3163) Zemla; Austerweil
(3164) Carney; Levin; Warner; Kirchhoff; Bretches
(3165) Greenaway; Livesey
(3166) Yang; Li; Wilkinson; Spaniol; Hasher
(3167) Loehr; Fazio; Rittle-Johnson
(3168) Gray; Kelley
(3169) Darby; Sederberg
(3170) Sheldon
(3171) Marton; Campanelli
(3172) Park; Rogers; Vickery
(3173) Smith; Delaney
(3174) Scholz; von Helversen
(3175) Roark; Lehet; Dick; Holt

Metamemory I (3176-3198)
(3176) Kuhlmann
(3177) Onken; Hines
(3178) Witherby; Tauber
(3179) Yamaguchi; Takahashi; Kaneko
(3180) Ryals; Reynolds; Patton; Cleary
(3181) Drew; Marsh
(3182) Kopatich; Feller; Santuzzi; Higgs
(3183) Castro; Curley; Hertzog
(3184) Thomas; Hughes
(3185) Doyle; Hockley
(3186) Wulff; Karanian; Race; Thomas
(3187) Myers; Rhodes
(3188) Mitchell; Borda; Dougherty; Grillo; Muller
(3189) Rivers; Janes; Dunlosky
(3190) Umanath; Coane; Walsh; Lo
(3191) Takahashi
(3192) Stone; Storm
(3193) Besken
(3194) Undorf; Live; Ackerman
(3195) Wilck; Martin; Altarriba
(3196) Flurry; Eakin
(3197) Erwin; Matsuyama; Winston; Eacrett; Tjarks
(3198) Tatz; Undorf; Peynircioglu

Prospective Memory (3199-3213)
(3199) West; Mulligan
(3200) Rummel; Hicks; Kuhlmann
(3201) Gao; Roberts; Fillmore; Bliwise; Scullin
(3202) Möschl; Walser; Surrey; Miller
(3203) Cook; Rummel; Klapatch; Lopez; David
(3204) Spitler; Hicks; Cohen
(3205) Anderson; McDaniel
(3206) Frankenstein; McCurdy; Sklenar; Leshikar
(3207) Jones; Scullin; Benge
(3208) Branch; Anderson
(3209) Vogel; Arnett; Blais; Brewer
(3210) Reese-Melancon; Harrington; Kytola
(3211) Heisick; Hicks
(3212) Streeper; Bowen; Yang; Bugg
(3213) Guevara Pinto; Hicks; Papesh

Recall II (3214-3238)
(3214) Stepan; Fenn; Altmann
(3215) Pepe; Tan; Savani; Rajaram
(3216) Kobayashi; Ueno; Kawaguchi
(3217) Coverdale; Pandeirada; Nairne
(3218) Li; Hills
(3219) Kelly; Beran
(3220) Lindsey; Logan
(3221) Campbell; Abrams
(3222) van Genugten; Schacter
(3223) Paulo; Albuquerque; Bull
(3224) Cheuk; Farrell; Hurlstone
(3225) LoGiudice; Norman; Watter
(3226) Windsor; Murray; Donaldson
(3227) Stevens; Pierce
(3228) Abel; Bäuml
(3229) Paulus; Koch; Coutanche
(3230) Featherston; Hale

(3231) Hargis; Castel; Bjork
(3232) Bruett; Fang; Kamaraj; Haley; Coutanche
(3233) VanArsdall; Razi
(3234) Chen; Criss
(3235) Hopper; Huber
(3236) Bireta; Wood
(3237) Bosen; Luckasen
(3238) Runge; Sommers

Sensation and Perception II (3239-3249)
(3239) Cerisano; Crukley; Radenovic; Humphreys; Watter
(3240) Gallego Hiroyasu; Yotsumoto
(3241) Faunce; Atkins; Blumenthal
(3242) Zobel; Sanders; Wagner; Başkent
(3243) Vallet; Laflamme; Bediou; Grondin
(3244) Crowe; Kent
(3245) Strobach; Mueller; Utz; Carbon
(3246) Norman; Dowell; Moment; Shain; Norman; Phillips; Kappers
(3247) Magaldino; Cabe; Steele
(3248) Kraemer; Black
(3249) Carbonell; Schertz; Lotto

SATURDAY MORNING, NOVEMBER 17, 2018

8:00 AM-9:40 AM
Spoken Sessions (133-198)

Human Learning and Instruction I (133-137) Celestin GH
8:00-8:15 AM Sumeracki; Weinstein; Nebel
8:20-8:35 AM Foot V; Foot J; Wiseheart
8:40-8:55 AM Miyake; Carruth; Gustavson; Lurquin; Kane
9:00-9:15 AM Lyle; Bego; Hopkins; Ralston; Hieb
9:20-9:35 AM Brockmole; Krasich; Hutt; D'Mello

Attention: Control (138-143) Celestin D
8:00-8:15 AM Weissman
8:20-8:35 AM Arrington
8:40-8:55 AM Thomas; Crump; Dickson; Gray
9:00-9:15 AM Nieuwenstein; Woytaszek
9:20-9:35 AM Kent; Crowe
9:40-9:55 AM Draheim; Martin; Tsukahara; Mashburn; Engle

Decision Making II (144-148) Celestin BC
8:00-8:15 AM Hemmer; Robbins
8:20-8:35 AM Erez; Reyna; Lu; Tarpinian; Weldon
8:40-8:55 AM Kareev; Avrahami; Le Mens
9:00-9:15 AM Ranieri; Schneider
9:20-9:35 AM Cavallaro; Innes; Hawkins

Language Production (149-154) Celestin F
8:00-8:15 AM Goldrick; Gollan
8:20-8:35 AM Alderete; Chan; Yeung
8:40-8:55 AM Harmon; Kapatsinski
9:00-9:15 AM O'Seaghdha; Hupbach; Heflin
9:20-9:35 AM James; Saunders
9:40-9:55 AM Nozari; Omaki

Cognitive Aging (155-161) Celestin A
8:00-8:15 AM Pachur; Zilker
8:20-8:35 AM Ben-David; Malkin; Erel; Saban
8:40-8:55 AM Mattys; Ferguson; Heinrich
9:00-9:15 AM Lopez; Cadambi; Alferez; Barber
9:20-9:35 AM Bowen; Ford; Grady; Spaniol
9:40-9:55 AM Pansuwan; Swanson; Breuer; Cueva; Gazder; Lau; Taylor; Wilson; Morcom
10:00-10:15 AM Jaeggi; Buschkuehl; Pahor; Seitz; Shah; Reuter-Lorenz; Jonides

Spatial Cognition (162-166) Strand 13 AB
8:00-8:15 AM Shelton; Cortesa; Hager; Jones; Khudanpur; Landau
8:20-8:35 AM Beighley; Intraub
8:40-8:55 AM Chamberlain; Bruns
9:00-9:15 AM Mou
9:20-9:35 AM Twyman; Holden; Chen; Hagstrom; Mukherjee; Wassenberg

Symposium IV: Medical Image Perception and Decision Making (167-172) Celestin E
10:00-10:15 AM Krupinski
10:20-10:35 AM Carrigan; Curby; Moerel; Rich
10:40-10:55 AM Wolfe
11:00-11:15 AM Mitroff; Adamo
11:20-11:35 AM Elmore
11:40-11:55 AM Drew; Williams; Aufferman; Mills

Metacognition (173-178) Celestin BC
10:00-10:15 AM Day
10:20-10:35 AM Patel; Aldercotte; Tsapali; Parr; Serpell; Ellefson
10:40-10:55 AM Beran; Perdue; Parrish
11:00-11:15 AM Tullis
11:20-11:35 AM Huff; Gretz
11:40-11:55 AM Krogulska; Scoboria; Hanczakowski; Zawadzka

Event Cognition (179-184) Celestin GH
10:00-10:15 AM Christidis; Elman; McRae
10:20-10:35 AM Jaggy; Papenmeier; Meyerhoff
10:40-10:55 AM Cutting; Armstrong
11:00-11:15 AM Papenmeier; Boss; Mahlke
11:20-11:35 AM Miller; Min; Saad
11:40-11:55 AM Fisher; Radvansky

Attention: Visual Search (185-189) Celestin D
10:20-10:35 AM Itthipuripat; Woodman
10:40-10:55 AM Becker
11:00-11:15 AM Machluf; Sellers II; Hahn; Jones
11:20-11:35 AM Foraker; Cane
11:40-11:55 AM Leonard; Johnson

Numerical Cognition (190-193) Celestin A
10:40-10:55 AM Faulkenberry; Bowman; Hetzel
11:00-11:15 AM Reynvoet; Marinova; Sasanguie
11:20-11:35 AM Barth
11:40-11:55 AM Scheibehenne; Olschewski; Newell

Learning and Memory (194-198) Celestin F
10:20-10:35 AM Greene; Loftus; Hoffstein Grady; Levine; Murphy
10:40-10:55 AM Wahlheim; Alexander; Kane
11:00-11:15 AM Rotello; Starns; Cataldo
11:20-11:35 AM Brainerd; Nakamura; Chang; Bialer; Reyna
11:40-11:55 AM Steyvers; Benjamin

SATURDAY NOON, NOVEMBER 17, 2018
11:00 AM-1:30 PM
POSTER SESSION IV (4001-4246)
ELITE A

Attention III (4001-4020)
(4001) Pearson; Tang; Watson; Le Pelley
(4002) Chao
(4003) Koch; Meaders
(4004) Smith; Dykstra; Hazeltine; Schumacher
(4005) Schacherer; Nikolas; Hazeltine
(4006) Plessow; Fischer
(4007) Lagroix; Machlab; Ferber; Pratt
(4008) Feghhi; Rosenbaum
(4009) Gyurkovics; Stafford; Levita
(4010) Braun; Arrington
(4011) Christopher; Redick
(4012) Lim; Park; Cho
(4013) Wiradhany; Mathot; Nieuwenstein
(4014) Fan; Li; Ding; Cheng
(4015) Bailey; Shultz
(4016) Weichart; Turner; Sederberg
(4017) Hopman; LoTemplio; Scott; Strayer
(4018) Jeye; Slotnick
(4019) Appel; Wieth; Francis
(4020) Saeki; Saito

Bilingualism II (4021-4040)
(4021) Kałamała; Szewczyk; Senderecka; Chuderski; Wodniecka
(4022) Wadhera; Marton
(4023) Gleason; Kazanas
(4024) Kleinman; Gollan
(4025) Olson
(4026) Ljungberg; Sörman
(4027) O'Malley; Valian; Feitzinger
(4028) Heredia; Angelovska; Cieślicka
(4029) Lin Y; Lin P
(4030) Ratiu; Azuma
(4031) Jafferani; Basnight-Brown
(4032) Luque; Morgan-Short
(4033) Au Yeung; Chan
(4034) Annie; Titone
(4035) Stasenko; Gollan
(4036) Hoshino; Rodrigo Cristobal; Sakai
(4037) Yang; Olmstead; Viswanathan
(4038) Higby; Castillo; Medina; Castillo
(4039) Li; Gollan
(4040) Gurrola; Martínez; Negron; Medellín; Francis

Psycholinguistics II (4041-4062)
(4041) Irons; Fischer-Baum
(4042) Bannon; Humphreys
(4043) Warker; Fischer-Baum; Holloway; Poirier; Fasano
(4044) Denby; Goldrick
(4045) Hsu
(4046) Buchanan; Maxwell; Valentine; Cunningham; Gillenwaters; Padfield; Hopke; Van Nuland; Wikowsky
(4047) Lowder; Ferreira
(4048) Deibel; Folk
(4049) Potter; Almor
(4050) Siew
(4051) Botezatu; Kroll; Misra; Miller
(4052) Bowman; Robertson; Faulkenberry
(4053) Maass; Trout
(4054) Calcaterra; Hutchison
(4055) Snefjella
(4056) Riordan
(4057) Corddry; Berent
(4058) Di Betta; Jakubiel-Smith
(4059) Tessmer; Xie; Chandrasekaran
(4060) Casado; Ferré; Paolieri
(4061) Getz; Toscano
(4062) Zhou; Eskew, Jr.; Pearlmutter

Embodied Cognition (4063-4082)
(4063) Nishiguchi; Imaizumi; Tanno
(4064) Chong; Proctor
(4065) Smith; Davoli; Knapp; Abrams
(4067) Schwob; Lebkuecher; Kabasa; Kwon; Mason; MacDonald; Weiss
(4068) King-Shepard; Kuo; Nokes-Malach
(4069) Makinae; Kasai
(4070) Nguyen; Palmer; Aday; Davoli; Bloesch
(4071) Park
(4072) Yu; McBeath; Glenberg
(4073) Jia; Lu; Jiang; Zhang
(4074) Lu; Guo; Jia
(4075) Bueno; Seigneuric; Megherbi; Kacinik; Elbro; Oakhill
(4076) Bart; Koch; Rieger
(4077) Rieger; Dahm
(4078) Pacione; Pathak; Patel; Tremblay; Welsh
(4079) Welsh; Patel; Pathak; Jovanov; Pacione; Yoxon
(4080) Agauas; Thomas
(4081) Sheya; Dhaim

(4082) Casserly; Kuzmickaite

Numerical Cognition (4083-4095)
(4083) Xing; Zax; Paul; Cordes; Barth; Patalano
(4083) Liu; Bradley-Zrada; Tversky
(4085) Anchan; Soylu
(4086) LaCour; Serra
(4087) Paul; Williams; Zax; Patalano; Barth
(4088) Masson; Thevenot
(4089) Carrillo; Taraban
(4090) Huebner; Smith; LeFevre
(4091) Myer; Shipley
(4092) Marghetis; Landy; Goldstone
(4093) Morehead; Thompson; Dunlosky
(4094) Braithwaite; Leib; McMullen; Siegler
(4095) Talboy; Schneider

Spatial Memory and Cognition (4096-4108)
(4096) Jaeger; Levin
(4097) Sen; Boduroglu
(4098) Kao; Michaelcheck; Ferrera; Terrace; Jensen
(4099) Nardi; Clark; Holden; Twyman
(4100) Holden; Hampson
(4101) Gardony; Boyce; Horner; Shorter; Stainrod; Brunye; Amburn
(4102) Cody; Hund
(4103) Gunalp; Chrastil; Hegarty
(4104) Liu; Huang; Sun
(4105) Brunye; Gardony; Martis; Hendel; Taylor
(4106) Spets; Slotnick
(4107) Lim; Kelly; Carpenter
(4108) Timm; Papenmeier

Acquisition of Cognitive Skills (4109-4122)
(4109) Krupskyy; Wong; Barnes; Bradshaw; Moss
(4110) Zhang; Shin
(4111) Zhang; Johndro; Budson; Gutchess
(4112) Growns; Martire
(4113) Daniels; Moreau; Macnamara
(4114) Bainbridge; Mayer
(4115) Wells; Mayer; MacNamera; Plass; Homer
(4116) Hatano; Goto; Shigemasu
(4117) Vachon; Saint-Aubin; Pozzi; Harrigan; Marois
(4118) Mohammed; Katz; Parlett; Buschkuehl; Steyvers; Jonides; Shah; Jaeggi
(4119) Frank; Macnamara
(4120) Goodman; Seymour
(4121) Yakushijn
(4122) Pan; Lovelett; Phun; Rickard

Human Learning and Instruction II (4123-4150)
(4123) Al-Aidroos; Plater; Wiens; Nyman; Valecha
(4124) Harper; Bowles; Amer; Pandza; Linck
(4125) Read
(4126) Hanson; Yan
(4127) Fiorella; Kuhlmann
(4128) Zepeda; Nokes-Malach
(4129) Zhang; Fiorella
(4130) Smith; Cosentino; Huff
(4131) Salovich; Rapp
(4132) Redondo; Cho
(4133) Vuorre; Metcalfe
(4134) Robey; Dougherty
(4135) Lithander; Karaca; Sumeracki; Weinstein
(4136) Potvin; Sullivan
(4137) Ortegren; Daniels
(4138) Sozer; Mado; Hirst
(4139) Newman; DeCaro
(4140) Kuepper-Tetzel; Abercrombie
(4141) Pilegard
(4142) Arnold; Vargas Restrepo; Taylor; Rolack; Wright; Marsh
(4143) Broeren; Verkoeijen; Heijltjes; Arends; Smeets
(4144) Hausman; Rhodes
(4145) O'Day; Karpicke
(4146) Liu; Sparck; Bjork
(4147) Pirozzolo; Foss
(4148) Giebl; Mena; Li; Cook; Bjork E; Bjork R
(4149) Orscheschek; Rickard; Schubert; Strobach
(4150) Frank; Pugh; Hughes; Touron

Eyewitness Identification (4151-4170)
(4151) Toglia; Lovaas; Rumschik; Todorovic; Berman
(4152) Nesbitt; Malavanti; Weaver
(4153) Colloff; Wixted
(4154) Grabman; Dodson
(4155) Colaizzi; Kornell
(4156) Gier; Kreiner
(4157) Bialer; Brainerd
(4158) Gordon; Harvey; Sommers; Bulevich; Thomas
(4159) Briere; Wang; Drever; Marche
(4160) Akers-Goodwin; Ploran
(4161) Manley; Chan; Wells
(4162) Akan; Benjamin
(4163) Lin; Tekin; Roediger
(4164) Goodsell; McAdoo; Gronlund
(4165) Jones; Carlson; Lockamyeir; Carlson
(4166) Clevinger; Kleider-Offutt
(4167) Rothweiler; Meissner
(4168) Wilson; Donnelly; Christenfeld; Wixted
(4169) Kurinec; Weaver
(4170) Williams; Gilzow

Autobiographical Memory (4171-4197)
(4171) Reynolds; Lyday; Laurienti; Dagenbach
(4172) Barzykowski; Staugaard; Niedźwieńska; Mazzoni
(4173) García-Bajos; Migueles; Aizpurua
(4174) Tremblay-McGaw; Peterson
(4175) Wraga; Lednicky; Chen
(4176) Sagi; Jones
(4177) Niven; Miller
(4178) Tekcan; Ekinci
(4179) Hacibektasoglu; Boduroglu
(4180) Sanson; Takarangi
(4181) Sawczak; Moscovitch; McAndrews
(4182) Wilcox; Arch; Ives; Renger; Friedman; Andrews-Hanna
(4183) Putnam; Ross; Sterling-Maisel
(4184) Patihis; Herrera; Jackson; Alexander
(4185) Wilson; Lurie; Dodson

(4186) Cardenas; Crozier; Strange
(4187) Burnell; Garry
(4188) Taylor; Garry; Zajac; Takarangi; Jordan
(4189) Berger; Saphan; Brown
(4190) Mert; Tekcan
(4191) Fickling; Kahana**
(4192) Yang; Deffler; Marsh
(4193) Briere; Marche
(4194) Merck; Hirst
(4195) Kawaguchi; Nakamura
(4196) Buquoi; Isurin
(4197) Shrikanth; Szpunar**

Working Memory II (4198-4223)
(4198) Gunalp; Rathbun; Meyerhoff; Stieff; Franconeri; Hegarty
(4199) Jaroslawska; Rhodes
(4200) Iordan; Cooke; Moored; Katz; Buschkuehl; Jaeggi; Polk; Peltier; Jonides; Reuter-Lorenz
(4201) Fechner; Oberauer; Singmann; Shepherdson; Vandekerckhove; Schmiedek
(4202) Wilburn; Metzger; Gershman; Mehiel; Litchman; Silang
(4203) Tsubomi; Fukuda; Kikumoto; Mayr; Vogel
(4204) Mallett; Mummaneni; Lewis-Peacock
(4205) Grinschgl; Papenmeier; Meyerhoff
(4206) Aldugom; Fenn; Cook
(4207) Mızrak; Shepherdson
(4208) Shimi
(4209) Arcos; Jaeggi; Grossman
(4210) Poloczek; Jarrold
(4211) Overkott; Souza
(4212) Ishiguro; Satoru
(4213) Doherty; Belletier; Rhodes; Jaroslawska; Camos; Barrouillet; Cowan; Naveh-Benjamin; Logie
(4214) Simal; Jolicoeur
(4215) Werner; Parks
(4216) Makovski
(4217) Chooi; Logie
(4218) Kovács; Snijder; Hao; Conway
(4219) Ngiam; Khaw; Holcombe; Goodbourn
(4220) Winiger; Singmann; Kellen
(4221) Green; Pratte
(4222) Henderson; Harrell; Cooper; Yancey; Reed; Sargent
(4223) Lilienthal

Cognition and Technology (4224-4245)
(4224) Tullo; Faubert; Bertone
(4225) Wagner; Dickinson; Steele; Bergman
(4226) Waer; van der Wel
(4227) New; Kaiser
(4228) Patel; Sarno; Lewis; Neider; Bohil
(4229) Schertz; Kardan; Berman
(4230) Faghihi; Garcia; Vaid
(4231) Brosowsky; Crump
(4232) Lurie; Wilson; Dodson; Westerman
(4233) Milliken; Henkel
(4234) Day; Fenn; Ravizza
(4235) McKinley; Benjamin
(4236) Hays; Smith
(4237) Siler; Hamilton; Benjamin
(4238) Soares; Storm
(4239) Schmidt C; Schmidt S
(4240) Widdowson; Yoon; Wang; Hovakimyan
(4241) Feuer; Schober
(4242) Varao-Sousa; Lerand; Aleman; Szpunar**; Kingstone
(4243) Parong; Mayer
(4244) Bradshaw; Roberson
(4245) Cockrum; López

Speech Perception (3138-3162)
(4246) Biro; Shin; Zeng; Tremblay

SATURDAY NOON, NOVEMBER 17, 2018
12:00 PM-1:30 PM

Lunchtime Workshop: Psychonomics Digital Activities; Bring your lunch to Strand 12 A/B, 2nd floor

SATURDAY AFTERNOON, NOVEMBER 17, 2018
1:30 PM-3:30 PM
Spoken Sessions (199-263)

Symposium V: What Speech Prosody Can Tell Us About Cognition (199-203) Celestin E
1:50-2:05 PM Watson
2:10-2:25 PM Kurumada; Buxó-Lugo
2:30-2:45 PM Ferreira
2:50-3:05 PM Breen
3:10-3:25 PM Jacobs

Collaborative Remembering and Collective Memory (204-208) Celestin BC
1:30-1:45 PM Rajaram
1:50-2:05 PM Hirst; Fagin
2:10-2:25 PM Abel; Umanath; Wertsch; Roediger
2:30-2:45 PM Corning; Schuman
2:50-3:05 PM Szpunar

Decision Making III (209-214) Celestin F
1:30-1:45 PM Budescu; Zhang; Mellers; Chen
1:50-2:05 PM Young; McCoy; Sutherland
2:10-2:25 PM Wall; Kohn; Gunawan; Brown
2:30-2:45 PM Ghaffari; Fiedler; von Helversen
2:50-3:05 PM Eerland; van Charldorp
3:10-3:25 PM Lewandowsky; Madsen; Pilditch

Attention I (215-220) Celestin D
1:30-1:45 PM Klein; Arora; McCormick; Rehan

1:50-2:05 PM Kan; Drummey; Andrew; Cushing
2:10-2:25 PM Wolfe; Wu
2:30-2:45 PM Liefooghe
2:50-3:05 PM Craik; Eftekhari; Binns
3:10-3:25 PM Gibson; Healey; Gondoli

Working Memory: Vision and Neural Mechanisms (221-225) Celestin GH
1:30-1:45 PM Pratte
1:50-2:05 PM Brady; Schurgin; Wixted
2:10-2:25 PM Souza; Overkott; Oberauer
2:30-2:45 PM Osaka; Kaneda; Azuma; Yaoi; Osaka
2:50-3:05 PM Cowan; Rhodes; Doherty; Jaroslawska; Belletier; Naveh-Benjamin; Barrouillet; Camos; Logie

Sensation and Perception II (226-230) Celestin A
1:30-1:45 PM Gallup; Ramirez; Ryan; Eldakar
1:50-2:05 PM Reeves; Amano
2:10-2:25 PM Schloss; Sibrel; Welch; Lai
2:30-2:45 PM Burns
2:50-3:05 PM Hubbard; Ruppel

Consciousness (231-236) Celestin BC
3:30-3:45 PM McBeath; Tang
3:50-4:05 PM Kane; Smeekens; Meier; Welhaf
4:10-4:25 PM Wierzchoń
4:30-4:45 PM Kimchi
4:50-5:05 PM Eitam
5:10-5:25 PM Dulany

Human Learning and Instruction II (237-242) Celestin GH
3:30-3:45 PM Metcalfe; Vuorre
3:50-4:05 PM Finn
4:10-4:25 PM Winchell; Lan; Grimaldi; Pashler; Baraniuk; Mozer
4:30-4:45 PM Watter; Ptok
4:50-5:05 PM Linck; Tomlinson; Masters; Lancaster; Clark; Balass
5:10-5:25 PM Levin; Seiffert; Carter; Little; Marshall

Speech Perception (243-248) Celestin A
3:30-3:45 PM Marian; Hayakawa; Lam; Schroeder
3:50-4:05 PM Ingvalson; Lansford
4:10-4:25 PM Baese-Berk; Samuel
4:30-4:45 PM Samuel; Choi; Tong
4:50-5:05 PM Banai; Lavie
5:10-5:25 PM Neuhoff; Sikich

Conceptual Processes (249-253) Strand 13 AB
3:50-4:05 PM Wyble; Hess; Callahan-Flintoft; Folk
4:10-4:25 PM Hoffmann; Albrecht; von Helversen
4:30-4:45 PM Durgin; Zhu
4:50-5:05 PM Young; Ou; Simmering
5:10-5:25 PM Pepperberg; Cornero

Statistics: Reproducibility (254-258) Celestin D
3:50-4:05 PM Fritz; Morris
4:10-4:25 PM Ghazal; Allan; Cokely; Garcia-Retamero
4:30-4:45 PM Stephens; Hayes; Matzke
4:50-5:05 PM Shiffrin; Chandramouli
5:10-5:25 PM Heck

Perception, Memory, and Skilled Performance (259-263) Celestin F
3:50-4:05 PM Macnamara; Frank
4:10-4:25 PM Rickard; Vul*; Jovelett
4:30-4:45 PM Gill; Stefanucci; Olpin; Thompson
4:50-5:05 PM Pfeuffer; Kiesel
5:10-5:25 PM Paxton; Griffiths

SATURDAY EVENING, NOVEMBER 17, 2018

4:00 PM-7:30 PM
POSTER SESSION V (5001-5246)
ELITE A

Visual Perception (5001-5021)
(5001) Miyazaki; Kawahara
(5002) Goetschalckx; Wagemans
(5003) Goold; Choi; Henderson
(5004) Zosky; Vickery; Dodd
(5005) Soto; Wong
(5006) Dopkins; Galyer
(5007) Yokosawa; Nobuta; Asano
(5008) Bukach; Laskowitz; Deutsch; Cole; Couperus; Reed
(5009) Chunharas; Ahsan; Hagopian; Ramachandran
(5010) Liu; Tang; Zhou
(5011) Kaplan; Teng; Kravitz
(5012) Thomas; Didierjean; Kuhn
(5013) Keezing; Durgin
(5014) Masuoka; Nishiyama; Terasawa
(5015) Center; Beck
(5016) Tong; Dubé
(5017) Armstrong; Cutting
(5018) Li; Ito; Yotsumoto
(5019) Sterling; Berkhout
(5020) Lappe; Mayer; Riddell
(5021) Ito; Yotsumoto

Visual Search and Scene Processing (5022-5049)
(5022) Ueda
(5023) Swallow; Li; Moyal
(5024) Sahar; Lamy; Makovski
(5025) Hutson; Smith; Saucier; Miller; Strain; Palavamäki; Loschky
(5026) Anderson; Bischof; Kingstone
(5027) Niimi
(5028) Cronin; Irwin
(5029) Harding; Shiffrin

(5030) Still; Hicks; Still
(5031) Madrid; Hout
(5032) Conley; Sudevan; Doering; Wheaton
(5033) Tellinghuisen; Moes
(5034) Wilmott; Song
(5035) Thayer; Bahle; Mordkoff; Hollingworth
(5036) Williams; Drew
(5037) Lanagan-Leitzel
(5038) Adamo; Brem; Mitroff
(5039) Nicora; Drew; Stokes; Stefanucci
(5040) De Lillo; Brunsdon; Bradford; Fysh; Ferguson
(5041) Bahle; Hollingworth
(5042) Huang; Yang; Fifić
(5043) Drisdelle; Jolicoeur
(5044) Gokce; Geyer
(5045) Hebert; Goldinger; Walenchok
(5046) Desjardins; Lefebvre; De Beaumont; Jolicoeur
(5047) Scarince; Hout
(5048) Jobson; Moore
(5049) Robinson; Merrill

Cognitive Control (5050-5069)
(5050) Ashitaka; Shimada; Wada
(5051) Foerster; Wirth; Kunde; Pfister
(5052) Bejjani; Egner
(5053) Jiang; Macnamara
(5054) Schneider
(5055) Green; Sansevere; Wolf; Robbins; Moore
(5056) Moss; Kikumoto; Mayr
(5057) Song; Guyton; Muir; White
(5058) Durriseau; Moss
(5059) Fröber; Stürmer; Frömer; Dreisbach
(5060) Vermeylen; Braem; Notebaert
(5061) Leontyev; Yamauchi
(5062) Craig; Goller; Holtzman; Zacka; Hood; Banks
(5063) Kozlik; Fischer
(5064) Riechelmann; Huestegge
(5065) Hirsch; Koch; Karbach
(5066) Pfister; Wirth; Weller; Foerster; Schwarz
(5067) Whitlock; Chiu; Sahakyan
(5068) van 't Wout; O'Donnell; Saw; Jarrold
(5069) Nusbaum; Hinson; Whitney; Stenson

Cognitive Aging (5070-5099)
(5070) Yu; Yang; Hsieh
(5071) Millar; Balota; Nicosia; Hutchison; Duchek
(5072) Harada E; Harada Y; Suto
(5073) Hinault; Kroeker; Incekara; Bakker; Dagher; Courtney
(5074) Sarno; Lewis; Bohil; Neider
(5075) Maddox; James; Hocut; Boyd-Rogers
(5076) Floridou; Halpern; Kvavilashvili; Williamson
(5077) Hughes; Allen; Lute; Houston
(5078) Bang; Lee Y; Lee J; Hahn
(5079) Cyr; Romero; Galin-Corini
(5080) Shafto; Abrams; James
(5081) Zhang; Eppes; Diaz
(5082) Ostrand; Gunstad
(5083) Saryazdi; Hou; Chambers
(5084) Cody; Wahlheim
(5085) Kuhns; Touron
(5086) Peters; Sheldon
(5087) Hosokawa; Tomida
(5088) Zakrzewski; Sanders; Berry
(5089) Isingrini; Sacher; Taconnat; Bouazzaoui
(5090) Bhangal; Barber
(5091) Bouazzaoui; Angel; Fay; Sacher; Froger; El Yagoubi; Taconnat
(5092) Rhodes; Abbene; Naveh-Benjamin
(5093) Greene; Naveh-Benjamin
(5094) Thapar; Osman
(5095) Otsuka; Shizawa; Sato; Itakura
(5097) Kirby; Van Gemmert; Ramakrishnapillai; Brouillette; Keller; Carmichael
(5098) Davis; Levy; Durham; Tomlin
(5099) Decker; Naveh-Benjamin

Reasoning and Judgment (5100-5128)
(5100) Nguyen; Dougherty
(5101) Volante; Cruit; Tice; Shugars; Hancock
(5102) Sisso; Brun; Odermatt; Scheibehenne
(5103) Jalbert; Newman; Schwarz
(5104) Szollosi; Donkin; Newell
(5105) Buontempo; Kusev; Baranova; Heilman
(5106) Robbins; Hemmer
(5107) Martin; Kusev; van Schaik
(5108) Salomon-Amend
(5109) Omerzu; Speekenbrink; Hoffmann
(5110) Meyers; Bialek; Turpin; Koehler; Fugelsang
(5111) Walker; Meyers; Turpin; Stolz; Fugelsang; Koehler
(5112) Kwon; Rhee; Hahn
(5113) Sandoboe; Berent
(5114) Armstrong; Sparrow; Spaniol
(5115) Michal; Shah
(5116) Ellinghaus; Bausenhart; Ulrich
(5117) Jang; Lee
(5118) Simmons; Kershaw
(5119) Ellis; Brewer
(5120) Frischkorn; Schubert; Hagemann
(5121) Mielicki; Wiley
(5122) Papaioannou; Luck
(5123) Kiyokawa; Imashita; Kiribayashi; Marukawa; Matsuo; Nira
(5124) Fickle; Troupe; Westerberg
(5125) Todaro; Morris
(5126) Ash; Lee; Shurkova
(5127) Korovkin; Savinova; Luneva; Morozova
(5128) Raden; Jarosz

Event Cognition (5129-5144)
(5129) Feller; Schwan; Wiemer; Magliano
(5130) Kurby; Magliano; Ackerman
(5131) Barnhart; Duckert
(5132) Krass; Joergensen; Zeidan; Zirnstein; Altmann; Rossi
(5133) Stawarczyk; Kahle; Wahlheim; Zacks
(5134) Smith; Newberry; Bailey
(5135) Kelly; Heit
(5136) Puig Rivera; Szpunar*
(5137) Andrew; Drummey; Mozel; Cushing; Kan
(5138) Huff; Papenmeier; Merkt

(5139) Swets; Kurby
(5140) O'Rear; Radvansky
(5141) Kersten; Earles; Perry
(5142) Hermann; Zacks
(5143) Bangert; Carrasco; Kurby
(5144) Newberry; Bailey

Language (5145-5163)
(5145) Christofalos; Raney
(5146) Neville; Incera
(5147) Paes; Ellefson
(5148) Bice; Kurum; Kroll; Rossi
(5149) Geller; Landrigan; Mirman
(5150) de Bruin; Kapnoula; Duñabeitia
(5151) Thye; Geller; Pizarro; Szaflarski; Mirman
(5152) McGrew; Keefer; Brown; Pazos
(5153) Emerson; Özçalışkan; Conway
(5154) Duffels; Siakaluk; Matheson; Pexman; Harris
(5155) Barzy; Black; Williams; Ferguson
(5156) Avery; Jones
(5157) Chapman; Martin
(5158) Kumar; Balota; Steyvers
(5159) Kennison; Messer
(5160) Ellison; Wolff
(5161) Rickles; Balass; Bolger
(5162) Ovans; Huang; Novick
(5163) McCool; Bradshaw

False Memory II (5164-5183)
(5164) Calvillo; Baker
(5165) Alexander; Wahlheim
(5166) D'Angelo; Blalock
(5167) Cash; Lane
(5168) Ensor; Franklin
(5169) Morgan; Mickes*; Seale-Carlisle; Tamminen
(5170) Di Mauro; Xu; Chang; Walsh; Wood; Huff; Coane
(5171) Kashihara; Namba; Kabir; Miyatani; Nakao
(5172) Olszewska; Hodel; Luttenberger
(5173) Kawasaki; Okubo
(5174) Burnett; Gallo; Pan; Keysar
(5175) Corley; Selvam; Stephens; Ibragimova; Hindy
(5176) Yeh; Shih; Liou; He; Lim; Ruan
(5177) Rindal; Pollock; Lees; Martin; Wright; Zaragoza
(5178) Xu; Feng; Horwood; Chang; McBride; Coane
(5179) Goodwin; Cohee; Gladden; Kahn; Makori
(5180) Chang; Marche; Brainerd
(5181) DelGrosso; Fenn
(5182) Montagliani; Hockley
(5183) Payne; Eakin; Pratte

Implicit Memory (5184-5195)
(5184) Poulet; Didierjean; Goujon
(5185) Sanchez-Mora; Tamayo
(5186) Valle; Gómez-Ariza; Bajo
(5187) Kozloff; Nguyen; Arciuli; Qi
(5188) Nguyen; Sanchez Araujo; Georgan; Arciuli; Qi
(5189) Roberts; Forrin; MacLeod
(5190) Otsuka
(5191) Girard; Thiessen
(5192) Schorn; Thakur; Knowlton
(5193) Graham; Was
(5194) Basnight-Brown; Kazanas; Altarriba
(5195) Ricks; Fuhrman

Metamemory II (5196-5213)
(5196) Enam; McDonough
(5197) Tirso; Geraci
(5198) Ybarra; Allan; Garcia-Retamero; Feltz; Cokely
(5199) England; Serra
(5200) Saenz; Geraci
(5201) Wang; Yan
(5202) Sorenson; Kelley; Mitchum
(5203) Mitton; Fiacconi; Laursen
(5204) Fiechter; Kornell
(5205) Lu; Penney; Kang
(5206) Green; Serra
(5207) Carbajal; Ryals; Witherby; Tauber
(5208) Ariel; Karpicke
(5209) Wright; Smith
(5210) Badali; Reeder; Anderson; Paucarpura; McGillivray
(5211) Cohen; Reber
(5212) Mangels; Williamson
(5213) Markant

Recognition Memory II (5214-5233)
(5214) Lloyd; Oppenheimer; Learmonth
(5215) Meldrum; Cooper; Najjab; Odegard; Toups; Bartlett
(5216) Ensor; Hockley; Surprenant
(5217) Lee; Fernandes
(5218) Huebert; Cleary; White
(5219) Williams; Adams; Bodner
(5220) Greenwald; Kantner; Dobbins
(5221) Scofield; Price; Flores; Merkle; Johnson
(5222) Dianiska; Meissner; Chan
(5223) McCain; Pierce; Gallo
(5224) Carleton; Gregg
(5225) Megla; Janakiefski; Maxcey
(5226) Hong; Maxcey; Leber
(5228) Goujon; Tribout
(5229) Christman
(5230) Curl; White; Criss
(5231) Malejka; Heck; Erdfelder
(5232) Swirsky; Marinacci; Spaniol
(5233) Jeon; Resnik; Feder; Kim

Statistics and Methodology II (5234-5246)
(5234) Allan; Ghazal; Garcia-Retamero; Cokely
(5235) Liang; Newell; Rakow; Yechiam
(5236) Kvam; Romeu; Busemeyer; Vassileva
(5237) Etz; Vandekerckhove
(5238) Cox; Kalish
(5239) Simmons; Luck
(5240) Morris; Fritz
(5241) Steele; Amador; Easter; Ross
(5242) Haaf; Rhodes; Sun; Snyder; Naveh-Benjamin; Rouder
(5243) Anderson
(5244) von Bastian; Locher
(5245) Plant
(5246) Bruni; Macbeth; Atagi; Mech; Sarkis; Montag; Karan; Robbins; Chiarello

SUNDAY MORNING, NOVEMBER 18, 2018

8:00 AM-10:00 AM

Spoken Sessions (265-329)

Test Effects on Memory (265-270) Strand 11 B

8:00-8:15 AM Butler
8:20-8:35 AM Smith; Davis; Thomas
8:40-8:55 AM Hopper; Huber
9:00-9:15 AM Little
9:20-9:35 AM Fazio; von Bastian
9:40-9:55 AM Neely; Crocco; Vitrano; Bolte

Bilingualism II (271-276) Strand 11 A

8:00-8:15 AM Titone; Vingron; Palma; Gullifer; Whitford; Friesen; Jared
8:20-8:35 AM Zirnstein; Jaranilla; Fricke; Zhang; Guo; Kroll
8:40-8:55 AM Bertram; Salmela; Lehtonen; Vainio
9:00-9:15 AM Raney; Campbell; Riano Rincon; Miller; Christofalos
9:20-9:35 AM Francis; Guedea
9:40-9:55 AM Koch; Philipp

Cognitive Control (277-281) Strand 12 B

8:00-8:15 AM Potts; Carlson
8:20-8:35 AM Colonius
8:40-8:55 AM Braem
9:00-9:15 AM Kikumoto; Mayr
9:20-9:35 AM Turner; Rodriguez; Liu; Molloy; McClure

Decision Making IV (282-286) Strand 10 B

8:00-8:15 AM Cataldo; Cohen
8:20-8:35 AM De Neys; Frey; Borst; Houdé; Vidal; Bago
8:40-8:55 AM Diederich; Wyszynski; Ritov
9:00-9:15 AM Andriyanova; Bakuleva
9:20-9:35 AM Hotaling; Jarvstad; Donkin; Newell

Recognition and Recall (287-291) Strand 12 A

8:00-8:15 AM Osth; Yang; Lilburn; Little
8:20-8:35 AM Wixted; Schurgin; Brady
8:40-8:55 AM Lange; Berry; Hollins
9:00-9:15 AM Maxcey
9:20-9:35 AM Caplan; Sommer; Madan; Fujiwara

Statistics and Methodology II (292-295) Strand 13 A

8:00-8:15 AM Folsom-Kovarik; Chen
8:20-8:35 AM Kravitz; Kramer; Cox; Mitroff
8:40-8:55 AM Edmunds; Milton; Wills
9:00-9:15 AM Dixon; Glover

Working Memory II (296-301) Strand 10 B

10:00-10:15 AM Manelis; Rodgers; Swartz; Phillips
10:20-10:35 AM Loaiza
10:40-10:55 AM Camos; Belletier
11:00-11:15 AM Kozhevnikov
11:20-11:35 AM Awh; Hakim; Adam; Vogel
11:40-11:55 AM Plancher; Kumar; Shiffrin

Prospective Memory (302-306) Strand 11 B

10:20-10:35 AM Scullin; Kurinec; Jones
10:40-10:55 AM Moore; Lampinen; Adams
11:00-11:15 AM Shelton; Scullin; Vorwerk; Hacker
11:20-11:35 AM Horn; Freund
11:40-11:55 AM Ball; Vogel; Ellis; Brewer

Attention II (307-312) Strand 12 A

10:00-10:15 AM Verwey
10:20-10:35 AM Lamy; Zivony
10:40-10:55 AM Beck; Moen
11:00-11:15 AM Goller; Choi; Ansorge
11:20-11:35 AM Barker; Elliott
11:40-11:55 AM Gabouer; Bortfeld

Language Comprehension and Production (313-319) Strand 13 A

9:40-9:55 AM Viswanathan; Olmstead
10:00-10:15 AM Chiarello; Macbeth; Bruni; Atagi; Mech; Sarkis; Montag; Karan; Robbins
10:20-10:35 AM Malt; Scully; Lebkuecher; Joseph
10:40-10:55 AM You; Nam; Allopenna; Brown; Magnuson
11:00-11:15 AM Berent; Platt; Theodore; Pascual-Leone; Balaban
11:20-11:35 AM Feldman; van Rij; Dale
11:40-11:55 AM Nisbet; Kuperman; Siegelman; Frost

Reasoning and Judgment (320-324) Strand 11 A

10:20-10:35 AM Bilalic
10:40-10:55 AM Smith; Hernandez; Beda
11:20-11:35 AM Brashier; Marsh
11:40-11:55 AM Walker; Rodriguez; Christenfeld; Vul*

Reading II (325-329) Strand 12 B

10:20-10:35 AM Sehyr; Emmorey
10:40-10:55 AM Lelonkiewicz; Crepaldi
11:00-11:15 AM Schubert; Cohen; Fischer-Baum
11:20-11:35 AM Schroeder; Pittrich
11:40-11:55 AM Perea; Fernández-López; Marcet

Opening Session/Keynote Address
Celestin D/E, Thursday Evening, 8:00 PM
Hal Pashler, University of California, San Diego
Building a More Replicable Experimental Psychology: Key Challenges

Automatic Processing
Celestin D, Friday Morning, 8:00-9:40 AM
Chaired by Athanassios Protopapas, University of Oslo

8:00-8:15 AM (1)

Freedom From Interference and Serial Naming Advantage as Indices of Processing Automaticity: A Cross-Linguistic Exploration With Dice and Digits. ATHANASSIOS PROTOPAPAS, *University of Oslo*, KATERINA KATOPODI, *National and Kapodistrian University of Athens*, ANGELIKI ALTANI and GEORGE GEORGIOU, *University of Alberta* – Serial naming tasks are robustly associated with reading fluency. The relation is attributed to simultaneously processing multiple items through different stages, subject to limitations from attentional bottlenecks that are presumably observable in interference situations. A "serial advantage" (serial naming faster than discrete naming) indicates that processing of upcoming items takes place while articulating previous items, to the extent individual items resist interference from one another. Here we examined whether naming interference and serial advantage provide concordant indices of automaticity using data from 409 English-speaking Canadian and 302 Greek children in Grades 1, 3, and 5, performing digit and dice naming in serial and discrete formats, including cross-interference conditions with dice images made up of digits. Over mean scores across tasks, high interference was indeed associated with low serial advantage. However, in individual differences analysis, naming tasks were strongly intercorrelated, leaving little reliable variance in indices based on comparisons between conditions.
Email: Athanassios Protopapas, protopap@gmail.com

8:20-8:35 AM (2)

Capture and Control: Working Memory Modulates Attentional Capture by Reward-Related Stimuli. POPPY WATSON, DANIEL PEARSON, STEVE MOST, and MIKE LE PELLEY, *University of New South Wales, Sydney* – Previous research suggests that executive control processes act to reduce distraction by physically-salient but task-irrelevant stimuli in the visual scene. However it is not only physically-salient stimuli that grab our attention - stimuli paired with high relative to low reward involuntarily capture eye gaze, an effect known as value-modulated-attentional capture (VMAC). In two experiments, we investigated whether resource-dependent executive control processes can modulate the effect of reward on attentional capture, as is observed with physical salience. To this end we measured eye gaze during the VMAC task under conditions of both high and low working-memory load. Replicating previous studies we found a VMAC effect – increased involuntary attentional capture by a distractor signalling high relative to low reward. Furthermore, this effect was more pronounced under conditions of high working memory load - highlighting the causal role of executive control processes in reducing distraction by reward-related stimuli.
Email: Poppy Watson, poppy.watson@unsw.edu.au

8:40-8:55 AM (3)

What the Avatar's Eye Tells the Observer's Brain: A Critique of Spontaneous Perspective Taking. GEOFF G. COLE and ABBIE C. MILLETT, *University of Essex* – In recent years, a number of authors have suggested that the ability to represent the visual perspective of other individuals occurs rapidly and outside of conscious control, i.e., spontaneously. We present a critique of this notion both on empirical and theoretical grounds. We will argue that the experiments and paradigms that purportedly demonstrate spontaneous perspective taking have not as yet convincingly demonstrated the existence of such a phenomenon. We also argue that it is not possible to represent the percept of another person, and that the field is in danger of suggesting that humans can represent the visual experience of others. That is, going beyond assuming that we can represent another's viewpoint in anything other than symbolic form. In this sense, we suggest that the perspective taking notion has parallels with the pictorial theory of mental imagery. Finally, a new paradigm will be presented that will allow a more appropriate test of the perspective taking theory.
Email: Geoff G. Cole, ggcole@essex.ac.uk

9:00-9:15 AM (4)

Male Nurses and Female Builders: Uncovering the Cognitive Basis of Gender Stereotypes. KRISTEE LEE JOBSON, MARK RUBIN, and AMI EIDELS, *University of Newcastle* (Presented by Ami Eidels) – Stereotypes are beliefs about a person that are based on their group membership. Stereotypes facilitate expectations about the characteristics of individuals within a certain groups. For example, we are more likely to expect a nurse to be female rather than male and construction builder to be male rather than female. We offer and test a cognitive, attention-based account for stereotypes and counterstereotypes. In a nut shell, we propose that judgments concerning an individual could be affected by their group membership due to the failure of selective attention: When making judgements about others, people fail to attend exclusively to the individual's relevant attributes (profession) and instead take into account beliefs about the group (gender), which they should have ignored. Our experiments used an adapted version of Garner's speeded-classification paradigm. Participants were presented, on each trial, with an image of a female or a male employee, nurse or builder, and had to classify the profession and ignore the sex of the displayed figure. Response-time measures allow us to assess selective attention and thus the extent to which participants succumb to irrelevant category information and to stereotypical beliefs.
Email: Ami Eidels, ami.eidels@newcastle.edu.au

9:20-9:35 AM (5)

Contextual Modulation of Social Attention in Semi-Naturalistic Situations. BENNETT I. BERTENTHAL and SAMUEL M. HARDING, *Indiana University* – From cradle

to grave, humans are biased to look at conspecifics, especially their eyes and faces. Yet, this generalization is not entirely consistent with findings from joint attention studies. In real-time interactions with others, we tend to look at their eyes and faces during direct gaze, but shift our gaze to the object of their regard during averted gaze. This evidence for joint attention suggests that visual attention to faces is modulated by the direction of eye gaze. In order to study the real-time dynamics of this process, we measured participants' distribution of attention to faces and objects (with eye tracking) while viewing videos of an actor talking to them and demonstrating a series of object-directed actions from a first-person perspective. Bayesian statistical modeling revealed that social attention changes with age and is modulated by direction of eye gaze, but not by low-level featural salience.
Email: Bennett I. Bertenthal, bbertent@indiana.edu

Judgment
Strand 13 AB, Friday Morning, 8:00-9:40 AM
Chaired by Jessecae Marsh, Lehigh University

8:00-8:15 AM (6)
Integrating Discrepant Informants in Judgment. JESSECAE MARSH, *Lehigh University*, ANDRES DE LOS REYES, *University of Maryland, College Park*, ANDREW ZEVENEY, *Duke University* – In making judgments, people often have to integrate information from sources that provide discrepant information. For example, a person may receive conflicting recommendations for a local restaurant or contrary pieces of career advice. We examined how people integrate information from two sources when those sources provide discrepant reports. We focused on how people integrate reports about the outcomes of mental health treatments, as informants commonly provide discrepant reports in this setting. Participants saw accounts of a child's treatment outcomes from two informants (child, parent). We varied who was more pessimistic about improvement (child or parent) and the type of disorder being treated (disorder characterized by internal symptoms like depression or a disorder like ADHD characterized by external symptoms). Participants weighted their judgments based on the informant who they believed would be more insightful about the condition but was pessimistic about improvement; an effect observed with both lay (Experiment 1) and expert (Experiment 2) judges. Our findings suggest that when people make judgments they have strong domain intuitions that guide their integration of discrepant information.
Email: Jessecae Marsh, jessecae.marsh@lehigh.edu

8:20-8:35 AM (7)
False Consensus and the Role of Social Circles. WANDI BRUINE DE BRUIN, *University of Leeds*, MIRTA GALESIC, *Santa Fe Institute*, ANDREW M. PARKER and RAFFAELE VARDAVAS, *RAND Corporation* – False consensus refers to people's tendency to over-use information about themselves to estimate population characteristics. In a large national survey about influenza, we tested predictions from a recent social sampling model about mechanisms underlying false consensus. We posited that people use (relatively accurate) information about their social contacts to assess population characteristics, which produces false consensus in homogeneous social circles. We found false consensus patterns in flu-related beliefs and behaviors. For example, participants reporting consistent vaccination behavior (vs. not) estimated greater population vaccine coverage. Following the social sampling model, this relationship was mediated by participants' reported proportion of their social circles getting vaccinated, especially among those with more homogeneous social circles. Participants who reported more heterogeneous social circles showed less false consensus, and even leaned towards false uniqueness. We discuss implications of our findings for literatures on false consensus, false uniqueness, social sampling, and social norms interventions for behavior change.
Email: Wandi Bruine de Bruin, w.bruinedebruin@leeds.ac.uk

8:40-8:55 AM (8)
Boosting Experts' Judgment Accuracy via Coherentization and Aggregation. DAVID R. MANDEL, *Defence Research and Development Canada*, CHRISTOPHER KARVETSKI, *Unaffiliated*, MANDEEP K. DHAMI, *University of Middlesex* – Intelligence analysis is a consequential area of expert probabilistic judgment. To support analysts the intelligence community (IC) recommends use of structured analytic techniques (SAT), yet SATs have not received proper scientific evaluation. In the present research, 50 analysts judged the probability of 4 mutually exclusive and collectively exhaustive hypotheses and 2 superordinate groupings on the basis of base-rates and 12 probabilistic cues. Analysts were randomly assigned to SAT or no-SAT conditions. In the former, they were trained in and used the Analysis of Competing Hypotheses (ACH) SAT. The difference between groups in accuracy (mean absolute error) was small in favor of no-SAT, and the SAT group was marginally less coherent on an additivity test. Accuracy was substantially improved by coherentizing analysts' judgments (a process that ensures the probabilities respect the unitarity axiom). Accuracy was also improved by aggregating judgments, with most improvement attributable to a group size of 2 (vs. 1). Therefore, the IC might improve assessment quality by reducing emphasis on SATs, while capitalizing on developments in decision science, such as methods for recalibrating and aggregating probabilistic estimates.
Email: David Mandel, drmandel66@gmail.com

9:00-9:15 AM (9)
A Hindsight Bias Associated With the Illusory Sense of Prediction During Déjà vu. ANNE M. CLEARY, ANDREW M. HUEBERT, and KATHERINE L. MCNEELY-WHITE, *Colorado State University* – Recent research demonstrated an illusory sense of prediction during the déjà vu experience. During virtual tours of scenes, participants indicated a greater sense of predicting the next turn when experiencing déjà vu than when not, despite lacking actual predictive ability. Whereas prior research examined predictive judgments before a critical turn, the present study also examined postdictive judgments after the turn occurred. When navigation stopped short of a critical turn, participants indicated if they were experiencing déjà vu and if they had a feeling of knowing the direction of the next turn. Navigation then continued into the turn, with a

.50 probability of going right vs. left. Participants then indicated if they had successfully anticipated the turn. A postdictive bias, akin to the hindsight bias, was associated with both déjà vu and preceding feelings of prediction, as well as with higher scene familiarity intensity ratings. Familiarity may falsely signal successful prediction.
Email: Anne M. Cleary, Anne.Cleary@colostate.edu

9:20-9:35 AM (10)

Metamemory Viewed Through the Judgment Lens. ARNDT BRÖDER and MONIKA UNDORF, *University of Mannheim* – Metamemory research makes extensive use of judgments, such as judgments of learning (JOLs). In a JOL, people predict their chance of remembering an item in a memory test. According to the cue-utilization theory JOLs rely on probabilistic cues that are combined in an inference process. Accuracy as measured by the Gamma correlation between JOLs and actual performance is often mediocre, suggesting limited metacognitive abilities. In judgment and decision research, Brunswik's lens model is often used to decompose judgmental accuracy: A matching index G measures how adequately people's cue weights match the optimal weights, two reliability indices assess the predictability of judgments and environment, respectively, and a nonlinear component measures systematic variance not captured by the cues. We employed the lens model for the first time to analyze four published and one new JOL data sets. Although Gamma was higher than a Pearson correlation, it still underestimated metacognitive ability in terms of matching (G). Also, the nonlinear component was considerably higher than in other judgment domains, pointing to substantial item-person-interactions. We suggest the lens model as a potentially promising tool in metacognition research.
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Discourse Processes
Celestin A, Friday Morning, 8:00-10:00 AM
Chaired by Joanna Morris, Hampshire College

8:00-8:15 AM (11)

That Project Was a Rollercoaster: An ERP Test of Deliberate Metaphor Theory. SOPHIE GREENE, *Tufts University*, JOANNA MORRIS and DANIEL ALTSHULER, *Hampshire College* (Presented by Joanna Morris) – Deliberate Metaphor Theory (DMT), holds that deliberate metaphors are those that are intended in their production to be explicit metaphors, and that are understood and processed as such by the comprehender. Deliberate metaphors thus serve as a distinct rhetorical device with an explicit communicative goal. DMT posits that it is only for these deliberate metaphors that cross-domain mappings are recruited, as a result of the speaker signaling to the hearer---via distinct pragmatic cues---that the source domain should be explicitly represented and mapped to the target. In this ERP study we cued deliberate metaphors by using the word 'like' in sentences of the form 'a [target domain] is like a [source domain]', and compared N400 responses to words serving as the source domain in both deliberate and in non-deliberate metaphors. Although amplitudes of the N400 ERP component were more negative for metaphors than for literal sentences, the amplitude of N400 responses to deliberate and non-deliberate metaphors did not differ. These data suggest that contrary to the claims of DMT, deliberate and non-deliberate metaphors may be processed in similar ways.
Email: Joanna Morris, jmorris@hampshire.edu

8:20-8:35 AM (12)

Conversational Style and Task Performance. JENNIFER S. PARDO, ALEXANDER BACHERT, MONIQUE OWCZAREK, GEORGE PAULJOHN, and BETHANY TRILONE, *Montclair State University* – This study examines relationships between aspects of conversational style and task performance in the Montclair Map Task Corpus, which comprises recordings of task-oriented conversational interaction among 48 pairs of native English speakers. A previous analysis revealed that same-sex pairs of male interlocutors were less efficient than pairs involving females in this conversational setting—male talkers produced more words to elicit equivalent task performance from their partners on average, and greater verbosity of individual male talkers was associated with lower performance of their male partners. In contrast, greater verbosity of both male and female talkers was associated with improvements in female partner task performance. Analyses of speaking rate, inter-turn intervals, and turn exchange overlaps reveal similar complexities with respect to talker sex and pair composition. In general, performance of males in same-sex pairings differed from pairings that included females with respect to aspects of conversational style and their relationship with task performance.
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8:40-8:55 AM (13)

The Semantics of Silence: How Brief Pauses in Turn-Taking Trigger Pragmatic Inferences. CRAIG G. CHAMBERS and ADRIANA BALTARETU, *University of Toronto* – Turn-taking in dialogue normally reflects predictable patterns of timing. However, silences between contributions of dialogue partners ('inter-turn-intervals': ITIs) can sometimes become pragmatically meaningful. We explore how even small ITI contrasts affect inferences about what speakers are communicating, as well as the influence of one's language-processing abilities. Participants listened to recorded dialogues containing 'socially-loaded' Yes/No questions and another person's response ("Have you ever cheated on a test?" "No."), and rated the sincerity of the replies. ITI duration was varied across 500 ms steps. Replies were rated as increasingly insincere as ITI duration increased. Moreover, although older adults' (70+) and non-native listeners' ratings showed a similar gradient, replies were rated as more sincere across-the-board. The findings demonstrate how subtle differences in conversational timing shape communicative meaning, and the additional influence of one's own language processing traits: "Slower" comprehenders (non-natives, older adults) tolerate longer ITIs before interpreting them as carrying additional pragmatic meaning.
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9:00-9:15 AM (14)

Emotional Reactions and Myside Bias During Statement Reading: Insights From Eye-Tracking and Think-Alouds. JOHANNA K. KAAKINEN and SUVI K. HOLM, *University of Turku* – Forty-five participants with variable opinions on immigration read immigration-related statements (e.g., 'Immigrants commit more sex crimes than native Finns') while their eye movements were recorded. After each statement, participants rated its valence, arousal and credibility, and verbalized their thoughts. The results showed that a positive emotional reaction and high observed credibility were related to facilitation in processing. The word position effect in gaze duration (decrease in fixation times towards the end of a sentence) was greater, and regression path duration from the sentence end was shorter for positively valenced statements. High credibility was related to shorter regression path duration from the sentence end. These results suggest that liking of information (i.e., experienced positive valence, and high credibility) facilitates processing, whereas extra effort is invested into processing of disliked statements. The think-aloud data suggests that this extra effort is spent to disconfirm or refute the disliked statements. The present study implies that emotional reactions are part of the myside bias and play a role in how it materializes during text processing.
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9:20-9:35 AM (15)

Coordinating Meaning and Understanding During Reference Making. DELPHINE DAHAN, *University of Pennsylvania* – When talking about a specific entity multiple times, speakers must decide how to refer to it each time. Reliance on precedence is well established but its interpretation subject to debate. This study examined when, in a referential communication task involving a set of hard-to-describe figures, participants produced a precedent rather than a novel description. Precedents were favored first, people resorting to novel descriptions when the first proved unsuccessful. Precedents were also more frequent when participants' roles as director or matcher were maintained than switched. These findings highlight the multiplicity of factors people rely on when coordinating meaning and understanding.
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9:40-9:55 AM (16)

Automatic Evaluation of Texts for Gist Inferences. CHRISTOPHER R. WOLFE and MITCHELL DANDIGNAC, *Miami University*, VALERIE F. REYNA, *Cornell University* – Following Fuzzy-Trace Theory, we automatically assessed texts for features that help readers produce gist inferences. In a memory study, 64 participants recalled events under gist or verbatim instructions. Using Coh-Metrix, we analyzed their written responses to create Gist Inference Scores (GIS), an average of seven variables designed to assess the potential for readers to form gist inferences from observable text characteristics. Measures of textual cohesion and abstract verb overlap increase GIS because they facilitate coherent mental representations. Word concreteness, specificity, and imagability decrease GIS because they promote verbatim representations. Gist-condition responses scored significantly higher on GIS than verbatim-condition responses. The GIS formula was confirmed in text analyses of 100 scientific journal articles, news articles, and editorials. An additional analysis of 244 National Cancer Institute texts about cancer treatments indicates that patients are less likely to make meaningful gist inferences than some might assume based on the traditional Flesch-Kincaid grade level.
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Embodied Cognition
Celestin F, Friday Morning, 8:00-9:40 AM
Chaired by Daniel Casasanto, Cornell University

8:00-8:15 AM (17)

The Semantics of Beat Gestures. DANIEL CASASANTO, *Cornell University*, DEFU YAP and GEOFFREY BROOKSHIRE, *University of Chicago* – People gesture when they talk, and often gestures carry information about their thoughts. Beat gestures, however, which are simple flicks of the hand, are widely believed to carry no semantic information. Here we challenge this belief with a quantitative analysis of more than 5000 spontaneous co-speech gestures. Participants told stories suggesting literal or metaphorical motion in one of four directions: up, down, left, or right. They produced beats in the direction implied by the story, much more frequently than would be expected by chance, not only during literal spatial language (my rocket went higher), but also when participants used spatial metaphors for abstract motion (my grades went higher), and when they expressed the same abstract ideas without using any spatial language (my grades got better). Beats constituted the majority (76%) of the gestures that storytellers produced. Beat gestures are pervasive and meaningful, and reveal the spatial scaffolding of abstract thoughts.
Email: Daniel Casasanto, casasanto@alum.mit.edu

8:20-8:35 AM (18)

Metacontrol and Body Ownership: Divergent Thinking Increases the Virtual Hand Illusion. KE MA, *Southwest University, Beibei*, BERNHARD HOMMEL, *Leiden University* (Presented by Bernhard Hommel) – The virtual hand illusion (VHI) paradigm demonstrates that people tend to perceive agency and bodily ownership for a virtual hand that moves in synchrony with their own movements. Given that this kind of effect can be taken to reflect self–other integration (i.e., the integration of some external, novel event into the representation of oneself), and given that self–other integration has been previously shown to be affected by metacontrol states (biases of information processing towards persistence/selectivity or flexibility/integration), we tested whether the VHI varies in size depending on the metacontrol bias. Persistence and flexibility biases were induced by having participants carry out a convergent thinking (Remote Associates) task or divergent-thinking (Alternate Uses) task, respectively, while experiencing a virtual hand moving synchronously or asynchronously with their real hand. Synchrony-induced agency and ownership effects were more pronounced in the context of divergent

thinking than in the context of convergent thinking, suggesting that a metacontrol bias towards flexibility promotes self–other integration.
Email: Bernhard Hommel, hommel@fsw.leidenuniv.nl

8:40-8:55 AM (19)

Grasp Compatibility Effects Depend on Relative Size. RENE ZEELENBERG and DIANE PECHER, *Erasmus University Rotterdam* – Researchers have argued that object identification results in the automatic activation of actions associated with the object. Consistent with this view, research has shown that participants respond faster when the response grasp to an irrelevant stimulus feature is compatible with the grasp that would be used to interact with an object. Thus, participants respond faster with a precision (thumb-index finger) grip to a picture of a blackberry than to a picture of a pear. Likewise, participants respond faster with a power (full hand) grip to a picture of a pear than to a picture of a blackberry. An alternative view is that these grasp compatibility effects are due to abstract codes. In this view, compatibility effects are not due to the correspondence of the shape of the hand response with the picture object, but rather on the correspondence of relative sizes of response and the pictured object. Thus, compatibility effects should depend on the relative size of the objects in the stimulus set. That is, responses to a picture of a pear in the context of a watermelon should be similar to responses to a picture of a blackberry in the context of a pear. The results of our experiments are consistent with these predictions.
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9:00-9:15 AM (20)

Testing the Action-Sentence Compatibility Effect: A Pre-Registered, Multi-Lab, Collaborative Replication. RICHARD D. MOREY, *Cardiff University*, ARTHUR M. GLENBERG, *Arizona State University*, MICHAEL P. KASCHAK, *Florida State University*, DANIËL LAKENS, *Eindhoven University of Technology*, ROLF A. ZWAAN, *Erasmus University Rotterdam* – The Action-Sentence Compatibility Effect (ACE; Glenberg and Kaschak, 2002) is a speeding of response times to evaluate sentences when the actions described in those sentences are congruent with the actions necessary for a response. For instance, if a participant must evaluate the meaningfulness of the sentence "You handed Meghan the book," and the correct response is away from the participant's body, the described movement (handing to) is compatible with the response. The ACE effect is presumed to be due to strong links between cognitive systems for understanding language about motor actions and motor systems themselves. Although the ACE has been described in dozens papers, Papesh (2015) recently reported a number of failures to replicate the effect concluding that the effect may not be as robust as previously believed. We discuss a number of potential methodological explanations for Papesh's results, and report the findings of a pre-registered collaborative multi-lab, pre-registered attempt to elicit the effect.
Email: Richard D. Morey, moreyr@cardiff.ac.uk

9:20-9:35 AM (21)

About the Replication Crisis: Shall We Teach the Most Up-to-Date Knowledge? FRANÇOIS MAQUESTIAUX and PIERRICK BOYER, *Université Bourgogne Franche-Comté, Besançon*, GUILLAUME CHAUVEL, *Paris-Est Créteil*, MARIE MAZEROLLE and ANDRÉ DIDIERJEAN, *Université Bourgogne Franche-Comté, Besançon* – Since Witt, Linkenauger, and Proffitt's (2012, Psychological Science) study, we happily taught our students that the famous Ebbinghaus visual illusion can influence action. Witt et al. found better performance on a golf-putting task when the hole was made to appear larger than it really was (when surrounded by small circles) rather than smaller (when surrounded by larger circles). In this talk, we will report on six experiments aimed at replicating these findings. Despite our best efforts, we found no evidence that perception could influence golf-putting performance. We tried several manipulations, for instance by using a more sensitive dependent variable or by increasing the salience of the apparent difference between hole sizes. All of them failed to replicate Witt et al.'s results. Our study challenges the hypothesis of an obligatory reciprocal influence between perception and action. More generally, it speaks in favor of precaution before teaching the most up-to-date knowledge.
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Forensic Science and Eyewitness Identification
Celestin BC, Friday Morning, 8:00-10:00 AM

Chaired by Thomas Busey, Indiana University, Bloomington

8:00-8:15 AM (22)

Calibrating Human Decision Making in Forensic Science. THOMAS BUSEY and BRANDI EMERICK, *Indiana University, Bloomington*, KELLY CARTER, *Vanderbilt University*, MACGREGOR VOGELSANG and WILLA MANNERING, *Indiana University, Bloomington*, FRED MANNERING, *University of South Florida* – In the forensic comparative disciplines such as fingerprints, handwriting, or firearm identification, an examiner must compare a sample of unknown origin (for example, a cartridge case found at a crime scene) against a known exemplar (a test-fired cartridge case from a suspect's weapon). Although quantitative methods exist in some fields, for the most part an examiner considers the amount of perceived detail in agreement to determine whether the two items share a common source. This amount of perceived detail in agreement must be compared against an internal threshold, the placement of which is governed by a number of different factors, some of which are out of the control of the examiner. In this talk we explore different approaches for communicating the results of the forensic examination such that they more accurately reflect the strength evidence as well as the values imposed by society. The results demonstrate that there are a number of pressures on examiners that could be addressed by management, and we make several policy recommendations that we believe address both job performance and job satisfaction among forensic practitioners.
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8:20-8:35 AM (23)

Similarity Judgments in Forensic Science and in Other Courtroom Evidence. BARBARA A. SPELLMAN, *University of Virginia School of Law*, HEIDI ELDRIDGE, *RTI International* – Similarity judgments are more prevalent in the US justice system than one generally imagines. Many of the currently used forensic sciences, such as fingerprints and firearm identification, and the largely discredited forensics of bitemarks and microscopic hair analysis, involve assessing similarity between an example generated by a known source and one by an unknown source. Psychological research demonstrating how external information (e.g., what other evidence has shown; what other analysts have concluded about the evidence) can bias similarity judgments has successfully infiltrated forensic laboratories resulting in (some) improved procedures. Research regarding the biases engendered in the process of making a similarity judgment has had less effect. We focus on various unaddressed cognitive issues in forensic comparisons. We also describe how courtroom similarity judgments about other evidence – like whether two bombs are sufficiently similar to conclude they were built by the same person, or whether a person's past crime is so similar to the present crime that it should be excluded for impeachment purposes – could take a lesson from the progress made in the forensic comparison sciences.

Email: Barbara A. Spellman, spellman@virginia.edu

8:40-8:55 AM (24)

Communication During a Forensic Case: A Task Analysis. LAURA A. CARLSON, *University of Notre Dame*, JARRAH KENNEDY, *Kansas City Police Crime Laboratory*, KIMBERLY ZELLER, *Houston Forensic Science Center*, THOMAS BUSEY, *Indiana University, Bloomington* – Forensic disciplines specialize in the processing of specific types of evidence, such DNA, fingerprints, bloodstain pattern, trace, fire debris, controlled substances, documents, footwear, and digital products. While each discipline has developed its own processes for collection and analysis, all disciplines operate within a fundamental framework by which information is communicated back and forth between forensic scientists and law enforcement across the course of an investigation. There is a tension that undergirds this communication that can be linked to the need to transfer information between a scientific culture and a legal culture. At the heart of this clash is the different types of decisions that are made, and how they are used both within the culture and beyond the culture. To explore this communication further, we present a flow-chart for a specific investigative case, describing the time-points of communication, the potential challenges that may arise at each one, and offer examples for overcoming these challenges.

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9:00-9:15 AM (25)

What Causes High Confidence Eyewitness Misidentifications. CHAD DODSON, *University of Virginia* – Mistaken eyewitness identification is the leading cause of false convictions. We examined a number of factors that are cited as important for eyewitness identification. Nearly 2700 individuals completed a lineup identification test based on watching an earlier video of a mock robbery. We also measured everyone's baseline face recognition ability with the Cambridge Face Memory test (CFMT). One of the strongest predictors of high confidence misidentifications on the lineup test was an individual's CFMT score, with poor face recognizers much more prone than strong face recognizers to make high confidence errors. We also observed that the presence/absence of a weapon in the mock robbery influenced the relationship between identification confidence and accuracy, such that confidence was less predictive of accuracy in the weapon-present condition. Overall, improving our understanding of factors that influence eyewitness identification should in turn reduce false convictions.

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9:20-9:35 AM (26)

Crime Blindness and Eyewitness Suggestibility: The Role of Attention Focus in Eyewitness Awareness, Identification, and Misinformation Adoption. IRA E. HYMAN, SOHA POURPIRALI, and ROCHELLE ROBINSON, *Western Washington University* – Most people are not constantly watching for crimes and accidents. In this study, we asked participants to watch a complex video that included a theft. They watched in one of three attention conditions: Some watched for a crime, some focused on an unrelated task, and others simply watched. Participants then read a narrative description of the video which contained true and misleading information. Following a delay, participants completed a source monitoring test. We found that participants focused on an unrelated task often experienced inattentional blindness for the crime. We investigated how attention focus influenced correct culprit identifications and erroneous identifications of an innocent bystander. We looked at how attention focus influenced adoption of misinformation when it was presented in the post-event narrative.

Email: Ira E. Hyman, ira.hyman@wwu.edu

9:40-9:55 AM (27)

Lineup Fairness: Testing the Concept of Propitious Heterogeneity and the Diagnostic Feature-Detection Hypothesis. CURT A. CARLSON, JANE E. WHITTINGTON, ALYSSA R. JONES, ROBERT F. LOCKAMYEIR, and MARIA A. CARLSON, *Texas A&M University, Commerce* – Researchers have argued that a simultaneous lineup could become too fair if a principle of propitious heterogeneity is violated (e.g., Wells, 1993). In other words, if the foils are too similar to the perpetrator, even an eyewitness with a good memory could fail to correctly identify him. A similar prediction can be derived from the Diagnostic Feature-Detection hypothesis (Wixted & Mickes, 2014), such that empirical discriminability will decrease if there is not enough variance in potentially diagnostic features. We tested these predictions in both a set of three laboratory experiments (N = 118) utilizing artificial faces and an experiment with a mock-crime eyewitness identification paradigm (N = 1965). Our results support these predictions by showing that (a) as lineups approach an upper boundary of fairness (i.e., homogeneity of facial features), empirical

discriminability decreases, and (b) lineups with description-matched foils generally yield higher empirical discriminability than those with suspect-matched foils.
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Statistics and Methodology
Celestin GH, Friday Morning, 8:00-10:00 AM
Chaired by Corey White, Missouri Western State University

8:00-8:15 AM (28)
The Reverse Inference Problem for RT Measures of Cognitive Function. COREY N. WHITE, *Missouri Western State University* – Reaction time differences between conditions are commonly used to measure individual differences in cognitive processing. However these measures are subject to a reverse inference problem: differences in RTs can reflect more than one process, making it difficult to determine what is driving differences among individuals. The ubiquity of this problem is illustrated with data from lexical decision, flanker, and stroop tasks, showing that extraneous processes like response caution affect measures of task processing. This reverse inference problem can be mitigated by using choice RT models to decompose the data into measures of different decision components, which controls for extraneous processes and provides a cleaner measure of the processes of interest. In many cases, these model-based analyses can be added to the standard analysis pipeline with little additional effort. However, for certain tasks, new RT models need to be developed and tested before this approach can be used.
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8:20-8:35 AM (29)
Using Big Data to Improve Research Practices in the Lab. STEPHEN R. MITROFF, MICHELLE R. KRAMER, PATRICK H. COX, and DWIGHT J. KRAVITZ, *The George Washington University* – Cognitive psychology is undergoing a methodological rebirth, with a variety of new techniques and data sources opening novel research opportunities. Here, we focus on how insights from crowd-sourced big data can improve the design and efficacy of laboratory experiments. While several specific issues/improvements will be discussed, we argue that it is generally possible to better isolate the cognitive "signal" of interest from extraneous "noise." For example, using a massive dataset gleaned from a binary decision task (from a mini-game from the Airport Scanner app) we demonstrate that response time (RT) can be separated into distinct components, with each providing independent information about distinct cognitive mechanisms. Further, these decomposed RT components had far greater inferential power than the generally used aggregate measure. Such methodological insights often cannot be adequately quantified in a typical dataset, but big data offers sufficient power to discover and define them. These insights can then be implemented in laboratory experiments, which improves their effectiveness and ability to investigate new cognitive mechanisms that can, in turn, be examined in big data scenarios.
Email: Stephen Mitroff, mitroff@gwu.edu

8:40-8:55 AM (30)
Optimizing Research Payoff, I: A Simple Way to Increase Research Efficiency. JEFF MILLER, *University of Otago*, ROLF ULRICH, *University of Tuebingen* – Within the hypothesis testing framework, total research payoff can be viewed as the sum of positive scientific contributions accruing from correct decisions (i.e., true positives and negatives) minus negative contributions from incorrect decisions (i.e., false positives and negatives). We present a simple mathematical model that can be used to quantify expected research payoffs, and we used it to compare expected payoffs from three different strategies for hypothesis testing. One strategy was the standard or canonical version of null hypothesis significance testing as it is almost universally employed, and the other two strategies were straightforward modifications of it. The results indicate that the modified strategies lead to much greater expected research payoffs than the canonical one—approximately 1.5 times as large—which suggests that research efficiency can be substantially increased by shifting to one of the new strategies in situations where they are appropriate. The findings illustrate the utility of having an explicit model to measure research payoffs, and they open up the possibility of further enhancing research efficiency by systematically investigating alternative research strategies.
Email: Jeff Miller, miller@psy.otago.ac.nz

9:00-9:15 AM (31)
Optimizing Research Payoff, II: The Quest for an Optimal Alpha. ROLF DIETER ULRICH, *University of Tuebingen*, JEFF MILLER, *University of Otago* – Hypothesis testing requires a critical "alpha" level, traditionally α=.05, as a cutoff for deciding whether a data set demonstrates a particular effect. Recently, many have argued for changing to the more stringent α=0.005 cutoff, which would tend to reduce the rate of false positives. Unfortunately, however, this change would simultaneously tend to increase the rate of false negatives. We show how a simple mathematical model for research payoff can be used to assess the tradeoff between false positives and false negatives and to identify the optimal α level. The payoff model makes it clear what characteristics of the research area determines the optimal α level, and it thereby provides a blueprint for researchers seeking to find the optimal α level for use in their area. In particular, it is clear that α=.05 is indeed approximately the optimal value in some areas, but the optimal α would be substantially larger or smaller in other areas.
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9:20-9:35 AM (32)
Beyond Overall Effects: A Bayesian Approach to Finding Constraints in Meta-Analysis. JULIA M. HAAF, *University of Missouri*, JEFFREY N. ROUDER, *University of California, Irvine* (Presented by Jeffrey N. Rouder) – Most meta-analyses focus on grand-mean effects and effect sizes. In many cases, however, this grand mean is difficult to defend as a construct because the underlying distribution of studies reflects many factors including how we as researchers choose to design studies. We present an alternative goal for meta-analysis. The analyst may ask about relations that are stable in each of the studies rather than present as an average. In a typical meta-analysis, there is a

hypothesized direction (e.g., that violent video games increase, rather than decrease, aggressive behavior). We ask whether all studies in a meta-analysis have true effects in the hypothesized direction. If so, this is an example of a stable relation across all the studies. We propose four models: (i) all studies are truly null; (ii) all studies share a single true nonzero effect; (iii) studies differ, but all true effects are in the same direction; and (iv) some study effects are truly positive while others are truly negative. We develop Bayes factor model comparison for these models and apply them in extant meta-analyses to show their usefulness.
Email: Jeffrey Rouder, jrouder@uci.edu

9:40-9:55 AM (33)

A Bayesian Alternative to Within-Subject Confidence Intervals. FAROUK S. NATHOO, ROBYN E. KILSHAW, and MICHAEL E.J. MASSON, *University of Victoria* (Presented by Michael E.J. Masson) – Recent critiques have identified fundamental problems with the way in which researchers interpret classically defined confidence intervals. Bayesian highest-density intervals (HDIs) can be used in place of confidence intervals but HDIs have not been defined for within-subject designs. We present a method for computing HDIs for these cases, based on a standard noninformative prior and a modified posterior distribution that conditions on both the data and point estimates of subject-specific random effects. This method removes between-subject variance and produces an interval that is the Bayesian analogue of the within-subject confidence interval proposed by Loftus and Masson (1994): it can be easily computed using a similar formula and it always yields a smaller interval. The method can be readily generalized to data in which homogeneity of variance is violated.
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Symposium I: Generalization in Language and Memory
Celestin E, Friday Morning, 10:00 AM-12:00 PM
Chaired by Jelena Mirkovic, York St John University and University of York; M. Gareth Gaskell, University of York

10:00-10:15 AM (34)

Experience Shapes Generalisation of Form-Meaning Knowledge in Mind and Brain. KATHLEEN RASTLE, *Royal Holloway, University of London* – Most English words are built by combining and recombining smaller meaningful units (morphemes; e.g. develop, developer, undeveloped, redeveloping). This morphological structure provides the primary basis for generalisation in the language, providing users with the flexibility to create and understand new words (e.g. hyperdevelopment). However, this type of generalisation depends on the acquisition of knowledge relating the forms of words to particular meanings (e.g. hyper means 'having too much of a quality'). In this talk, I will describe what is known about how this form of knowledge is acquired and represented, and how it is shaped by experience. Drawing on both behavioural and neuroimaging studies of skilled readers, I provide evidence that acquisition of this form of knowledge reflects an accumulation of text experience, and I discuss whether particular types of text experiences are more important than others. Finally, I describe how this knowledge may change over the course of learning, or through modifications to the nature of the training regime.
Email: Kathleen Rastle, kathy.rastle@rhul.ac.uk

10:20-10:35 AM (35)

Consolidation in Non-Native Phonetic Learning. EMILY MYERS, *University of Connecticut* – The acoustics of speech vary according to the talker that is producing the sound, and as a function of coarticulation from adjacent speech sounds. As such, non-native speech sound learning inherently requires generalization from learned instances to new talkers and phonological contexts. Work from our group suggests that a consolidation period that contains sleep (but not a waking interval) is sufficient to support generalization from one talker to a similar novel talker in non-native learning as well as in perception of accented speech. These findings support the hypothesis that consolidation during sleep allows listeners to abstract away from trained tokens to generalize to a new talker, however overnight generalization to novel phonological contexts has been harder to demonstrate. In this talk, I will discuss the role of sleep-mediated consolidation processes during non-native phonetic learning, and will point to potential obstacles that may prevent overnight generalization to new phonological environments.
Email: Emily Myers, emily.myers@uconn.edu

10:40-10:55 AM (36)

Influences of Sleep and Time of Day on Memory and Generalization of Semantic Category Structure. ANNA SCHAPIRO, *Harvard Medical School* – Semantic memory encompasses knowledge about both the properties that typify concepts (e.g. robins, like all birds, have wings) as well as the properties that individuate conceptually related items (e.g. robins, in particular, have red breasts). We investigated the impact of sleep on new semantic learning using a property inference task in which participants learned names and visual properties of objects possessing both category-typical and exemplar-unique properties. Memory for typical properties improved and memory for unique properties was preserved across a night of sleep, while memory for both feature types declined over a day awake. These and other findings from the literature motivate the idea that sleep may also support generalization of category properties to novel objects. In experiments targeting this generalization, we found no effect of sleep and instead a strong time of day effect, with better generalization occurring in the morning.
Email: Anna Schapiro, annacschapiro@gmail.com

11:00-11:15 AM (37)

Contributions of Memory Processing During Sleep to Rule Generalization in Language. LAURA J. BATTERINK, *University of Western Ontario* – Sleep plays an important role in memory consolidation, as well as in abstraction and generalization. During sleep, memories that share common elements may be reactivated together, strengthening the shared connections and leading to the formation of general rules or schemas. Generalization is an essential component of many

aspects of language acquisition, including grammar learning. In two studies using two artificial language learning paradigms, we tested whether extraction of novel grammatical rules may be facilitated by memory processing during sleep. In the first study, we found evidence that both slow-wave sleep and REM sleep synergistically facilitate the extraction of a novel hidden grammar rule. In the second study, we demonstrate that grammatical generalization can be biased and promoted through auditory cueing during sleep. These findings have important implications for language learners, suggesting that sleep provides an opportunity to stabilize and perhaps actively enhance grammatical rule knowledge acquired during wake.
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11:20-11:35 AM (38)

The Intertwined Nature of Learning, Representation, and Generalization: Insights From Connectionist Modeling. BLAIR C. ARMSTRONG, *University of Toronto, Scarborough,, and Basque Center on Cognition, Brain and Language,*, NICOLAS DUMAY, *Basque Center on Cognition, Brain and Language, and University of Exeter,* WOOJAE KIM, *Howard University*, MARK A. PITT, *The Ohio State University* – There are competing tensions between learning to represent new words and generalizing new knowledge. For example, learning new spelling-sound correspondences in English often benefits from generalizing other words (e.g., bint rhyming with mint, tint). However, exception words must also be represented (e.g., pint). This work explored how these pressures can be understood in terms of a graded representational "warping" mechanism inherent to the connectionist framework. It studied how made-up words with a dominant (regular), subordinate (ambiguous) or previously non-existent (exception) pronunciation were learned in simulations and a multi-day training experiment. The results showed that generalization was related to the degree of warping required to represent the new pronunciation. These findings highlight how theories of representation are fundamentally intertwined with theories of learning and generalization. The impact of warping is discussed in relation to other types of language learning (e.g., second language, semantics) as well as statistical learning.
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11:40-11:55 AM (39)

How Does Consolidation Support Language Generalization? M. GARETH GASKELL, *University of York,* JELENA MIRKOVIC, *York St John University and University of York* – Memory consolidation is often thought to promote generalization. We will review a set of recent studies that provide empirical tests of this claim within the language domain. In each study, we have used sets of associations (e.g., form-meaning mappings) that vary in the systematicity of the mapping across the trained pairs. The typical pattern that emerges from these studies is that the strength of the consolidation effect depends on the level of systematicity, with mappings that are low in systematicity (i.e., arbitrary) showing the largest benefit. In effect, consolidation promotes arbitrary mappings most strongly, with generalization based on overlapping patterns benefiting to a lesser extent or not at all. With this in mind, we take a new look at the properties of a complementary memory systems account of language learning, focusing on the ability of the medial temporal lobes to support generalization, and the ability of cortical networks to acquire regularities prior to consolidation.
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Bilingualism I
Celestin A, Friday Morning, 10:20 AM-12:00 PM
Chaired by Tamar Gollan, University of California, San Diego

10:20-10:35 AM (40)

Inhibitory Control Intact in Bilingual Alzheimer's Disease. TAMAR H. GOLLAN, ALENA STASENKO, CHUCHU LI, and DAVID P. SALMON, *University of California, San Diego* – The current study investigated whether bilinguals with Alzheimer's disease (AD) can mix languages fluently despite impairments in inhibitory control. Spanish-English bilinguals with AD and matched controls read aloud paragraphs written mostly in one language with a small number of language switches. When cognitively healthy bilinguals read such paragraphs, they sometimes produce intrusion errors (saying translations of written switch words by mistake instead of switching). Such intrusions exhibit a powerful signature of inhibitory control in which language dominance reverses (i.e., bilinguals produce the most intrusions when failing to switch on dominant language switch words in paragraphs written mostly in the nondominant language). Surprisingly, though inhibitory control is thought to be impaired in AD, bilinguals with AD exhibited the same pattern. These results imply intact operation of inhibitory control with contextual support during default language selection in AD, but impaired ability to monitor language membership while regulating inhibitory control.
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10:40-10:55 AM (41)

Who You Are Talking to Matters! The Role of Interactional Context on Executive Control. RAMESH MISHRA, *University of Hyderabad*, PRATIK BHANDARI, *Basque Center on Cognition, Brain, and Language*, SEEMA PRASAD, *University of Hyderabad* – Is executive control in a bilingual modulated depending on who she is talking to? Does second language proficiency (L2) play a role? Thirty-six Telugu-English bilinguals were familiarized to monolingual, bilingual and neutral cartoon-like interlocutors. This was followed by Attentional Network Test (ANT) with the image of an interlocutor appearing on every trial before the target. The interlocutor images were presented either in blocks ("Pure context") or mixed together randomly ("Mixed context"). Participants were divided into high and low L2 proficient groups (HP and LP) by a median split on L2 proficiency composite score. The analysis of executive network showed that HP bilinguals were faster ($p=0.004$) than LP bilinguals, but only in the mixed context. No differences were observed in the "Pure context" suggesting that HP bilinguals bring in higher executive control compared to the LP bilinguals only when the interactional context becomes demanding. We interpret our results with respect to adaptive control hypothesis.
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11:00-11:15 AM (42)

Failures to Reproduce Bilingual Advantages in Selective Attention. KENNETH R. PAAP, REGINA ANDERS-JEFFERSON, LAUREN MASON, and BRANDON ZIMIGA, *San Francisco State University* – When bilinguals are conversing in one language, the other language is coactivated. This point of consensus diverges to controversy regarding whether general inhibitory control is recruited to resolve the competition and if so, is this ubiquitous practice sufficient to enhance general executive functioning (EF) and transfer to nonverbal task interference tasks. Using a bibliometric analysis Sanchez-Asana, et al. (2017) identified Paap and Greenberg (2013) as a "turning point" toward skepticism. Nonetheless, Bialystok (2017) reiterated her strong belief in "experience-dependent plasticity", but shifted its locus from EF to selective attention. This revised hypothesis was supported by bilingual advantages in conjunctive visual search (Friesen, et al., 2014) and an ambiguous figures task (Chung-Fat-Yim, et al., 2017). In close replications we failed to find any differences between bilinguals and monolinguals. Nor was their any evidence for experience-induced plasticity when bilingualism was treated as a set of continuous dimensions: L2 proficiency, L2/L1 ratio, AoA, % of L2 use, frequency of daily switching, code switching within utterances, dual language use, and language similarity.
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11:20-11:35 AM (43)

Does Bilingualism Protect From Executive Control Decline With Aging? SOLEDAD BALLESTEROS and JENNIFER RIEKER, *Universidad Nacional de Educación a Distancia* – Recent findings suggest a positive impact of bilingualism on late cognition. In the current study, early simultaneous bilinguals, late highly immersed bilinguals and monolingual older adults performed a task-switching task under low (predictable switching) versus high (random switching) demands of top-down executive control. Bilinguals committed fewer errors and were significantly faster than monolinguals in the difficult condition, whereas no group differences were found in the easier condition. The performance of monolinguals decreased significantly with increasing task complexity. In bilinguals we did not observe this trend, independently of the age of acquisition of the second language, or the balance of usage of both languages. Our results suggest that a bilingual advantage in executive functioning in older adults only becomes apparent with increasing task demands, and that this effect is also observed in those bilinguals, who acquired their second language after childhood.
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11:40-11:55 AM (44)

Genetics, Plasticity, and Cognitive Control: A Neuroemergentist Approach. ARTURO E. HERNANDEZ, *University of Houston* – Do bilinguals have better cognitive control or do those with better cognitive control become better bilinguals? Whereas recent work in the literature has focused on the debate of whether bilingual possess some advantage over monolinguals, there has been much less attention paid to the factors that might mediate these differences. In the present talk, work that has begun to look at the potential role of genetics and development in bilinguals will be presented. A series of studies investigating the role of genes involved in striatal and cortical dopamine reveals complex interactions between language experience and brain activity associated with cognitive control and language proficiency tasks. In addition, work with child bilinguals has also found associations between structural and functional brain measures and degree of language proficiency in a second language. Taken together these results are consistent with a complex relationship between a particular language environment and individual differences. Results will be discussed with respect to a Neuroemergentist view which proposes a more dynamic, developmentally oriented view of bilingualism.
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Associative Learning and Recall
Celestin BC, Friday Morning, 10:20 AM-12:00 PM
Chaired by Timothy Vickery, University of Delaware

10:20-10:35 AM (45)

Task-Relevant Category Differences Strongly Influence Temporal Visual Statistical Learning. TIMOTHY J. VICKERY and SU HYOUN PARK, *University of Delaware*, MARIAN BERRYHILL, *University of Nevada, Reno*, VALERIE M. BECK, *University of Delaware* – Temporal visual statistical learning (VSL) refers to the extraction of temporal regularities from a succession of visual experiences. In several experiments we found that VSL is enhanced by categorical similarity, but only when those categories are task-relevant during familiarization. Subjects were exposed to a stream of faces and scenes composed of paired images that always appeared in sequence, and either made categorical judgments (e.g., indoor/outdoor) or monitored the stream for "jiggle" events and made a detection response. Following the more passive detection task, categorical differences (e.g, a face paired with a scene) did not impact pair recognition. However, when categorization was required, much higher recognition accuracy was observed for same-subcategory (e.g., two indoor scenes) than any other type of pair (e.g., an indoor followed by an outdoor scene). Two additional experiments examined whether such effects were due to response interference, since categorical differences were confounded by response switching. Inducing response interference during familiarization had no effect on subsequent recognition. VSL is strongly influenced by categories, but only when those categories are task-relevant.
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10:40-10:55 AM (46)

Involuntary Conditioned Motor Preparation in Brain and Behavior. EVAN J. LIVESEY, DOMINIC M.D. TRAN, IRINA M. HARRIS, and JUSTIN A. HARRIS, *University of Sydney* – The Perruchet effect is a dissociation between conscious expectancy of an outcome and the strength of conditioned priming in anticipation of the outcome, and provides evidence for independent processes in associative learning. However, a confound between learning history and outcome presentation means that the dissociation may not be based on learning, but rather recency priming. We tested the associative basis of

the Perruchet effect using transcranial magnetic stimulation (TMS) to probe motor preparation in primary motor cortex. Participants performed a go/no-go task that produces the Perruchet effect and received single-pulse TMS during or just before the onset of a preparatory signal (cued- vs uncued-TMS). Participants also rated their expectancy of a response on the next trial. Contrary to expectancy, motor evoked potentials elicited by TMS revealed a pattern of increasing motor excitability after successive go trials but, critically, only on cued-TMS trials, providing evidence that the dissociation involves associative learning.
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11:00-11:15 AM (47)

The Effects of Imageability and Word Frequency in Cued Recall. ASLI KILIC, EZGI MELISA YUKSEL, and HATICE DEDETAS, *Middle East Technical University* – Item properties such as imageability and word frequency enhance accuracy in cued recall which may depend on the strength of cue and target items as well as on the strength of associations between them. The current study simultaneously evaluates the effects of imageability and word frequency by independently manipulating words with varying degrees of imageability and frequency as targets and cues. The results from three experiments showed that highly imageable and less frequent words enhance recall to a comparable degree when used as cues. On the other hand, highly imageable and high frequency words enhance recall. This suggests that highly imageable word pairs provide both strong cues and targets, while low frequency words provide strong cues and high frequency words provide strong targets to enhance accuracy in cued recall. The theoretical implications for the memory models will be discussed.
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11:20-11:35 AM (48)

Intention to Respond in a Special Way Protects Against Forgetting Associations Even When Working Memory Is Occupied. ALICE F. HEALY and VIVIAN I. SCHNEIDER, *University of Colorado, Boulder*, CAROLYN J. BUCK-GENGLER, *University of Colorado, Boulder*, JAMES A. KOLE, *University of Northern Colorado*, IMMANUEL BARSHI, *NASA Ames Research Center* – Subjects engaged in six 124-trial sessions of a continuous memory-updating paradigm. They studied name-location associations and were tested for the location most recently associated with a given name. On study trials, all responses were to be made on a right-hand map. On default test trials, responses were also to be made on the right-hand map, but on special test trials, designated as such during study (by showing the associations in green), responses were to be made on a left-hand map. Memory for the location associated with a given name was assessed after short (2-back) and long (8-back) retention intervals when both default and special responses were required. In the last session, trials occurred under conditions where working memory was occupied with a secondary counting backwards task. Memory for the name-location associations was better with short than with long retention intervals and was better when special (rather than default) responses were to be made, especially at the long retention interval, even with counting backwards. Thus, the intention to respond in a special way protects against forgetting associations, and this protection is not simply due to holding the information from the special trials in working memory.
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11:40-11:55 AM (49)

A Model of Cued Recall. AMY H. CRISS, GREG COX, SHARON CHEN, and JACK WILSON, *Syracuse University*, WILLIAM AUE, *Purdue University* – Cued recall is an analog for every day memory tasks like retrieving the name of a face. In a cued recall task participants are asked to generate a target memory in response to a cue that was present during encoding of the target memory. Cued recall is a theoretically important task because it contains elements of recognition and free recall, the two most common and best understood episodic memory tasks. We identify hallmark findings in cued recall: decreasing performance as a function of the number of to-be-remembered pairs (list length effect), increasing accuracy with repetition and a null effect of the strength of other items from the list (item strength and null list strength effects), decreasing correct responses and increasing failures to respond across consecutive test trials (output interference), and an increase in both correct responses and intrusions for pairs containing items studied in multiple pairs (proactive interference and proactive facilitation). We present a model that accounts for these findings in cued recall and corresponding manipulations in free recall and recognition.
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Working Memory I
Celestin GH, Friday Morning, 10:20 AM-12:00 PM
Chaired by Robert Logie, University of Edinburgh

10:20-10:35 AM (50)

Common Principles and Individual Variation in Human Cognition. ROBERT H. LOGIE, *University of Edinburgh* – A core assumption in experimental cognitive psychology is that common principles govern the functioning of human cognition. These principles are assumed to be revealed in the aggregate data from groups of participants. Individual variability in sensitivity to experimental manipulations is then treated as statistical noise. There may be such common principles, but people may use their cognition in different ways to perform the same task in the laboratory and in everyday life. That is, aggregate data patterns may be statistical artefacts, and the individual variability may be highly informative, reflecting use of different strategies by different participants. This presents a challenge to the tendency in cognitive psychology research to develop theories of tasks rather than theories of how the cognitive system might perform those tasks within and outside of the laboratory. These arguments will be illustrated with examples from studies of immediate memory for serial order. It is proposed that advances in cognitive theories and applicability of those theories would benefit from more detailed exploration of the flexibility of human cognition during task performance.
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10:40-10:55 AM (51)

Miller's Error: Short-Term Memory Spans Do Not Measure One, but Two Capacities. PIERRE BARROUILLET and SIMON GORIN, *Université de Genève*, VALÉRIE CAMOS, *Université de Fribourg* – Simple spans such as digit or letter spans are usually assumed to assess the capacity of verbal short-term memory understood as a unitary construct. However, it has been assumed that there are two stores in verbal WM, a phonological loop that holds information through articulatory rehearsal and an executive loop in which information is maintained through attentional refreshing (Camos, 2017). In a series of experiments we tested the hypothesis that people, being unaware of its structure, underuse their verbal WM. In a letter span task, participants were either left free to memorize the letters as they wish, or instructed to perform a cumulative overt rehearsal of the n first items (n being close of the estimated capacity of the phonological loop, i.e. 3 to 5 items) and to keep repeating these letters until the end of the list. The access of the phonological loop being blocked by articulatory suppression, the following letters might be stored in the executive loop. The results revealed a dramatic increase in span under instructed partial rehearsal. This finding sheds a new light on the role of articulatory rehearsal in verbal WM and more generally on the structure of verbal short-term memory.
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11:00-11:15 AM (52)

Predictability and Preferential Retention: Rethinking the Culture of Capacity Estimates When Directing Attention During Visual Working Memory Maintenance. MICHI MATSUKURA, *Drake University* – One of the critical assumptions of visual working memory capacity estimates is that observers attempt to encode and maintain as many items as possible. Accordingly, this assumption is violated in any paradigms/tasks that the observers are required to preferentially retain a single attended item or a particular attended set of items in memory. Yet, because these tasks typically instruct the observers to utilize the cueing information as a predictor of the to-be-tested item's location (in the tradition of spatial cueing during perceptual processing), their links to the mnemonic motivation to retain the attended item or set may not be immediately clear (consequently, the practice of capacity estimates continues). Recent evidence suggests that, when attention is diffused across the visual memory field, changes in task instructions influence capacity estimates. However, when attention was restricted to particular items' locations (the present study), the magnitude of attentional benefit remained constant regardless of instructions.
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11:20-11:35 AM (53)

Are the Advantages of Chess Expertise on Visuo-Spatial Working Memory Capacity Domain Specific or Domain General? EVAN T. SMITH, JIM BARTLETT, DANIEL KRAWCZYK, and CHANDRAMALLIKA BASAK, *University of Texas at Dallas* (Presented by Chandramallika Basak) – Experts of chess have repeatedly demonstrated exceptional recall memory of chessboards. This memory ability is substantially weakened by disruption of the chessboard (e.g., scrambling), but chess experts still perform better than novices when recalling such chessboards. This suggests some generalized expertise effect of chess, albeit limited to chess stimuli. In the current study, we examined the visual short-term memory of 14 chess experts (Elo rating >2000) and 15 novices using a paradigm which varied in visuospatial demands and degree to which the stimuli differed from chess pieces. Experts demonstrated an advantage in memory discriminability (d') on a variety of conditions, including that in which no chess information was present, provided the stimuli were presented on a visual 8x8 grid, but demonstrated no such advantage in the absence of a grid. These results suggest that the knowledge structures relevant to chess expertise appear to be generalizable to non-chess, non-verbal information overlaid on a chess-like grid structure, even if the overall representation of the chess board does not map onto past knowledge.
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11:40-11:55 AM (54)

When Do People Refresh? Tracking the Focus of Attention Over Time in Different Tasks. EVIE VERGAUWE, NAOMI LANGEROCK, and KIM UITTENHOVE, *University of Geneva* – Refreshing is a proposed mechanism to keep information active in working memory, by bringing memory items into the focus of attention. Refreshing is assumed to take place spontaneously, as soon as attention is available. In a series of recent studies, we presented probe letters either between the to-be-remembered items, immediately after list presentation, or following a short retention interval after list presentation. Response times to these probes were used to assess whether refreshing had occurred. This revealed that participants spontaneously engaged in refreshing of short verbal lists between study and test, and between list items, but not in all task situations (e.g., Vergauwe et al., 2016, 2017, 2018). Here, we follow up on these studies and examine the evidence for spontaneous refreshing in different task situations, using similar time windows available for refreshing across the different task situations.
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Concepts and Categories
Celestin F, Friday Morning, 10:00 AM-12:00 PM
Chaired by Kenneth Kurtz, Binghamton University, State University of New York

10:00-10:15 AM (55)

The Weights-as-Adaptive-Reference Points (WARP) Model of Category Learning. KENNETH J. KURTZ and DANIEL SILLIMAN, *Binghamton University, State University of New York* – A leading approach to explaining human category learning is the exemplar view based on the following design principles: (1) localist storage of reference points corresponding to psychological representations of observed training items; (2) activation of exemplar representations by calculating the attention-weighted inverse exponential similarity between stimulus and exemplar; and (3) predicting class likelihood based on exemplar activations. We propose a novel formulation that integrates this framework with a traditional connectionist approach (i.e., knowledge in the weights) such that reference

points are discovered and optimized with error-driven learning via standard back-propagation. The core advance is a novel activation rule at the hidden layer of a multilayer perceptron so that similarity to reference points is realized in terms of the dot-product between the input and each hidden node's vector of incoming weights. We report promising results fitting the model to benchmark results in human artificial classification learning and address theoretical implications.
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10:20-10:35 AM (56)

High-Dimensional Feature-Space Representations for Naturalistic Categories. ROBERT NOSOFSKY, *Indiana University Bloomington*, CRAIG SANDERS, *Vanderbilt University* – An important goal in formal modeling of human category learning is to extend the application of the models to real-world, naturalistic domains. In our recent work we have pursued that goal by testing an exemplar model on its ability to predict learning and generalization of rock categories in the geologic sciences. A prerequisite for conducting rigorous tests is to derive a comprehensive, high-dimensional feature-space representation for the stimuli. Here we report progress in our multi-pronged approach to deriving such a representation. The approach involves a combination of complementary methods based on scaling models of similarity-judgment data, direct ratings of hypothesized dimensions, and deep-learning technology. We iterate over these methods after analyzing deviations between the predictions of the categorization model and empirical findings. When used in concert with the derived high-dimensional feature-space representation, the exemplar model is achieving increasingly precise accounts of learning and generalization in this complex, naturalistic category domain.
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10:40-10:55 AM (57)

Representation of Regular and Exception Items in Category Learning. VLADIMIR SLOUTSKY and OLIVERA SAVIC, *The Ohio State University* – Evidence from multiple category learning studies suggest that exceptions to the category rule are remembered better than items that follow the rule. Based on differences in recognition memory, it has been suggested that category exceptions may be represented differently than other category members. Here we present experiments investigating representations of regular and exceptional category members and potential developmental changes in these representations. Although 4-year-olds and adults demonstrated different memory patterns, both age groups have shown (a) higher memory sensitivity for regular members of the category and (b) isomorphic memory representations for regular and exception items. Additionally, we have found asymmetry in generalization patterns for regular items and exceptions. Features of regular items contributed significantly more than exceptions' features in making category decisions about new items. These findings (1) challenge the hypothesis that items that violate known knowledge structure have a special status in memory and (2) suggest that exceptions can be represented as a subset of regular items.
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11:00-11:15 AM (58)

Prior Verbal Description of Exemplars Facilitates the Learning of Information Integration Categories. JOHN PAUL MINDA, JOSHUA HATHERLEY, and BAILEY BRASHEARS, *The University of Western Ontario* – A prominent theory of category learning assumes that people rely on two cognitive systems when learning new categories: an explicit system that abstracts rules and an implicit system that associates exemplars with correct responses. Because the explicit system relies on verbal processing, we hypothesized that asking participants to provide a verbal description of some of the exemplars prior to learning would enhance performance on rule-described (RD) categories but would have no effect on the learning of information-integration (II) categories. In our experiment, participants first provided a verbal description to a subset of exemplars like the ones they would learn to classify, or they described a set of unrelated stimuli (control). They then learned to classify a set of 80 stimuli into two RD or two II categories. Our results failed to confirm our hypothesis and we observed the opposite pattern: prior verbal description improved the learning of II categories but not RD categories. Our data and subsequent modelling suggest that participants in both conditions tended to rely on a rule-based strategy, but participants who described the stimuli and then learned II categories were quicker to abandon that incorrect strategy.
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11:20-11:35 AM (59)

Coaching of Naturalistic Rule-Based Categories With Exceptions: Unexceptional Performance. MARK A. MCDANIEL and RESHMA GOURAVAJHALA, *Washington University in St Louis* – Learning of laboratory categories described by rules plus exceptions is enhanced when the presentation order of stimuli is blocked by the rule rather than intermixed. Similarly, learning of laboratory and science categories can be enhanced through explicit coaching of the rule-relevant features. We explored these techniques for helping learners acquire and generalize rock categories that were structured according to a one-dimensional rule with exceptions. In two experiments, rock category learning and transfer were not improved by blocking the rule or by coaching the rule. Moreover, rule-coached training penalized transfer for exception items. In contrast, a training procedure that emphasized learning individual instances produced equivalent transfer for rule-consistent and exception items. We speculate that for complex naturalistic categories, coaching the rule does not stimulate the high-dimensional encoding of training instances that may support transfer to rule-exception items.
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11:40-11:55 AM (60)

Using Big Data to Understand Memory and Prospection. ROBERT S. THORSTAD and PHILLIP WOLFF, *Emory University* – The Constructive Episodic Simulation Hypothesis (CES) holds that memory and prospection recruit similar processes. In a series of big data analyses, we find evidence for CES for semantic but not episodic processes. Past and future references were collected from the Blog Authorship Corpus (N = 140,000,000 words). Episodic processing was identified using

concreteness, perceptual language, and spatial relation words. Contrary to CES, all 3 episodic measures were higher in past than future references. Semantic processing was identified using Latent Dirichlet Allocation to identify prominent semantic categories. Consistent with CES, these semantic categories were invoked to similar degrees by past and future references. A lab study using the Modified Future Crovitz Test showed largely similar results. The results show both similarities and differences between memory and prospection. The results also demonstrate how big data methods can be used to better understand cognitive processes and representations.
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Psycholinguistics
Celestin D, Friday Morning, 10:00 AM-12:00 PM
Chaired by Alexia Galati, University of North Carolina at Charlotte

10:00-10:15 AM (61)
Do Aligned Bodies Align Minds? Body Alignment as a Constraint on Coordinating During Direction Giving. ALEXIA GALATI, *University of North Carolina at Charlotte*, ANGELINA SYMEONIDOU, *University of Cyprus*, CAMILA ALVIAR, *University of California, Merced*, RICK DALE, *University of California, Los Angeles*, MARIOS AVRAAMIDES, *University of Cyprus* – Interpersonal alignment is often assumed to support joint performance. Here, we examine whether the relative body alignment of partners in a direction-giving task influences spatial language and performance. In 32 pairs, Direction Givers (DGs) and Direction Followers (DFs) interacted in two conditions. For one route description they sat side-by-side (aligned), while for another they sat opposite one another (counter-aligned). After each description, DFs drew the route on a map. When counter-aligned (vs. aligned), DGs used more survey expressions (e.g., north), and DFs more words per conversational turn. The accuracy of the drawn routes was not predicted by body alignment, spatial language, or spatial ability. Thus, despite difficulties in grounding when counter-aligned, pairs invested the effort to override any performance decrement. Although accuracy was unaffected by relative alignment, we are now examining whether it is affected by coordination in body movement. We use automated video processing and quantify coordination through time series analysis.
Email: Alexia Galati, alexia.galati@gmail.com

10:20-10:35 AM (62)
The Role of Memory Processes and Quality of Lexical Representations in L1 and L2 Reading Comprehension. NAYOUNG KIM and KIEL CHRISTIANSON, *University of Illinois at Urbana-Champaign* (Presented by Kiel Christianson) – To understand reading ability, we examined the role of memory processes and quality of lexical representations in L1 and L2 reading comprehension. Based on the cue-based retrieval approach, which emphasizes content-addressable retrieval and similarity-based interference as memory mechanisms determining reading comprehension, we tested L1 and L2 English readers' sensitivity to syntactic and semantic retrieval interference in subject-verb long-distance dependency resolution during eye-tracking. Both groups provided supportive evidence for the cue-based retrieval parsing, but only L1 data showed a two-way interaction, suggesting that less-skilled L2 readers may have difficulty in employing multiple cues simultaneously during parsing. In Exp. 2, we examined the influence of quality of lexical representations on retrieval latency and probability during L1 and L2 reading. Number of modifiers for targets and distractors was manipulated. Results showed that greater elaboration for either targets or distractors resulted in inflated reading times at retrieval and lower comprehension accuracy in L1 and L2, suggesting that quality of lexical representations did not improve cue-based retrieval.
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10:40-10:55 AM (63)
Spatial Indexing of Referents in Spoken Language Processing in the Absence of Visual-Spatial Features. CAMERON M. SMITH and AMIT ALMOR, *University of South Carolina* (Presented by Amit Almor) – Previous research on sign language, gesture, and eye movements during language comprehension has shown that language users often utilize spatial cues in the visual environment during reference processing. Given that the primary modality of spoken language is audition, and that referents are often not present in the visual environment, an important open question is whether the reliance on spatial information is specific to referents that are, or were, visible. We report three experiments demonstrating that listeners encode auditory non-visual spatial information associated with referents and activate this information when processing subsequent references. Our results are consistent with findings from studies of sign language and manual gesture that suggest that spatial representation may influence reference resolution, and further indicate that these spatial representations are not specific to the tracking of visual referents. We argue that a-modal spatial representation are preferably used for reference tracking during spoken language comprehension.
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11:00-11:15 AM (64)
Morphological Decomposition in Single Word and Sentence Reading: Evidence From Prefixed and Particle Verbs in German. PETROULA MOUSIKOU and LORENA NÜESCH, *Max Planck Institute for Human Development*, JANA HASENÄCKER, *International School for Advanced Studies (SISSA)*, SASCHA SCHROEDER, *Max Planck Institute for Human Development* – Morphologically complex words are thought to be decomposed into their constituent morphemes, a process that is known to enable access to their corresponding lexical representations, thus facilitating reading. However, how this process occurs is under debate. The vast majority of German words are morphologically complex. In particular, verbal stems (e.g. stehen, "to stand") are often combined with a prefix (e.g. ver-) or a particle (e.g. auf-), forming prefixed or particle verbs (e.g. verstehen, "to understand"; aufstehen, "to get/stand up", respectively). Prefixes in prefixed verbs cannot be separated from the stem, whereas particles in particle verbs can be separated from the stem by other words in a sentence. In two experiments that employed the masked priming paradigm in single-word reading and the eye-contingent

boundary paradigm in sentence reading, we used this unique characteristic of the German language to investigate the nature of morphological decomposition in skilled adult reading. We observed no differences in the processing of the two types of verbs, which indicates that morphological decomposition in the German reading system occurs on the basis of the words' forms rather than on their meaning.
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11:20-11:35 AM (65)

Conceptualizing Syntactic Category Membership as Continuously Graded Semantics. CHRIS WESTBURY and GEOFF HOLLIS, *University of Alberta* – Information about word class membership is recoverable from word co-occurrence statistics. This fact has not been accompanied by any compelling evidence that co-occurrence models represent word class information in any way relevant to human language processing. That would require that co-occurrence models to make specific predictions about human behaviour that would be difficult to make or explain by other models. We report on four experiments that test and confirm the prediction that humans represent syntactic categories as continuous categories derived from linguistic experience. Using the skip-gram model (Mikolov, Chen, and Corrado, 2013), we derive continuous measures of how noun-like and how verb-like a word is. In a series of four go/no-go experiments that required participants to decide if a word belonged to a specific syntactic category, we demonstrate that these measures predict accuracy and response time to verb and noun category decisions. These results suggest that syntactic category membership is continuously-graded rather being binary, by showing that the behavioral effects of the gradation can be predicted using the same simple vector operations that have previously been used to model semantic category membership.
Email: Chris Westbury, chrisw@ualberta.ca

11:40-11:55 AM (66)

Does Language-Driven Conceptual Combination Activate Congruent Visual Representations? LIEKE J. SEGERINK, *Erasmus University Rotterdam*, MARKUS OSTAREK, *Max Planck Institute for Psycholinguistics, Nijmegen*, HANNAH H. VAN HALM and ROLF A. ZWAAN, *Erasmus University Rotterdam* (Presented by Rolf A. Zwaan) – Language processing involves the activation of visual representations (e.g., Zwaan, Stanfield, & Yaxley, 2002). But how routine is this activation? Perhaps the most stringent method by which this currently can be established is continuous flash suppression (CFS). Detection in CFS is generally assumed to rely on relatively low-level visual processes. Using CFS, Ostarek and Huettig (2017) showed that comprehenders activate visual information. Auditorily presented words facilitated the detection of pictures of objects when these pictures were congruent with the meaning of the word. We conducted a direct replication Ostarek & Huettig's Experiment 1, which involved single words, and then used CFS to examine conceptual combination by presenting noun phrases such as inflated-balloon vs. deflated balloon and pictures that match or mismatch these phrases. If conceptual combination of noun and adjective occurs, we should see more facilitation for congruent than for incongruent pictures.
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Lunchtime Workshop: Encouraging Future Scientists: Supporting Undergraduates at Psychonomics (UP)

Strand 12 A/B, Friday, 12:00-1:30 PM

Symposium II: Should Statistics Determine the Practice of Science, or Science Determine the Practice of Statistics?
Celestin E, Friday Afternoon, 1:30-3:30 PM
Chaired by Richard M. Shiffrin, Indiana University Bloomington

1:30-1:45 PM (67)

Science Should Govern the Practice of Statistics. RICHARD M. SHIFFRIN, *Indiana University Bloomington* – Although there are two sides to these complex issues, this talk will make the case for the scientific judgment side of the ledger. I will I argue that statistics should serve science and should be consistent with scientific judgment that historically has produced progress. I argue against one-size-fits-all statistical criteria, against the view that a fundamental scientific goal should be reproducibility, and against the suppression of irreproducible results. I note that replications should on average produce smaller sized effects than initial reports, even when science is done as well as possible. I make a case that science is post hoc and that most progress occurs when unexpected results are found (and hence against the case for general use of pre-registration). I argue that much scientific progress is often due to production of causal accounts of processes underlying observed data, often instantiated as quantitative models, but aimed at explaining qualitative patterns across many conditions, in contrast to well defined descriptive statistical models.
Email: Richard M. Shiffrin, shiffrin@indiana.edu

1:50-2:05 PM (68)

The Emptiness of Statistics without Scientific Context. RICHARD MOREY, *Cardiff University* – Recently psychological scientists have been (rightly) re-examining their methodology. Failures to replicate many studies, including those featured in textbooks, have thrown light on pernicious practices that run the gamut from opportunistic analyses to outright fraud. The use of formal "statistical significance" at the 5% level ($p<.05$) is often blamed for weak replicability. Recently Benjamin et al (2018) called for statistical significance to be redefined to .5% to raise the evidential bar for "discoveries" of new effects. It is my view that the proposal is based on a misunderstanding: there cannot be any statistical criterion for discovery, because discovery occurs against the background of a scientific context. Adopting a more stringent criteria may exacerbate the problem by reifying yet another statistical criterion, instead of dealing with it at its philosophical core.
Email: Richard Morey, moreyr@cardiff.ac.uk

2:10-2:25 PM (69)

Some Bayesian and Psychometric Reflections on Reproducibility and Robustness. JOACHIM VANDEKERCKHOVE and BETH BARIBAULT, *University of California, Irvine* – In retrospect, it appears that there are many good explanations for the poor reproducibility of psychological studies. Poor research practice, publication bias, small samples, misaligned incentives, and over-interpretation of weak evidence all seem to occur regularly. I will discuss some of these issues from the perspective of Bayesian statistics (focusing on evidence considerations rather than a lexicographic decision rule); from the perspective of psychometrics (focusing on generalizability and robustness rather than one-off observations); and from the perspective of cognitive science (focusing on model building rather than hypothesis testing). I will suggest a few new approaches, some top-down and some bottom-up, and some more radical than others, that might improve our research practice. The approaches have in common that they are meant to encourage the two-way traffic between scientific and statistical goals, with careful translation from scientific accounts to statistical models and rigorous inference from finite data to abstract knowledge.
Email: Joachim Vandekerckhove, joachim@uci.edu

2:30-2:45 PM (70)

Breaking Out of Tradition: Statistical Innovation in Psychological Science. TRISH VAN ZANDT and STEVE MACEACHERN, *The Ohio State University* – An insistence on p-values that meet arbitrary criteria for publication has resulted in the current replication crisis. This misapplication of statistical methods can be tied directly to a failure of statistics education in psychological science. Not only must we reconsider the statistics curriculum in our graduate programs, but we argue that we must change our focus to those methods that (a) permit the construction of hierarchical models that allow us to explain a range individual differences under a common theoretical umbrella, and (b) move us away from procedures that emphasize asymptotic models (such as the GLM) over theory-driven models. Finally, we need to emphasize the discovery of qualitative patterns in data over quantitative differences across groups, which leave open the question determining the size of a practically meaningful difference. Bayesian methods provide ways to address these difficulties. In this talk, we discuss how Bayesian models incorporate meaningful theory, and how hierarchical structures are flexible enough to explain a wide range of individual differences.
Email: Trish Van Zandt, trishvz@gmail.com

2:50-3:05 PM (71)

When Are Sample Means Meaningful? The Role of Modern Estimation in Psychological Science. CLINTIN DAVIS-STOBER, *University of Missouri* – Sample means are considered a foundational statistic for understanding experimental psychological data. We argue that in many areas of psychology sample means are unacceptably inaccurate at estimating parameters of interest, often due to impoverished sample and effect sizes. We define the sample mean as unacceptably inaccurate if it is less accurate than a benchmark estimator that does not use the data to estimate the relations among experimental conditions. We consider two such benchmark estimators: one that randomizes the relations among conditions and another that states that there are no condition effects no matter the data. We show that there are common cases within psychology where these (nonsensical) benchmark estimators outperform sample means on average, and these may even occur when effects are detected. Our argument highlights the need for modern estimation methods, e.g., hierarchical Bayes, which yield more accurate estimates. We argue that modern estimators should replace sample means, even for describing data, because they are interpretable in a wider range of contexts.
Email: Clintin Davis-Stober, stoberc@missouri.edu

3:10-3:25 PM (72)

We Should be Doing More Estimation: Designing Studies for Hypothesis Testing May Be Slowing Our Progress. CHRISTOPHER DONKIN, *University of New South Wales* – Most of us were trained to do hypothesis testing above all else. Most experiments are planned around an eventual hypothesis test. While hypothesis testing is an integral part of the research process, it should be reserved for when we have competing hypotheses that make quantitative predictions for data, rather than a null and a 'default' alternative. More concerning is that the premature use of hypothesis testing may actually stymie the development of quantitative models, since the space of potential experience goes under-explored. I argue that we may be better served doing more estimation, and using the information we gain to build alternative hypotheses that combine the data we have observed and the theoretical principles we wish to imbibe.
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Recognition Memory
Celestin BC, Friday Afternoon, 1:30-3:30 PM
Chaired by David Kellen, Syracuse University

1:30-1:45 PM (73)

Directly Testing the Foundations of Signal Detection Theory. DAVID KELLEN, *Syracuse University*, SAMUEL WINIGER, *University of Zurich*, JOHN C. DUNN, *University of Western Australia*, HENRIK SINGMANN, *University of Zurich* – Signal Detection Theory (SDT) is one of the most successful and widely used theoretical frameworks in psychology. At the core of SDT is the notion that choices are based on the evaluation of samples taken from distributions established on a latent-strength continuum. It is often assumed that SDT is untestable in its most general form. The present work shows that this untestability notion is incorrect, and that one can actually establish strict tests on SDT using well-known theoretical results from the decision-making literature. Such tests are carried out with perceptual-judgment data from Swets (1959) as well as new recognition-memory studies. Moreover, it will also be shown that Yes-No Receiver Operating Characteristic (ROC) functions can be reconstructed from forced-choice accuracy under minimal assumptions, without the need for confidence ratings or response-bias manipulations.
Email: David Kellen, davekellen@gmail.com

1:50-2:05 PM (74)

Not All People Are Cut Out for Criterion Shifting on a Recognition Test. MICHAEL B. MILLER, *University of California, Santa Barbara* – How strong does a memory need to be before you are willing to accept that it actually occurred? Your answer should differ depending on the situation. Weak memory evidence may be appropriate for some situations, while stronger memory evidence is pertinent for others. The setting and shifting between these memory evidence thresholds (decision criteria) across various situations can profoundly affect overall recognition performance. Yet, the underlying mechanisms of these criterion processes are poorly understood. One critical property of these processes that we can demonstrate is the enormous variability in people's tendency to shift a decision criterion in response to known changes in target rates, payoffs, and warning instructions. Some individuals shift to almost optimal criteria while others do not shift at all. Further, we demonstrate that these individual differences are remarkably stable across time, stimuli, task demands, cognitive domain, and criterion manipulations.
Email: Michael B. Miller, miller@psych.ucsb.edu

2:10-2:25 PM (75)

Is Familiarity Automatic? KLAUS OBERAUER, *University of Zurich* – Dual-process models of recognition often assume that one retrieval process, familiarity, is automatic, whereas the other, recollection, is controlled. I tested for automaticity of familiarity in a short-term recognition task, using the Psychological Refractory Period (PRP) paradigm to assess whether familiarity requires central processing capacity. Task 1 was an oral tone-classification task. Task 2 was a local-recognition task, in which participants decided whether a probe matched a particular item in the memory set, identified by its screen location. Intrusion probes, matching a memory item in a different location, were rejected more slowly than new probes; this intrusion cost reflects the influence of familiarity. The size of the intrusion cost was additive with the stimulus-onset-asynchrony (SOA) of Task 1 and Task 2, implying that accrual of familiarity requires central capacity. In one experiment, participants showed some ability to reduce the influence of familiarity when it was completely uninformative. To conclude, familiarity is not automatic by two criteria: It demands central processing capacity, and it can to some extent be intentionally controlled.
Email: Klaus Oberauer, k.oberauer@psychologie.uzh.ch

2:30-2:45 PM (76)

Reconsidering Proactive Interference Increase and Release. RICHARD A. CHECHILE, *Tufts University* – The classic understanding of proactive interference in recent memory is examined in several new experiments. Evidence is presented that proactive interference does not immediately "release" upon switching to a new encoding context. Only after a number of intervene trials is there a recovery from proactive interference. Evidence is also provided that the build up and recovery from proactive interference are accounted by changes in memory storage. These findings are a challenge for storage-based consolidation theory.
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2:50-3:05 PM (77)

Strategic Self-Initiated Encoding in Object-Location Memory in Late Childhood. INBAR RACHEL BEN-HAROSH and HAGIT MAGEN, *The Hebrew University of Jerusalem* (Presented by Hagit Magen) – As children age they become more independent and responsible for their belongings, rendering self-initiated object-location memory essential for efficient everyday functioning. In the current study, we explored the development of this aspect of long-term memory. Twenty-four young adults and 24 children (aged 8-10) memorized the locations of pictures of real-world objects embedded in pictures of indoor scenes, and retrieved them after a 30 minutes delay. Locations were selected by the participants (i.e., self-initiated), or provided to them. On half of the self-initiated trials, participants elaborated on the strategies they used. The results revealed similar accuracy levels in both age groups, and similar benefits in accuracy from self-initiated encoding. Moreover, children utilized deep encoding strategies as frequently as did young adults, mostly placing objects based on spatial regularities and the objects' function. However, relative to young adults children relied more on functionality than on spatial regularities. Overall, the results demonstrate mature ecological self-initiated object-location memory in late childhood.
Email: Hagit Magen, msmagen@mail.huji.ac.il

3:10-3:25 PM (78)

An Electrophysiological Signature of Strategically Orienting Episodic Retrieval Toward Memory Age. JEFFREY D. JOHNSON and ANNA K. MCGHEE, *University of Missouri*, EMILY K. LEIKER, *Boys Town National Research Hospital*, MASON H. PRICE, *University of Missouri* – Some of the oldest and most robust findings in research on memory retrieval are related to the age of a targeted memory (i.e. recent vs. remote). These effects are often interpreted as reflecting changes in the qualities – such as strength or specificity – of traces. Here we present results from a series of EEG studies supporting an alternative account, in which retrieval processes are strategically oriented to memories of different ages. Our general procedure involves having subjects encode two lists of items, separated by one week, and then testing memory shortly after the second list. Separate test blocks direct subjects to focus retrieval on items from one list at a time. Restricting the EEG analyses to new test items, such that retrieval success differences are reduced, revealed more positive-going waveforms associated with recent compared to remote lists. Furthermore, to minimize the substantial confound of difficulty across test conditions, multiple methods were used to dissociate such effects from orienting. The findings support the idea that knowledge about the age of candidate memory traces might give rise to expectations about memory quality, thereby changing the use of strategic control processes that serve retrieval.
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Decision Making I
Celestin GH, Friday Afternoon, 1:30-3:10 PM
Chaired by Andrew Heathcote, University of Tasmania

1:30-1:45 PM (79)
Confidence and Varieties of Bias. ANDREW HEATHCOTE, ELEANOR HOLLOWAY, and JIM SAUER, *University of Tasmania* – Vickers and Lee (1998) proposed that there are two types of response bias, "expectation" based on genuine belief (e.g., that one option is more common) and strategic "relative caution" (e.g., that one option should be favoured because it has higher payoffs), and that they dissociate in terms of confidence. Participants made easy and difficult perceptual choices where the favoured option was either more common or received more points and rated their decision confidence as low or high. The favoured option was chosen more often in both cases but when correctly chosen was associated with a greater confidence in the expectation condition, whereas the opposite held for errors. Bayesian analysis of state-trace plots (Davies-Stober et al., 2016) supported the dissociation. We discuss, explanations including Vickers and Lee's Balance-of-Evidence model of confidence judgements. Davis-Stober, C. Morey, R.D., Gretton, M. & Heathcote, A. (2016). Bayes factors for state-trace analysis. Journal of Mathematical Psychology, 72, 116-129. Vickers, D., & Lee, M. D. (1998). Dynamic models of simple judgments: I. Properties of a self-regulating accumulator module. Nonlinear Dynamics, Psychology, and Life Sciences, 2(3), 169–194.
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1:50-2:05 PM (80)
A Comparison of a Prediction Error Frequency Model to the Delta Rule Model. DARRELL A. WORTHY and ASTIN C. CORNWALL, *Texas A&M University*, HILARY J. DON, *University of Sydney*, TYLER DAVIS, *Texas Tech University* – The Delta rule model is a standard model of experience-based decision-making and reinforcement learning. This model assumes that people learn expected values, which are the recency-weighted average payoffs received after selecting each option. However, recent work suggests that people attend more to the total, rather than average rewards, when options are available for selection at different rates. Additionally, people often ignore the magnitude of payoffs and instead focus on the frequency of positive versus negative outcomes. Here we present a Prediction Error Frequency (PEF) model that assumes that individuals track the frequency of positive versus negative prediction errors for each option, irrespective of prediction error magnitude. The PEF model fits the data better than the Delta model in a variety of different tasks. We also show that in some cases the PEF model makes almost identical predictions to the Prospect Valence Learning model, but the models diverge in other scenarios.
Email: Darrell Worthy, worthyda@tamu.edu

2:10-2:25 PM (81)
Why Do Decision Makers Reject Mixed Gambles? A Drift-Diffusion Analysis. WENJIA ZHAO, *University of Pennsylvania*, LUKASZ WALASEK, *University of Warwick*, SUDEEP BHATIA, *University of Pennsylvania* (Presented by Sudeep Bhatia) – Decision makers often reject mixed gambles offering equal probabilities of a larger gain and a smaller loss. This behavior has been traditionally attributed to loss aversion, that is, higher weights attached to losses relative to gains. In this paper we consider two additional mechanisms that can generate high rejection rates: 1. A response bias towards rejecting gambles without the calculation of utility, and 2. An evaluation bias according to which gambles receive a constant additive penalty in utility. Using a drift diffusion model of decision making, applied to choice and reaction time data from four experiments (including one incentivized and preregistered experiment), we are able to disentangle the effects of these mechanisms. We find that the response bias provides the largest quantitative contribution to model fits. This mechanism also predicts qualitatively unique reaction time patterns, and we find support for these predictions in our data. Our results indicate that high rejection rates for mixed gambles can be a result of multiple different mechanisms, and that a response bias applied prior to the computation of utility (rather than loss aversion) is the primary determinant of this behavioral tendency.
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2:30-2:45 PM (82)
Models of Risky Choice: A State-Trace Analysis. JOHN C. DUNN, *University of Western Australia*, LI-LIN RAO, *University of Chinese Academy of Sciences* – Models of risky choice fall into two broad classes: fixed utility models and everything else. While it is known that behaviour can be observed that is inconsistent with all extant models, this has largely been based on the construction of special cases. We use state-trace analysis to test fixed utility models on a set of relatively unselected risky choices. The advantage of this approach is that there is no requirement to posit a particular form for the error function that links the difference in the underlying utilities of two options, A and B, with the probability of choosing A over B, P(A, B). We presented groups of participants with 30 alternative options (A) each paired with one of four standard options (B) and tested the prediction of all independent utility models that P(A, B) has the same order over A for all B.
Email: John Dunn, john.dunn@uwa.edu.au

2:50-3:05 PM (83)
Modeling Decision Processes on a Continuous Scale. ROGER RATCLIFF, *The Ohio State University* – I present a model for perceptual decision making for stimuli and responses in continuous space on lines, circles, and planes. The experiments use a range of stimulus types, including perceptual, symbolic, dynamic, and static. Participants were asked to make eye movements, mouse movements, or finger movements to, for example, the brightest part of a display or the color on a wheel surrounding a central stimulus that matches the central stimulus. The models are diffusion processes on lines and planes. In the models, evidence from a stimulus drives the noisy decision process which accumulates evidence over time to a criterion at which point a response is initiated. Noise is represented as a continuous Gaussian process or Gaussian random field. The model produces predictions for the full distributions of response times and choice probabilities and fits to data for choice probability, RT distributions, and choice

proportion and RT across the stimulus space are presented. I illustrate the model with fits to data from one perceptual and one numeracy task.
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Music Cognition
Celestin A, Friday Afternoon, 1:30-3:10 PM
Chaired by Peter Pfordresher, University at Buffalo, State University of New York

1:30-1:45 PM (84)
Musical Training Constraints Auditory/Motor Sequence Learning. PETER Q. PFORDRESHER and KAREN CHOW, *University at Buffalo, State University of New York* – We report an experiment that tested the flexibility of sensorimotor learning in sequence production. We hypothesized that sensorimotor learning is constrained by task-specific associations that arise from skill acquisition. Non-pianists and pianists learned simple melodies by ear under one of two auditory feedback conditions: one with normal pitch mapping (higher pitches to the right) and one with an inverted (reversed) mapping. After learning, both groups played melodies from memory with different feedback conditions. Both groups exhibited sensorimotor learning, and produced fewer errors at test while hearing the feedback used during training than the alternate feedback condition. However, pianists who learned melodies with an inverted feedback condition produced more errors at test than pianists who learned with normal pitch mapping. Non-pianists produced errors with similar frequency at test regardless of feedback during training. Pianists thus exhibited unstable learning when feedback during training conflicted with task-specific sensorimotor associations for pitch mapping.
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1:50-2:05 PM (85)
The Effect of Music Tempo and Tonality on Speech Perception. LEAH FOSTICK, *Ariel University*, ADRIANA ZEKVELD, *VU University Medical Center*, BOAZ BEN-DAVID, *IDC Herzliya* – Music affects the emotional state of the listener; major tonality is interpreted as 'happy', while minor tonality as 'sad'. In the current study, we tested whether tonality-inflicted emotional state can affect basic perceptual performance, such as speech perception. Thirty participants were asked to repeat consonant-vowel-consonant words that were presented with background music composed of major and minor scales, in fast and slow tempo. The melodies were composed and rated with different valence by Caldwell et al. (2015). Each melody repeated in four different permutations: major, minor, fast, and slow, creating major-fast, major-slow, minor-fast, and minor-slow combinations. The data showed main effect for tempo and tonality. Higher accuracy rate was obtained for slow tempo and major tonality, than for fast and minor. The tempo effect probably reflects energetic masking, but the tonality effect suggests that tonality-inflicted emotional state affects speech perception, with better perception of 'happy' (major) than 'sad' (minor).
Email: Leah Fostick, Leah.fostick@ariel.ac.il

2:10-2:25 PM (86)
Fluency and Metamemory for Written Music. BENNETT L. SCHWARTZ, *Florida International University*, ZEHRA F. PEYNIRCIOĞLU and JOSHUA R. TATZ, *American University* – We examined the effects of processing fluency on metamemory for written musical sequences. Previously, we found that piano players remembered musical sequences played on a silent keyboard using the nontraditional hand (treble clef/left hand and bass clef/right hand—dysfluent condition) better than those played using the traditional hand (treble clef/right hand and bass clef/left hand—fluent condition). In the current experiments, participants gave judgments of learning (JOLs) after studying each musical sequence. In Experiment 1, JOLs were higher in the fluent condition than the dysfluent condition, but we did not get a memory advantage for dysfluent items. Retrospective confidence of recognition was higher for sequences written in bass clef. In Experiment 2, we showed that whether the music was fingered on the silent keyboard or not did not influence JOLs, recognition, or confidence judgments. We discuss the results in terms of when processing fluency does or does not influences metacognition.
Email: Bennett L. Schwartz, schwartb@fiu.edu

2:30-2:45 PM (87)
Singing Accuracy and Memory for Music. ANDREA R. HALPERN, *Bucknell University*, PETER Q. PFORDRESHER, *University at Buffalo* – People vary in their ability to produce the correct pitches of even familiar songs like Happy Birthday. Prior work has suggested that good pitch-matching requires an accurate representation of the target pitch, in addition to motor planning. We tested whether better pitch matchers would be advantaged in two types of musical memory tasks. In Experiment 1, we examined the Vocal Memory Advantage (better recognition memory for novel melodies in a voice vs. a piano sound). However, pitch matching accuracy was not predictive of the VMA, nor overall recognition memory. In Experiment 2, we examined memory for the starting note of familiar pop tunes that had only been recorded in one key. Participants (none had Absolute Pitch) tried to find the correct starting note of the song on a keyboard. The better pitch matchers were more accurate at that task. We conclude that accurate pitch representation facilitates tasks in which prior memory representations are re-activated, but not necessarily when encoding new pitches.
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2:50-3:05 PM (88)
Toward a Comprehensive Model of Musical Ability. BROOKE OKADA and L. ROBERT SLEVC, *University of Maryland, College Park* (Presented by L. Robert Slevc) – Measuring individual differences in musical ability is critical in order to investigate questions about e.g., the innate vs. acquired nature of musical skill, the potential transfer from musical training to other abilities, and the components of musical ability and their dissociations in amusic patients. However, there has been little consensus on what exactly constitutes musical ability and how to best measure it. Previous research has used a variety of tasks assessing mainly perceptual skills (e.g., same/different judgments in sequentially presented melodies). Outcomes

from these tasks range from single indices (e.g., pitch ability) to composite scores from multiple tasks (e.g., pitch, rhythm, loudness, timbre). We will present individual differences data from several representative musical ability tasks (including perception and production measures) to assess the unity and diversity of musical abilities. We also assess how performance on these tasks relates to individual differences in working memory, intelligence, socioeconomic status, and personality factors.
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Letter/Word Processing
Celestin F, Friday Afternoon, 1:30-3:30 PM
Chaired by Kate Revill, Emory University

1:30-1:45 PM (89)
Prediction Under Load: The Effects of Cognitive Load on Anticipation and Competition in Spoken Word Recognition. KATE PIROG REVILL, *Emory University* – There is ongoing debate about whether prediction is fundamental or a costly strategy in language processing. Furthermore, different stages of lexical processing may be differentially affected by cognitive load. We examine the effects of verbal and spatial cognitive loads on participants' abilities to make anticipatory fixations to likely targets and to reduce competition from inconsistent competitors in a visual world task. Cognitive load resulted in a brief delay in anticipatory fixations to likely referents and a slightly reduced maximum benefit. The reduction in fixations to contextually inconsistent cohort competitors was also smaller under load. Spatial loads had a smaller effect than verbal loads even when the spatial load task was more difficult. This data suggests that while some forms of prediction in language processing are resistant to load, other consequences of prediction, like the modulation of lexical competition, may be more demanding and may rely on domain-specific mechanisms.
Email: Kate Pirog Revill, krevill@emory.edu

1:50-2:05 PM (90)
The Color-Word Contingency Effect Has Little to do With Word Reading. SACHIKO KINOSHITA and LUKE MILLS, *Macquarie University* – The color–word contingency effect is a phenomenon in which color identification responses to words that appear more often in particular colors are faster than those to low-contingency stimuli (Schmidt, et al., 2007; Lin & MacLeod, 2018). To date, the effect has been demonstrated with stimuli like color-neutral words (e.g., MONTH) and pseudowords (e.g., FLABE) that produce little interference in the manual Stroop task. In Experiment 1, we used incongruent color names (e.g., GREEN presented in red) as stimuli, and found that they produced contingency effects which were equal in size as color-neutral words. Subsequent experiments investigated whether the contingency manipulation commands attention to the word dimension. The results, as indexed by the "word interference effect" (the slower response to color when the distractor is a word, e.g., CROSS, relative to a non-linguistic neutral distractor, e.g., #####) indicated it does not.
Email: Sachiko Kinoshita, sachiko.kinoshita@mq.edu.au

2:10-2:25 PM (91)
Stress Assignment in English. REBECCA TREIMAN, NICOLE ROSALES, LAUREN CUSNER, and BRETT KESSLER, *Washington University in St. Louis* – How do readers of English decide which syllable of a word to stress? We report four studies that examine the properties of syllables that relate to stress assignment. The studies used bisyllabic nonwords that varied in number of initial and final consonants. The participants were university students, and the tasks included oral reading of sentences that contained nonwords, pronunciation of isolated nonwords, and metalinguistic judgments about stress. Contrary to the widely cited view within linguistics that onsets are irrelevant to stress assignment, syllables with longer onsets were more likely to receive stress than syllables with shorter onsets or null onsets. Also influential were the number of consonants at the end of the nonword and the syntactic context in which it appeared. The results shed light on the properties of syllables that are important for stress and that underlie patterns in languages and the behavior of language users.
Email: Rebecca Treiman, rtreiman@wustl.edu

2:30-2:45 PM (92)
Early Influences on Morphological Priming Effects. DEBRA JARED, *University of Western Ontario* – A controversy in the literature on morphological processing is whether semantic information plays a role early in processing, or whether the first step involves an orthographic parse of affixes. In a classic paper, Rastle, Davis, & New (2004) provided evidence that supported the latter view. Specifically, they demonstrated equivalent masked priming effects for transparent (cleaner-CLEAN) and opaque primes (corner-CORN). The present study replicated their study using exactly the same stimuli. In analyses comparable to those used by Rastle et al., priming was indeed equivalent for the two types of primes. However, more fine-grained analyses produced several results that are incompatible with an early orthographic parsing mechanism. The opaque priming effect was largely produced by items with long RTs and was sensitive to the data trimming procedure used. The divergence point of the RT distributions for related and unrelated primes was earlier for transparent than for opaque primes. Furthermore, transparent and opaque priming effects were differentially influenced by several lexical and individual difference variables. The results provide evidence that semantic relationships influence morphological priming early in processing.
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2:50-3:05 PM (93)
Extracting Meaning From Abbreviations: How Bavarian Is a BMW? TIM SLATTERY and ADAM PARKER, *Bournemouth University* – Miscommunication occurs frequently and is prevalent with abbreviations as they intentionally obscure meaning in order to reduce text. Informal textisms (e.g. thnks, frendz) can disrupt efficient reading. These abbreviations, however, are more similar to misspelt words than to formal abbreviations. Abbreviation use has been on the rise in formal written communication as well. While highly familiar abbreviations (e.g. BBC) may be treated as words (Brysbaert et al. 2009), it is not clear how novel abbreviations are

understood during reading—despite their widespread use. We report the results of an eye movement study of reading that presented passages of text with novel abbreviations which were manipulated to have either higher or lower frequency base words (Extraordinary Science Awards Ceremony vs. Ecological Scholars Algae Convention). Gaze durations were longer on abbreviations that had lower frequency base words. This suggests that readers are attempting to access the lexical information of an abbreviations base words when fixating the abbreviation (ESAC). Implications for the processing of multi-word units will be discussed.
Email: Tim Slattery, tslattery@bournemouth.ac.uk

3:10-3:25 PM (94)

Falsification of Theories Is Not Statistical, But Consensual: The Case of Letter Processing Models. PABLO GOMEZ, *DePaul University*, JEFFREY N. ROUDER, *University of California, Irvine* – In the last decade, visual word recognition researchers have spent considerable efforts at developing models of letter position coding and trying to "crack" the orthographic code. In doing so, theories have been implemented as models, and dozens of papers have attempted to falsify or adjudicate among competing models. This presentation takes stock of the progress made in the last decade in light of the distinction between theories, models, and statistical inference. Most researchers in psychology have, philosophically, a Popperian orientation that values falsification as a fundamental principle of theory advance. However, the inferential procedures used to assess data are not well suited to achieve falsification goals and hence the falsification of theories cannot be statistical, but instead consensual among communities of researchers. This process is messy and subjective, and when we fail to recognize its subjectivity we do so at our own peril.
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Attention Capture
Celestin D, Friday Afternoon, 1:30-3:10 PM
Chaired by Nicholas Gaspelin, Binghamton University, State University of New York

1:30-1:45 PM (95)

Selection History Overpowers Explicit Goals in Visual Search. NICHOLAS GASPELIN, *Binghamton University, State University of New York*, JOHN M. GASPAR, and STEVEN J. LUCK, *University of California, Davis* – For decades, theories of attentional guidance have focused on explicit goals. Recently, some theorists have made the provocative claim that unconscious factors—such as the previous locations or previous features of search items (called selection history)—play a much stronger role than explicit goals in guiding attention. However, most prior research was not designed in a manner that allowed a direct comparison of these two sources of top-down control. In the current project, participants performed a visual task adapted for eyetracking. We found that selection history controlled the first shift of gaze on each trial at least as strongly as the explicit goal, both in terms of directing gaze to targets and avoiding salient distractors. These results indicate that people have far less explicit control over visual attention than is ordinarily assumed.
Email: Nick Gaspelin, gaspelin@binghamton.edu

1:50-2:05 PM (96)

Fractionating Selection History: Dissociable Components of Experience-Driven Attention. HAENA KIM, MARK K. BRITTON, and BRIAN A. ANDERSON, *Texas A&M University* (Presented by Brian A. Anderson) – The control of attention is thought to be governed by three distinct influences: current task goals, physical salience, and selection history. This third construct, selection history, is often characterized as a unitary mechanism of control that can be contrasted with the other two. We present evidence that two of its components, reward history and outcome-independent selection history (repeated selection of a target), are fundamentally dissociable in how they influence selection. Specifically, pairing a stimulus with reward causes the stimulus to gain competitive priority via associative learning, whereas repeated selection causes the act of orienting to become habitual. This dissociation is evident in oculomotor biases following antisaccade training with and without rewards, and in the contextual specificity of the resulting biases. Our findings demonstrate that the influence of selection history on attention encompasses more than one learning process, and challenge the idea that selection history reflects a single mechanism of control.
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2:10-2:25 PM (97)

Implicit Attentional Biases in a Changing Environment. JAN THEEUWES and BENCHI WANG, *Vrije Universiteit* – Lingering biases of attentional selection affect the deployment of attention above and beyond top-down and bottom-up control. Recently we showed that implicitly learning the statistical regularities present in the display changes the topographical landscape of spatial 'priority' maps (Wang & Theeuwes, 2018a,b).The current study investigated the flexibility of this learning in a study in which the statistical regularities changed over the course of the experiment. While searching for a target singleton, the distractor singleton appeared much more often in one location than in all other locations. Crucially, this location at which the distractor appeared more often changed over time. By means of Gaussian modelling we established exactly how the bias of attention followed these changes in the display. We show that selection was remarkably flexible as the attentional bias followed the changes in the environment incorporating contributions of previous contingencies to the current attentional bias. We argue that the weights within the spatial priority map of selection are optimally adjusted to changing environment, even though observers are not aware of these changes in the environment.
Email: Jan Theeuwes, J.Theeuwes@vu.nl

2:30-2:45 PM (98)

Combined Electrophysiological and Behavioral Evidence for the Suppression of Salient Distractors. STEVEN J. LUCK, *University of California, Davis*, NICHOLAS GASPELIN,

Binghamton University – Recent visual search studies suggest that salient stimuli can be suppressed by top-down attentional mechanisms. The initial evidence for this hypothesis came from ERP studies demonstrating that salient stimuli which fail to capture attention elicit a distractor positivity (PD) component, a putative neural index of suppression. Other support comes from behavioral studies showing that processing at the salient location is inhibited compared to other locations. The current study was designed to link the behavioral and neural evidence by combining ERP recordings with an experimental paradigm that provides a behavioral measure of suppression. We found that when a salient distractor item elicited the PD component, processing at the location of this distractor was suppressed below baseline levels (as measured behaviorally). Furthermore, the magnitude of the behavioral suppression and the magnitude of the PD component covaried across participants. These findings "connect the dots" between the behavioral and neural measures of suppression, increasing our confidence that the PD component can be used to assess the timing and neural substrates of the behaviorally observed suppression.
Email: Steven J. Luck, sjluck@ucdavis.edu

2:50-3:05 PM (99)

Inattentional Numbness for Sustained and Dynamic Tactile Events. SANDRA MURPHY and POLLY DALTON, *Royal Holloway, University of London* (Presented by Polly Dalton) – It is now well-known that the absence of attention can leave us 'blind' and 'deaf' to stimuli that are otherwise clearly detectable. However, research into the possibility of a tactile analogue – 'inattentional numbness' – is still in its infancy. In particular, whereas inattentional blindness and deafness have been demonstrated for sustained and dynamic stimuli, such as the presence of a 'gorilla person' on screen (Simons & Chabris, 1999) or in earshot (Dalton & Fraenkel, 2012), inattentional numbness has so far only been demonstrated for brief, transient stimuli, such as air puffs (Mack & Rock, 1998) or short vibrations (Murphy & Dalton, 2018). Here, we present evidence that the absence of attention can leave people unaware of a longer-lasting 'spider' stimulus, consisting of a sequence of six taps moving up the forearm. To our knowledge, these experiments provide the first demonstration of sustained inattentional numbness.
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Symposium III: Leading Edge Workshop–Time for Action: Reaching for a Better Understanding of the Dynamics of Cognition
Celestin D, Friday Afternoon, 3:30-5:30 PM
Chaired by Joo-Hyun Song, Brown University, and Timothy Welsh, University of Toronto

3:30-3:45 PM (100)

Introduction. JOO-HYUN SONG, *Brown University,* TIMOTHY WELSH, *University of Toronto*
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3:50-4:05 PM (101)

The Time for Action is at Hand. DAVID ROSENBAUM, *University of California, Riverside* – The science of mental life and behavior has paid surprisingly little attention to the means by which mental life is translated into physical actions. Even with the growing acceptance of embodiment, motor control has more often been viewed as a window into perception and cognition than as a topic in its own right. In a 2005 American Psychologist article, called "The Cinderella of Psychology," I suggested that the relegation of motor control to the sidelines of psychology has a number of historical causes. I will briefly review those causes and then turn to studies showing that psychonomic-style research has revealed important principles of action organization. New, exciting lines of work are also in the pipeline. These developments suggest that the time for the integration of action research with research on cognition, perception, and emotion is at hand.
Email: David Rosenbaum, david.rosenbaum@ucr.edu

4:10-4:25 PM (102)

Toward a Unitary Approach to Human Action Control. BERNHARD HOMMEL, *Cognitive Psychology Unit & Leiden Institute for Brain and Cognition, Leiden University*, REINOUT W. WIERS, *University of Amsterdam* – From its academic beginnings, the theory of human action control has distinguished between endogenously-driven, intentional action and exogenously-driven, habitual or automatic action. We challenge this dual-route model and argue that attempts to provide clear-cut, straightforward criteria to distinguish between intentional and automatic action have systematically failed. Specifically, we show that there is no evidence for intention-independent action, and that attempts to use the criterion of reward sensitivity and rationality to differentiate intentional and automatic action are conceptually unsound. As a more parsimonious, and more feasible alternative, we suggest a unitary approach to action control, according to which actions are (a) represented by codes of their perceptual effects; (b) selected by matching intentionsensitive selection criteria; and (c) moderated by metacontrol states.
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4:30-4:45 PM (103)

Actions as Social Signals: Methods and a Framework for Studies of Human Social Interaction. ANTONIA HAMILTON, *University College London* – Social interactions in real life are spontaneous, fluid and rarely repeated in exactly the same way again. How, then, can we pin down these behaviours in the lab and place them in a theoretical framework? To answer these questions, I will describe a series of studies, which record hand, head and body movement in high resolution during naturalistic social interactions. We characterize these actions in a social signalling framework, testing if an action performed only for one person, or is it intended as a signal which sends a message to another? For example, we find evidence that imitation is greater when people believe they are watched, showing that that imitation is a social signal. This showcases how high-precision methods and strong theories are both needed to advance studies of human social interaction.
Email: Antonia Hamilton, a.hamilton@ucl.ac.uk

4:50-5:05 PM (104)

Dynamics of Distraction in Goal-Directed Action. JEFF MOHER, *Connecticut College* – Our ability to stay focused on the task at hand fluctuates from moment-to-moment. In recent work, I have explored these fluctuations in focused attention in the context of goal-directed action. Specifically, I have found that the trajectory of a hand movement towards a target in a simple search task can vary widely over time, despite no changes in the task or stimulus properties. Increased deviation towards a non-target distractor on one trial appears to indicate a lack of focus that sustains into subsequent trials. These effects are not limited to motor priming, as similar patterns are observed when participants switch between goal-directed action responses and keypress responses. The results of these studies hold promise both for furthering our understanding of the dynamics of attention and for practical implementations that could detect drifts in focus during high-stakes situations (e.g., driving) and send alerts to prevent costly errors.
Email: Jeff Moher, jmoher@conncoll.edu

5:10-5:25 PM (105)

Choice Reaching With a LEGO Arm Robot (CoRLEGO). DIETMAR HEINKE, *University of Birmingham* – I will present a neurobiologically inspired robotics model, termed CoRLEGO (Choice reaching with a LEGO arm robot). CoRLEGO's architecture is based on the assumption that the process of selecting reaching targets can leak into the motor system (i.e., leakage effect). In CoRLEGO this leakage effect was implemented with neurobiologically plausible, dynamic neural fields (DNF); competitive target selection and topological representations of motor parameters. CoRLEGO demonstrates how the leakage effect can simulate evidence from Song and colleagues' choice reaching studies such as the curvature effect and the colour priming effect. An extension of CoRLEGO can mimic findings that transcranial direct current stimulation (tDCS) over the motor cortex modulates the colour priming effect (Woodgate et al., 2015). The extension includes feedback connections from the motor system to the brain's attentional system (parietal cortex). This architecture adds to growing evidence that there is a close interaction between the motor system and the attention system. This view is different from the traditional conceptualization of the motor system as the endpoint of a serial chain of processing stages.
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Cognition and Emotion
Celestin F, Friday Afternoon, 3:50-5:30 PM
Chaired by Jonathan Schooler, University of California, Santa Barbara

3:50-4:05 PM (106)

Aha Misattribution: Solving Anagrams Leads to Inflated Truth Judgments. RUBEN LAUKKONEN, *University of Queensland*, BENJAMIN KAVELADZE and JONATHAN W. SCHOOLER, *University of California, Santa Barbara* (Presented by Jonathan W. Schooler) – The "aha" experience is associated with a sudden sense of a correct solution, but is it used to infer the veracity of an answer? To explore this question we examined whether "aha" experiences can lead to inflated truth judgments. Participants assessed general knowledge questions with a missing target item such as "____ keep growing until they die". The answer was subsequently presented either in an unscrambled manner (kangaroo) or as an anagram (ooknagar) that participants attempted to solve. Regardless of solution success, all participants were shown the answer and made truth judgments. Answers corresponding to solved anagrams were judged as more true than those corresponding to unsolved anagrams, or items that were initial viewed in an unscrambled format. These differences were similarly reflected in participants "aha" ratings. These findings suggest that "aha" experiences elicited in one context (anagram solving) can be misattributed to a different source (truth claims), and thereby lead to faulty veracity judgments. The results will be discussed in relationship to allied paradigms (e.g. revelation effect, discovery misattribution) and theories of affect as information.
Email: Jonathan Schooler, schooler@psych.ucsb.edu

4:10-4:25 PM (107)

Is Mind Wandering Related to Depression Symptom Severity? MELANIE TAKARANGI and DIANE NAYDA, *Flinders University* – We know that experiencing negative mood increases the likelihood of mind-wandering, that mind-wandering often focuses on a "current concern" and that mind-wandering on negative content can exacerbate negative affect. Prior research has also shown a relationship between depression symptoms and mind-wandering without awareness. We aimed to replicate and extend this research. Participants completed measures of depression symptoms and mind-wandering either before or after a behavioural mind-wandering task (Sustained Attention to Response Task) with thought sampling probes. Depression symptom severity was related to self-reported mind-wandering, and mind wandering both with and without meta-awareness on the SART. However, these effects were evident only when participants completed the questionnaires prior to completing the SART. Our results suggest that when depression symptoms are made salient, people are more likely to mind wander; reflecting on symptoms may increase negative mood and/or increase accessibility to negative thoughts and rumination about the causes and consequences of depression.
Email: Melanie Takarangi, melanie.takarangi@flinders.edu.au

4:30-4:45 PM (108)

Sleep Makes New Alarming Words Hijack Attention. NICOLAS DUMAY, MADELEINE MILLAR, ANTONIA NASH, ANNABELLE SIMPSON, and MARGAUX SHIPLEY, *University of Exeter* – This study examined whether sleep gives new emotional words the capacity to hijack attention. Participants learnt associations between made-up words (e.g., 'drott') and pictures with an alarming or a neutral content (e.g., 'a dead sheep' vs. 'a munching cow') 12 hrs apart. Whereas half of the participants learnt Set 1 at 8 am and Set 2 at 8 pm, the others did the reverse. While learning was easier in the morning, alarming and neutral associations had similar learning rates in both groups. Still, emotional Stroop and an auditory analogue involving pause detection revealed robust interference for 12-hr old alarming words after sleep only. In a complementary fashion, old/new recognition showed faster latencies after 12

hrs of sleep, and in that case only, a better performance for alarming words. Sleep (or some associated act), therefore, plays a role in turning mere word-like objects into fully established representations capable of hijack attention.
Email: Nicolas Dumay, n.dumay@exeter.ac.uk

4:50-5:05 PM (109)

Touch Increases Disgust Salience in Episodic Memory. DAVID ANAKI, *Bar-Ilan University*, HANNAH TARDER-STOLL and MORRIS MOSCOVITCH, *University of Toronto* – Studies have found memory-enhancement for disgusting stimuli, yet the reason for this difference between emotions is unclear. We hypothesized that disgusting stimuli are remembered better because of their self-relevance. Self-relevance was operationalized using the contamination effect, namely, avoidance of physical contact with a disgusting entity. Participants were presented with disgusting and fearful images, with a pair of digits overlaid on them. Participants selected the numerically larger digit. Half of the participants responded by pressing keyboard buttons, while the others pressed the digit on the touchscreen. Following the completion of the numerical task, participants were unexpectedly asked to recall the images. The memory of disgusting and fearful stimuli was comparable in the keyboard condition but greater for disgusting than fearful images in the touch condition. We suggest that participants in the touch condition felt contaminated by the disgusting images, making these disgusting stimuli more self-relevant and subsequently more salient in memory.
Email: David Anaki, david.anaki@biuac.il

5:10-5:25 PM (110)

Aftereffects of Emotional Affect: Crossmodal Learning, Bias, and Adaptation. MARTIJN BAART, MIRJAM KEETELS, and JEAN VROOMEN, *Tilburg University* – Perception of vocal affect is influenced by the concurrent sight of an emotional face. We investigated whether repeated exposure to 'happy' or 'fearful' visual information (conveyed by a dynamic video or static image of a speaker) combined with auditory sentences with ambiguous emotional prosody, can induce a perceptual shift in subsequent emotional valence ratings of auditory-only sentences. In a series of experiments, we consistently observed such cross-modal learning effects (i.e., recalibration of vocal affect), which were larger than the cross-modal bias induced by visual only exposure, and in opposite direction of adaptation that we observed after exposure to unambiguous emotionally congruent audio-visual stimuli, as well as auditory-only stimuli. Perception of vocal affect is thus flexible and can be recalibrated by dynamic and static visual information.
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Sensation and Perception I
Celestin A, Friday Afternoon, 3:30-5:30 PM
Chaired by Mary Peterson, University of Arizona

3:30-3:45 PM (111)

Semantic Priming of Figure-Assignment: Unmasked Primes, Masked Primes, and Task Set Effects. MARY A. PETERSON and RACHEL SKOCYPEC, *University of Arizona* – Past experience is a prior for figure assignment. Moreover, the shape and semantics of familiar objects suggested along a border are activated even when the figure is assigned on the other side. Can semantic expectations produced by a word prime affect figure assignment? Subjects viewed displays with a familiar object suggested on one side of a central border and a novel object on the opposite side. Before the displays, either the basic level (BL) name of the familiar object or the name of an unrelated (UNR) object appeared. The prime word was unmasked in Exp.1 and masked in Exps. 2–4. Subjects perceived the figure on the familiar side of the central border more often after BL than UNR primes, as expected if semantic expectations can affect figure assignment. For masked words these effects were observed only when a semantic induction task preceded the prime and not when a perceptual induction task, or no induction task, preceded the prime. Thus, when task set engages semantic networks, expectations produced by a word prime increase the probability that the figure is assigned on the side of a border where an object from the same BL category lies. These results extend predictive models of perception beyond specific expectations.
Email: Mary A. Peterson, mapeters@u.arizona.edu

3:50-4:05 PM (112)

Multiple Paths to Holistic Processing: Holistic Processing of Gestalt Stimuli and of Non-Face Objects of Expertise Differentially Overlap With Holistic Processing of Faces. KIM M. CURBY, DENISE MOEREL, and MENGJIE HUANG, *Macquarie University* – Holistic processing is typically considered specific to faces and non-face stimuli of expertise. However, 1) holistic processing can arise for untrained, novel stimuli containing salient Gestalt perceptual grouping cues and 2) previous findings suggest that the mechanisms supporting this are not independent from those supporting holistic processing of faces. Here we examine whether there is a mechanistic overlap between holistic processing of these Gestalt stimuli and of faces that is like that between the holistic processing of objects of expertise and of faces. To do this we used the 2-back interleaved part-matching task that previously revealed a mechanistic overlap between holistic processing of faces and of objects of expertise. In this task, concurrent holistic processing of these salient Gestalt stimuli did not impact (Experiment 1), nor was it impacted by (Experiment 2), holistic processing of face stimuli. This suggests that the nature of the overlap between holistic processing of faces and of salient Gestalt stimuli may be distinct from that between the holistic processing of objects of expertise and of faces. We discuss potential mechanistic accounts of this difference.
Email: Kim Curby, kim.curby@mq.edu.au

4:10-4:25 PM (113)

The Role of Response Inhibition in Simulated Lethal Force Decision Making. ADAM T. BIGGS, *Naval Medical Research Unit Dayton*, KYLE A. PETTIJOHN, GRANT ROUSH and KARA J. BLACKER, *Naval Medical Research Unit Dayton, HMJF* – Lethal force decision making involves numerous sensory, motor, and cognitive components that occur in a brief timeframe. Here, using participants with a range of firearms experience, we compared a video game-based simulator and a

military-grade simulator. Cognitive-specific comparisons were included by having participants complete a battery of response inhibition tasks to determine whether cognitive predictors of shooting errors would provide similar predictive power across simulators. Results demonstrated good reliability in sensitivity (d') and false alarm rate (i.e., civilian casualties) between the simulators, even when controlling for baseline marksmanship ability. Further, we found that a "hybrid" response inhibition task, incorporating aspects of both a traditional go/no-go and a stop-signal reaction time task, was significantly predictive of sensitivity in both shooting simulators, as well as response time of the first shot fired. These findings may suggest a target area for novel shoot/don't-shoot training.
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4:30-4:45 PM (114)

Perception of Ensemble Centers and Headings. MATTHEW S. CAIN, *US Army Natick Soldier RDEC*, SASEN S. CAIN, *University of California, San Diego*, DAWN M. WENDELL, *Massachusetts Institute of Technology* – Humans controlling robot swarms in real-time face a difficult perceptual and cognitive challenge: when the number of items far exceeds the capacity of attention, how can the human perceive and guide the swarm? One possible solution is mentally representing the swarm using ensemble properties such as perimeter shape (i.e., convex hull), centroid, and heading, but there may be biases in perception or representation of these summary statistics. First, we show that observers are faster and more accurate at inferring the shape that surrounds the items and identifying its centroid than they are at identifying the average position of the items. Second, we show both that centroid perception is biased toward the apparent heading and that heading perception is biased toward the ensemble center. This suggests that swarm control should be based on centroids and compensate for heading-induced bias, and also challenges theories positing that ensemble judgements arise from individuated objects.
Email: Matthew S. Cain, matthew.s.cain6.civ@mail.mil

4:50-5:05 PM (115)

The Impact of Head Movements on Speech Intelligibility in Multi-Talker Environments. ILJA FRISSEN and JOHANNES SCHERZER, *McGill University*, HSIN-YUN YAO, *Clear-Com Inc.* – The Coordinate Response Measure corpus was used to measure how head movements affect speech intelligibility of two, four, or six concurrent talkers that are spatialized over headphones using virtual 3D audio. In two conditions, participants moved their head aided by a visual target tracking task. In one condition, the changes in the spatial location of the talkers were compensated for (i.e., the talkers were world-fixed) while in the other there was no such compensation (i.e., the talkers were head-fixed). In an additional baseline condition, participants did not move their heads. Contrary to expectation, the world-fixed condition impaired speech intelligibility.
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5:10-5:25 PM (116)

Selective Influence in Systems Factorial Technology and Perceptual Separability in General Recognition Theory: Similarities, Distinctions, and Synthesis. JAMES T. TOWNSEND, *Indiana University*, RU ZHANG, *University of Colorado*, YANJUN LIU, *Indiana University* – In the history of scientific psychology, researchers have long tied specific experimental manipulations to psychological concepts and mechanisms. Selective Influence can be viewed as a landmark in the application of this precept to strategic aspects of psychological processes. Selective influence demands that particular experimental operations affect theoretically specified subprocesses and not others. Perceptual separability is a valuable property of a feature or dimension in which the percept is invariant across experimental or environmental alterations of another feature or dimension. Both are examples of the search for lawful change and invariance that have proven so invaluable in the physical and biological sciences. Both have, in recent years, been endowed with high logical and quantitative precision as well as sturdy statistical methods of assessment. Both have been deployed in numerous and broad avenues of psychological applications. This talk will discuss their similarity and differences and show how they interrelate to one another.
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Recall and Recognition Memory

Celestin E, Friday Afternoon, 3:50-5:30 PM

Chaired by Christoph Weidemann, Swansea University

3:50-4:05 PM (117)

Neural Activity Reveals Interactions Between Episodic and Semantic Memory Systems During Retrieval. CHRISTOPH T. WEIDEMANN, *Swansea University*, JAMES E. KRAGEL, *Northwestern University*, BRAD C.K. LEGA, *University of Texas Southwestern*, GREGORY A. WORRELL, *Mayo Clinic*, MICHAEL R. SPERLING and ASHWINI D. SHARAN, *Thomas Jefferson University Hospital*, BARBARA C. JOBST, *Dartmouth Medical Center*, FATEMEH KHADJEVAND, *Mayo Clinic*, KATHRYN A. DAVIS, *Hospital of the University of Pennsylvania*, PAUL A. WANDA, ALLISON KADEL, DANIEL S. RIZZUTO, and MICHAEL J. KAHANA**, *University of Pennsylvania* – Whereas numerous findings support a distinction between episodic and semantic memory, it is now widely acknowledged that these two forms of memory interact during both encoding and retrieval. The precise nature of this interaction, however, remains poorly understood. To examine the role of semantic organization during episodic encoding and retrieval, we recorded intracranial encephalographic signals as 69 neurosurgical patients studied and subsequently recalled categorized and unrelated word lists. Applying multivariate classifiers to neural recordings, we were able to reliably predict encoding success, retrieval success, and temporal and categorical clustering during recall. By assessing how these classifiers generalized across list types, we identified specific retrieval processes that predicted recall of categorized lists and distinguished between recall transitions within and between

category clusters. These results particularly implicate retrieval (rather than encoding) processes in the categorical organization of episodic memories.
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4:10-4:25 PM (118)

Systems Consolidation Reconsidered: Evidence for a Contextual Binding Theory of Episodic Memory. ANDREW P. YONELINAS, *University of California, Davis* – Episodic memory reflects the ability to encode and subsequently recollect our past personal experiences. This process is dependent on the hippocampus, but it is often assumed that the hippocampus plays only a temporary role such that memories will be forgotten unless they are consolidated to neocortical areas for long-term storage during off-line periods like sleep. Here, we review behavioral, lesion, neuroimaging and sleep studies of episodic memory, that are often taken as evidence in support of consolidation and find that a growing body of research directly challenges the consolidation notion and provides support for an alternative contextual binding account, whereby episodic memories remain dependent on the hippocampus and forgetting is produced by gradual changes in context that moderates interference from competing memories. The results suggest that forgetting effects are largely due to contextual interference, episodic memory remains dependent on the hippocampus across time, and sleep benefits memory because it reduces contextual interference.
Email: Andrew Yonelinas, apyonelinas@ucdavis.edu

4:30-4:45 PM (119)

Memory Search Under Different Task Demands. SIMON FARRELL, *University of Western Australia* – We examined how people search memory under task demands that encourage different retrieval operations. Participants were presented with short lists of words associated with one of three characters. and were asked to free recall the words associated with a character in response to one of three cues. A *specific* cue asked for the words from a single list associated with the target character. A *general* cue, tapping generalised memory across lists (Humphreys et al., 2009, Cognitive Psychology), asked for any words associated with a character across the lists, or for the words that tended to be associated with a particular character. A *recombination* cue tasked participants with recalling words from as many different lists as possible, a laboratory analogue of the recombination task used in future thinking research (e.g., Addis, et al., 2010, Psychology and Aging). In general, all three tasks were well characterised by standard episodic memory benchmarks, suggesting that search in all cases was conducted according to similar principles. Differences between tasks point to some quantitative differences in how people probe and search memory.
Email: Simon Farrell, simon.farrell@uwa.edu.au

4:50-5:05 PM (120)

Do Irrelevant Recall Cues Disrupt Idiosyncratic Recall Strategies? ANA LAPA and LEONEL GARCIA-MARQUES, *Faculdade de Psicologia Universidade de Lisboa* (Presented by Leonel Garcia-Marques) – Collaborative inhibition and part-list cueing effects have been accounted for by the effects retrieval cues that re-direct retrieval and deviate individuals from their spontaneous idiosyncratic retrieval plans (Basden, Basden, Bryner &Thomas, 1997). One condition for this disruptive effect to occur seems to be the relevant nature of the retrieval cues normally used (i.e., words included into the study lists). But what if the "cue" words present at retrieval would be irrelevant for recall? We argue that in these condition, one should find these effects to be lessened. In one collaborative memory experiment, we manipulated the degree of overlap between the lists studied by each group member (0%, 50% or 100%). Collaborative inhibition effects still emerged and even increased in the condition with zero overlap between study lists. In a second study we replicated these results with a part-list cueing paradigm. Consequences of the results for the disruption of recall strategies account of collaborative inhibition and part-list effects and discussed. We argue that the explanation for these effects requires the assumptions from re-consolidation theory.
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5:10-5:25 PM (121)

Two Ways of Calculating Confidence Accuracy Characteristic Plots in Yes/No Recognition Memory Experiments. EYLUL TEKIN, *Washington University in St. Louis*, K. ANDREW DESOTO, *Association for Psychological Science*, JOHN T. WIXTED, *University of California, San Diego*, HENRY L. ROEDIGER, III, *Washington University in St. Louis* (Presented by Henry L. Roediger, III) – Confidence-accuracy characteristic (CAC) plots were developed for use in eyewitness memory experiments in which witnesses are asked to select a suspect from a lineup and make a confidence rating. The findings show that high confidence indicates high accuracy in all studies yet reported with an unbiased lineup. We consider two methods of applying CAC plots in standard yes/no recognition experiments, one method considering hits and false alarms (akin to eyewitness experiments) and the other using hits and misses. We re-analyzed three sets of published data using both methods and show that whether one method leads to higher accuracy rates than the other depends on whether the lures used are related or unrelated to the target items. In addition, both methods of plotting CACs replicate the finding that high confidence leads to high accuracy, as in eyewitness identification studies. Even in cases in which the lures were highly related and thus deceptive, the CAC plots indicated that high confidence indicates high accuracy. The two methods of calculating CAC plots may provide a useful tool in analyzing standard yes/norecognition experiments.
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Reading I
Celestin BC, Friday Afternoon, 3:50-5:30 PM
Chaired by Elizabeth Schotter, University of South Florida

3:50-4:05 PM (122)

Oral Reading as a Tool to Study Parafoveal Influences on Saccade Planning and Word Recognition. ELIZABETH R. SCHOTTER, *University of South Florida* – To read quickly

people parafoveally process upcoming words before directly looking at them, allowing them to determine how long to look at it, if at all. But do they fully recognize the word based on this preview? Studies that rely solely on eye tracking limit our ability to measure the relationship between seeing and understanding. The current study measured verbal responses and eye movements concurrently during oral reading to obtain a direct measure of what the reader had understood from the text in real-time. We used a gaze-contingent boundary paradigm with unrelated high and low frequency word pairs that were orthogonally crossed to create valid and invalid previews. Readers had shorter fixations and were more likely to utter the preview when it was high frequency, indicating parafoveal word identification was more efficient, even when the preview was invalid. Thus, parafoveal information can be used to trigger saccades and identify words.
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4:10-4:25 PM (123)

Modeling Individual Differences in Word Reading Using the Triangle Model. JAY G. RUECKL, *University of Connecticut and Haskins Laboratories*, JASON D. ZEVIN, *University of Southern California*, HENRY WOLF VII, *University of Connecticut and Haskins Laboratories* – In support of several projects concerning individual differences in word reading, we have conducted over 2000 simulations of the triangle model. In these simulations, three control parameters (the amount of phonological noise, the number of 'hidden units' mediating the mapping from orthography to phonology, and the parameter scaling the step size of the weight changes resulting from each learning trial) were independently varied, and the behavior of each run of the model was evaluated at many points over the course of training using a test set that included theoretically informative sets of words and nonwords. Here we report results bearing on two hypotheses concerning developmental dyslexia: that suboptimal settings of different control parameters give rise to different types of reading impairments; and that one such type ("phonological" dyslexia) is characterized by an aberrant developmental trajectory, whereas another ("surface" dyslexia) is associated with a slower growth rate along the trajectory followed by typically developing readers. Our results support both hypotheses, but with the caveat that there is significant variation in the developmental trajectories of "typically developing" readers.
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4:30-4:45 PM (124)

The Influence of Number of Syllables on Word Skipping During Reading Revisited. DENIS DRIEGHE, *University of Southampton*, AARON VELDRE, *University of Sydney*, GEMMA FITZSIMMONS, *University of Southampton*, JANE ASHBY, *Central Michigan University*, SALLY ANDREWS, *University of Sydney* – Fitzsimmons and Drieghe (2011) showed that a monosyllabic word was skipped more often than a disyllabic word during reading, indicating that syllabic structure was extracted from the parafovea early enough to influence word skipping. In a large-scale replication of this study in which we additionally measured the reading and spelling abilities of the participants, the effect of number of syllables on word skipping was not significant. Moreover, a Bayesian analysis indicates strong evidence for the absence of this effect. Our individual differences measures replicate previous observations showing that spelling ability uniquely predicts word skipping such that better spellers skip more often. These findings indicate that high quality lexical representations afford the system to reach an advanced stage in the word recognition process of the parafoveal word early enough to influence the decision whether or not to skip the word but that number of syllables does not feature in this decision.
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4:50-5:05 PM (125)

Why Is Second Language Reading Slower? An Eye-Tracking Investigation. STEVEN G. LUKE, KYLE NELSON, and JENNIFER BOWN, *Brigham Young University* – L2 reading is less efficient, but why? In Study 1, native speakers of Chinese and English were eye tracked while they read text passages in their L1 and L2. Participants also read pseudo-text, (letters and characters were replaced by block shapes). Reading efficiency was analyzed using fixation duration distribution analysis. As expected, Mu, the center of the fixation duration distribution, increased when reading the denser Chinese orthography. Removal of semantic content (pseudo-reading) increased Tau, the distribution tail, indicating that semantic difficulty influences a subset of fixations. L2 reading increased Mu equally for both languages, indicating that L2 reading difficulty is early-arising and likely orthographic in nature. In Study 2, beginning and advanced learners of Russian read both English and Russian passages while their eyes were tracked. Mu increased equivalently for beginning and advanced learners when reading in the L2 (Russian). Tau also increased for all learners when reading in the L2, but this change was larger for beginning learners. Results indicate that all L2 readers experience difficulty at an early, orthographic level, while more advanced learners have reduced difficulty with semantic processing.
Email: Steven Luke, steven_luke@byu.edu

5:10-5:25 PM (126)

Sleep Deprivation Impairs but Does Not Block Ability to Learn and Generalise a New Artificial Script. JAKKE TAMMINEN, LYDIA VINALS, BENEDETTA CEVOLI, and KATHLEEN RASTLE, *Royal Holloway, University of London* – Sleep deprivation impairs subsequent episodic memory, but its impact on the ability to generalise newly acquired knowledge to unstudied stimuli is unknown. We trained two groups of adults in the evening to read 36 novel words printed in an artificial script. The sleep deprived group remained awake overnight following training, while the rested group slept normally. After two recovery nights participants returned for two test sessions a week apart. Test tasks included recognition memory of the trained words, explicit knowledge of letter-phoneme mappings in the artificial script, as well as reading aloud and spelling of trained words and untrained words. Accuracy rates in all tasks were similar in the two groups, showing that both were able to learn the new script and to generalise their knowledge to read and spell untrained words. Reaction times however in the recognition memory and letter-phoneme knowledge tasks showed that sleep deprivation significantly slowed performance.

These results suggest that while learning and generalisation can occur without sleep, sleep nonetheless facilitates access both to episodic memory of the trained stimuli and to the inherent regularities of the new writing system.
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Problem Solving and Reasoning
Celestin GH, Friday Afternoon, 3:30-5:30 PM
Chaired by Richard Catrambone, Georgia Institute of Technology

3:30-3:45 PM (127)
AGORA: An Argument Visualization Tool to Stimulate Reflection and Self-Correction. RICHARD CATRAMBONE, MICHAEL HOFFMAN, and JEREMY LINGLE, *Georgia Institute of Technology* – The process of creating an argument—i.e., formulating a claim and reasons—can be used to stimulate reflection on one's own reasoning. This idea determines the user-guidance of the AGORA software, where argument maps can be created in logical form to reduce cognitive load. To do this, AGORA presents the justificatory relation between reason(s) and conclusion entered by the user in the form of an additional premise called an "enabler". Instead of reflecting in a rather abstract manner on the question whether the reasons provided can jointly justify the conclusion, the user only needs to look at the enabler and ask herself whether this premise is acceptable or not. This reflection can lead the user to either improve the argument or to modify the claim. We report preliminary results of a study comparing the quality of arguments created with AGORA with an off-the-shelf argument visualization tool and a text-based approach.
Email: Richard Catrambone, richard.catrambone@psych.gatech.edu

3:50-4:05 PM (128)
A Visual Method for Bayesian Reasoning. JEFFREY J. STARNS, ANDREW L. COHEN, CARA BOSCO, and JENNIFER HIRST, *University of Massachusetts, Amherst* – Bayesian reasoning is a mathematical procedure for updating the probability that a hypothesis is true based on new information. Without training, people are very unlikely to perform correct Bayesian reasoning for word problems that report information in terms of probabilities (Gigerenzer & Hoffrage, 1995). We tested whether undergraduate students could learn a spatial method for performing Bayesian reasoning that does not rely on any explicit equations. We found that students dramatically improved their Bayesian reasoning performance following a 6-minute video describing the spatial technique, and they were able to implement the technique regardless of whether they created the spatial visualizations using an interactive computer display or just pencil-and-paper. Moreover, the majority of students were able to discover the explicit mathematics "behind" the visualization technique without direct instruction. We will discuss various ways that the spatial method can enhance instruction on Bayesian reasoning and facilitate efforts to make Bayesian inference a standard component of undergraduate statistics instruction.
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4:10-4:25 PM (129)
Mathematics Problem Solving as Structural Alignment: Semantic Schemas and Diagrams Influence Solution Strategies in Probability Problem Solving. CHENMU XING, *Wesleyan University*, JAMES E. CORTER, *Columbia University Teachers College*, DORIS C. ZAHNER, *Council for Aid to Education* (Presented by James E. Corter) – Research has shown that the process and outcome of mathematics word problem solving can be influenced by a problem's concrete cover story, and by visualizations of that structure. Mathematics word problem solvers interpret the underlying structure of a word problem and solve it by mapping solution structures onto the semantic relations depicted in a word problem, a process which we argue can be influenced by structured external visualization. The present study investigated the effect of semantic schemas evoked by problem "surface" content, and of provided diagrammatic representations, on probability problem solving. Participants were assigned to no-diagram or one of four different diagram conditions. They solved a set of probability word problems that were structurally isomorphic but instantiated with different cover stories designed to evoke particular semantic schemas. Results showed that both the problem's semantic schema and the provided diagram structure affected the type of solution strategy used.
Email: James E. Corter, jec34@columbia.edu

4:30-4:45 PM (130)
Judgment of Solvability in Non-Verbal Problems: Combining Visual Cues with Expectations. TIRZA LAUTERMAN and RAKEFET ACKERMAN, *Technion—Israel Institute of Technology* (Presented by Rakefet Ackerman) – Meta-Reasoning refers to processes that monitor problem-solving activities and regulate effort investment. Monitoring begins with an initial Judgment of Solvability (iJOS) which reflects the solver's first impression whether the problem is solvable or unsolvable. It is assumed to affect the following time regulation and decisions regarding coping with the problem. The sparse research of iJOS neglected the non-verbal problems. Our aim was to explore possible bases for iJOS. We used Raven matrices as the non-verbal problems. Unsolvable matrices were generated by switching some of the elements in original Raven matrices, to break the rules while keeping the original components. In two experiments, participants gave quick iJOS for all matrices and afterwards solved them. Findings suggest that iJOS relies on both bottom-up perceptual heuristic cues and top-down expectations concerning the task. This study highlights the role of non-verbal factors in Meta-Reasoning processes and has applicable implications regarding presentation of non-verbal problems.
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4:50-5:05 PM (131)
Cognitive Miserliness, Cognitive Wastefulness, and Meta-Reasoning. SHIRA ELQAYAM, *De Montfort University* – The accepted wisdom in dual process theory is many an error and fallacy are due to cognitive miserliness, i.e. investing too little cognitive effort. Thus, investing cognitive effort is the remedy for irrationality. The chain of inference seems to be this: 1. Correct responding = normative responding 2. Cognitive resources are

necessary for correct responding 2. People have the necessary cognitive resources, but – 3. They satisfice, that is to say, they invest just enough resources and no more 4. Satisficing leads to bias and error 5. To respond correctly, invest cognitive effort Earlier work has already challenged many of these steps. However, the premise that people do indeed satisfice (step 4) has usually been accepted as an article of faith. Authors either deplore satisficing or celebrate it, but seldom doubt it. In this talk I will focus on step 4. I will draw on a parallel corpus of literature, research in metacognition, which explores the way that people monitor and regulate cognitive processes. Evidence from metacognition shows that people are not always cognitive misers. Indeed, cognitive wastefulness might be as common as cognitive miserliness. I explore the implications of this evidence for rationality.

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5:10-5:25 PM (132)

Microdosing Psychedelics: A Way to Enhance Creativity? LORENZA COLZATO, *Leiden University and Ruhr University Bochum*, LUISA PROCHAZKOVA, DOMINIQUE LIPPELT, ZSUZSIKA SJOERDS, and BERNHARD HOMMEL, *Leiden University* – Recently popular sub-perceptual doses of psychedelic substances such as truffles, referred to as "microdosing", allegedly have multiple beneficial effects including creativity and problem solving performance, potentially through targeting serotonergic 5-HT2A receptors and promoting cognitive flexibility, crucial to creative thinking. Here, we quantitatively explore the cognitive-enhancing potential of microdosing psychedelics. During a microdosing event organized by the Dutch Psychedelic Society, we examined the effects of psychedelic truffles on two creativity-related problem-solving tasks: the Picture Concept Task assessing convergent thinking, and the Alternative Uses Task assessing divergent thinking. A short version of the Raven's Progressive Matrices task assessed potential changes in fluid intelligence. We tested once before taking a microdose and once while the effects were manifested. We found that both convergent and divergent thinking performance was improved after a non-blinded microdose, whereas fluid intelligence was unaffected. Considering the sub-perceptual character and the apparent lack of problematic side-effects, microdosing might be considered a promising cognitive enhancer.

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Human Learning and Instruction I
Celestin GH, Saturday Morning, 8:00-9:40 AM
Chaired by Yana Weinstein, University of Massachusetts Lowell

8:00-8:15 AM (133)

Teaching First Year College Students Evidence-Based Learning Strategies: A Controlled Classroom Experiment. MEGAN A. SUMERACKI, *Rhode Island College*, YANA WEINSTEIN, *University of Massachusetts, Lowell*, CYNTHIA NEBEL, *Washburn University* (Presented by Yana Weinstein) – Researchers have made advances in applying cognition to education, but evidence-based learning strategies are not always taught. In a pre-registered experiment, we examined the effectiveness of an intervention in improving GPA at Washburn University. All first-year seminar sections were assigned to intervention or control groups. In the intervention, students learned and practiced evidence-based learning strategies (spacing, retrieval, elaborative interrogation, interleaving, dual coding, concrete examples) in class. We did not find the overall predicted intervention benefit. However, we found an unexpected cross-over interaction between experimental condition and students' parental education background. For students whose parents attended college, the intervention led to higher GPAs relative to the control, but for first-generation students, GPAs were worse in the intervention relative to the control. While the field has made significant advances in understanding learning, more research is needed to determine the best ways to help diverse students translate these strategies into their own learning.

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8:20-8:35 AM (134)

Spacing Effect in the Classroom: Fact Learning and Critical Thinking. VANESSA FOOT, *York University*, JUNE FOOT, *York Region District School Board*, MELODY WISEHEART, *York University* (Presented by Melody Wiseheart) – In the education system, student success is heavily dependent on foundational knowledge of the subject matter. Students are expected to retain taught content for later quizzes, assignments, end-of-unit tests, and in subsequent grades, where new content builds on existing knowledge. Spacing lessons is a potential solution for forgetting, but despite the prevalence of the spacing effect in the psychological literature, the impact of lesson timing has not yet been fully explored in real classrooms. The current study was conducted in Ontario public schools, and examined whether spacing could improve long-term retention of both factual and critical thinking curriculum-based teaching materials. Students 9- to 12-years-old were taught to judge the credibility of websites in either three consecutive days of lessons or one lesson per week. Lessons were carried out by a certified teacher. Thirty-five days after the final lesson, students were tested on factual knowledge and applied their knowledge to evaluating a new website. Students in the spaced condition remembered more facts from the lessons and were better able to explain their website ratings than students in the massed group.

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8:40-8:55 AM (135)

A Classroom Study of Individual Differences in Procrastination: Assignment Submission Times as Objective Measures of Academic Procrastination. AKIRA MIYAKE, and NICHOLAS P. CARRUTH, *University of Colorado, Boulder*, DANIEL E. GUSTAVSON, *University of California, San Diego*, JOHN H. LURQUIN, *University of Colorado, Boulder*, MICHAEL J. KANE, *University of North Carolina at Greensboro* – Although most studies of academic procrastination are based on subjective self-reports and questionnaire ratings, the recent development of learning management systems (LMS) makes it possible to record when each student started/completed each assignment and thereby objectively quantify their academic procrastination. We conducted a semester-long study (N=127) of academic procrastination, in which students completed

a survey of individual differences (weeks 1-2) and of their academic experiences (weeks 14-15), in addition to various course requirements (e.g., LMS-administered quizzes). ASTs collected during the semester—even those from just weeks 1-3—uniquely predicted the key academic outcome variables (e.g., final exam scores, final course grades, and self-reported stress/anxiety levels), above and beyond various individual differences variables (e.g., nonacademic procrastination, conscientiousness, test anxiety, media multitasking). In fact, ASTs predicted those outcome variables as well as did the students' end-of-semester self-reports of their procrastination levels. These results suggest that ASTs can serve as a viable, objective measure of academic procrastination that is based on actual academic behaviors.
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9:00-9:15 AM (136)

Retrieval Practice and Spacing: Independent and Additive Effects on Precalculus Learning. KEITH LYLE, CAMPBELL BEGO, ROBIN HOPKINS, PATRICIA RALSTON, and JEFFREY HIEB, *University of Louisville* – To help students remember what they learn in their classes, cognitive psychologists have recommended that educators do two things: Increase opportunities for students to practice retrieving course material and increase the temporal interval (or spacing) between retrieval attempts. We examined the independent and additive effects of these interventions in a college precalculus course utilizing an entirely within-subjects design. When tested at the end of the semester, retention of precalculus knowledge benefited from increasing the amount of practice and, independently, from increasing the spacing. These benefits were additive. However, only increased spacing of practice was associated with greater retention one month after the end of the semester. These findings suggest that retention gains associated with increasing the amount of retrieval practice are relatively fleeting while gains associated with increased spacing are more enduring.
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9:20-9:35 AM (137)

Attention-Aware Cyberlearning to Detect and Combat Wandering Minds. JAMES R. BROCKMOLE and KRISTINA KRASICH, *University of Notre Dame*, STEPHEN HUTT, and SIDNEY K. D'MELLO, *University of Colorado, Boulder* – Without maintaining attentional focus, learners are more likely to engage in self-distracting behaviors that lead to superficial understanding. In traditional classrooms, teachers monitor students' focus and adapt their instruction to maintain engagement. Computer-based education technologies, however, lack the ability to provide similar attention-aware instruction. To change this state, we have been developing a fully-automated attention-aware intelligent tutoring system (ITS) that can sense and respond to a form of waning attention known as mind wandering (MW). MW is an attentional shift away from external, task-related information to internal, task-irrelevant thoughts and accounts for 20%-40% of students' time in learning contexts. Using an ITS to teach topics in high-school biology, we examine how consumer-grade eye trackers can be used to monitor student attention, how the resulting gaze data can probabilistically detect MW, and the effectiveness of detector-based interventions aimed at refocusing student attention in real time.
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Attention: Control
Celestin D, Saturday Morning, 8:00-10:00 AM
Chaired by Daniel Weissman, University of Michigan at Ann Arbor

8:00-8:15 AM (138)

Domain-Specific Conflict Resolution Is an Illusion Caused by Confounds. DANIEL H. WEISSMAN, *University of Michigan at Ann Arbor* – According to a prominent view, experiencing conflict during an incongruent trial of a Stroop-like task triggers an upregulation of domain-specific control that facilitates the resolution of the same (but not a different) type of conflict in the next trial. Evidence for this view, however, comes only from tasks in which confounds may engender the illusion of domain-specific control. Here, I report that Stroop-incongruent and Simon-incongruent distractors in the hybrid Stroop-Simon task trigger selective reductions of the Stroop and Simon effects in the next trial, respectively, regardless of whether confounds are absent (Experiment 1) or present (Experiment 2). I also report, however, that evidence consistent with independent "domains" of Stroop and Simon conflict appears only when confounds are present. These findings suggest that domain-specific conflict resolution is an illusion caused by confounds. In particular, they suggest that conflict resolution processes operate in a "distractor-specific" but not "domain- (i.e., conflict-) specific" manner. This outcome challenges a prominent view of cognitive control and highlights the importance of avoiding confounds when exploring domain-specificity in human cognition.
Email: Daniel Weissman, danweiss@umich.edu

8:20-8:35 AM (139)

Influences of Task Complexity of Selection and Preparation in Voluntary Task Switching. CATHERINE M. ARRINGTON, *Lehigh University* – Human multitasking involves both selection of which task to perform and preparation of the cognitive processes needed to perform the selected task in the face of competition from other behaviors. The effect of task complexity on these selection and preparation processes was examined in a double registration task switching paradigm including both cued and voluntary trials. Across two experiments, complexity was manipulated either as the number of tasks (2 vs 3) or the number of S-R mappings per task (2 vs 3) such that the same number of overall S-R mappings were assigned to the task environment differently. As predicted, higher complexity in terms of the number of tasks slowed selection RTs and higher complexity in terms of the number of S-R mappings per task slowed task performance RTs. The effects of complexity held across multiple preparation intervals. Selection and preparation processes were clearly separable within the multitasking environment.
Email: Catherine Arrington, kate.arrington@lehigh.edu

8:40-8:55 AM (140)

Levels of Processing Distraction: Evidence That Both Young and Older Adults Attend To and Remember Irrelevant Information. RUTHANN C. THOMAS, AMY CRUMP, ALUNDRA DICKSON, and ZACHARY GRAY, *Hendrix College* – The aim of the current research is to investigate how younger and older adults attend to and remember distraction. Although some prior research suggests that both younger and older adults encode distraction, there is also evidence demonstrating that only older adults use distraction when it becomes relevant in later tasks. In two studies, we examined whether younger and older adults attend to distraction at a surface-level or a deeper, meaning-based level of processing by examining errors (i.e., false alarms) on a surprise recognition task. Participants were presented with old words that had appeared as distraction as well as new words that were either similar in appearance (castle), similar in meaning (cow), or unrelated (broom) to previously distracting words (cattle). Results showed that both younger and older adults recognized old distracting words and made more false alarms to words similar in appearance than to words similar in meaning to distracting words, suggesting that both younger and older adults may be attending to surface-level rather than semantic features of distraction. Results will be discussed in terms of cognitive control processes that regulate attention to distraction and restrict memory retrieval.
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9:00-9:15 AM (141)

First Come, First Served? Risk of Interference Determines Task Shielding During Working-Memory Consolidation. MARK R. NIEUWENSTEIN and RON WOYTASZEK, *University of Groningen* – Task shielding refers to the mechanisms that enable the successful completion of a first task (T1) without interference from a trailing task (T2). Using the psychological-refractory-period paradigm, Fischer and Dreisbach (2015) showed that T1-shielding depends on the likelihood of interference, with stronger evidence for T1-shielding when the risk of interference from T2 was high. Here, we expand on these findings by showing that the same principle applies when participants are asked to consolidate T1 into working memory and to respond rapidly to T2. Specifically, we show that the consolidation of T1 is completed first, at the expense of postponing response selection for T2, when T1 is subject to a high risk of interference from T2 or from distractors (indicating strong T1-shielding). In contrast, consolidation of T1 is interrupted prematurely by a switch to response selection for T2 when the risk of such interference is low (indicating a lack of T1-shielding).
Email: Mark R. Nieuwenstein, m.r.nieuwenstein@rug.nl

9:20-9:35 AM (142)

Goal-Directed Unequal Allocation of Attention to Moving Objects. CHRISTOPHER KENT and EMILY M. CROWE, *University of Bristol* – It is well established that we can track the position of several objects as they move around the environment. However, the vast majority of multiple object tracking studies have required participants to allocate equal amounts of attention to each object. In a series of experiments, we demonstrate that participants are able to allocate attention unequally when explicitly instructed to do so and motivated either via the probability with which a target will be probed or via differential monetary reward. High priority targets (associated with a greater chance of being probed or a higher reward) are tracked with greater precision than those associated with lower priority. This occurs within a trial when participants must simultaneously track a high and low priority target. However, the ability of participants to split attention unequally in small increments is less clear. Theories of multiple object tracking do not currently account for these data.
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9:40-9:55 AM (143)

Measurement of Attention Control. CHRISTOPHER D. DRAHEIM, JESSIE MARTIN, JASON TSUKAHARA, CODY MASHBURN, and RANDALL W. ENGLE, *Georgia Institute of Technology* (Presented by Randall W. Engle) – Attention control is an important executive function but its measurement issues are becoming more widely acknowledged (e.g., Friedman & Miyake, 2004; Paap & Sawi, 2016; Rey-Mermet, Gade, & Oberauer, 2018). We contend that the problem with measuring attention is that many tasks, like the prevalent Stroop and flanker, rely on unreliable and otherwise psychometrically problematic difference scores. We addressed this concern by testing individuals (N = 320) on ten different attention control measures, including new and modified versions of traditional tasks. Our results show that adaptive and accuracy-based measures do a much better job of measuring attention control than traditional reaction time tasks. Specifically, accuracy-based measures are more reliable, have a stronger relationship to other cognitive measures, and form a more coherent latent factor. Moving forward, researchers interested in the individual differences of attention control and related constructs would be better served using these accuracy-based measures over reaction time ones.
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Decision Making II
Celestin BC, Saturday Morning, 8:00-9:40 AM
Chaired by Pernille Hemmer, Rutgers University

8:00-8:15 AM (144)

Lay Understanding of Illness Probability Distributions. PERNILLE HEMMER and TALIA ROBBINS, *Rutgers University* – How accurate are laypeople's statistical intuitions about probability distributions within the domain of health? Decision processes are assumed to originate with a person's experience with the world, meaning that when someone makes a suboptimal decision, one of two things is at play: the person is using a flawed process to arrive at the answer, or the person is working with faulty information. In this work, we focus on assessing the accuracy of people's prior expectations, both in terms of the mean and form of distributions. We assess acute illnesses, for which people might have experience, as well as chronic conditions for which people are less likely to have experience. We find that participants can accurately estimate the mean and form of distributions for acute illnesses, and

accurately estimate the form while overestimating the mean of chronic illnesses. Finally, we assess the individual strategies people use to produce these distributions.
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8:20-8:35 AM (145)

When Changes in Probability Near the Midpoint Produce Large Changes in Risk Preferences: Contrasting Fuzzy-Trace and Dual-System Affective Models. YUVAL EREZ, VALERIE F. REYNA, SHUTING LU, and LINDSEY TARPINIAN, *Cornell University*, REBECCA B. WELDON, *Juniata College* (Presented by Valerie F. Reyna) – The assumption that probabilities are perceived nonlinearly is central to descriptive theories of decision making under uncertainty (e.g., prospect theory). We implemented an experimental design using risky framing decision problems that allows us to contrast predictions of fuzzy-trace theory (FTT) regarding the effect of probability changes on risky choice, with that of two dual-system mathematical models, whose affective system formulations are built on key properties of prospect theory. We found that participants were quite sensitive to changes in probabilities near the middle of the range, a behavioral pattern that challenges the fundamental assumption of probability insensitivity embedded in affective dual-system models. Interestingly, our findings support predictions of FTT, particularly under a condition that promotes categorical gist thinking. We conclude that meaningful gist representations can be more adaptive to different situational conditions, whereas psychophysics alone is largely limited in its ability to account for human behavior under uncertainty.
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8:40-8:55 AM (146)

Time Course of Repeated Choice: The Effect of Experience on Choosers' Well-Being. YAAKOV KAREEV and JUDITH AVRAHAMI, *The Hebrew University of Jerusalem*, GAEL LE MENS, *Universitat Pompeu Fabra* – People often make repeated choices from a set of options. We explore how the valuation of options, choice outcomes, and choosers' well-being change with experience. We postulate a choice process in which a choice provides a noisy rendition of the option's true value, an option's valuation is updated in light of a new observation, and the highest-valued option is chosen when another choice is required. This process leads to a gap in the accuracy of valuations: Whereas the highest-ranked option is accurately valued, all other options become undervalued. This gap increases with experience, affecting aspects of the chooser's well-being: Confidence in one's choice, product loyalty, and value maximization increase, whereas the probability of being disappointed with the outcome of one's choice and the probability of regretting that choice decrease. Manipulations of the noise level, the valuation-updating rule, the size of the choice set, and the shape of the parent distributions show these effects to hold across a variety of conditions. The effects of set size and parent distribution also provide novel insights pertaining to choice overload and to the relationship between the affluence of a society and the well-being of its members.
Email: Yaakov Kareev, yaakov.kareev@mail.huji.ac.il

9:00-9:15 AM (147)

Blinded by Context: Insensitivity to Probability in Good and Bad Settings. ANDREA RANIERI and SANDRA L. SCHNEIDER, *University of South Florida* (Presented by Sandra L. Schneider) – When things are going well or poorly overall, people may not react to more subtle changes in the rate of experiencing better or worse outcomes. In a study of choices across a series of two-outcome lottery pairs, we started with a set of mixed-outcome control lottery pairs. We then created a positive or negative context by surrounding these control lotteries with "fortune" lottery pairs involving all-gain (fortunate context) or all-loss (unfortunate context) outcomes. We also manipulated respondents' "luck" by making the occurrence of better (good luck) or worse (bad luck) outcomes much more likely in plays of the control lottery pairs. Respondents quickly changed risk-taking strategies based on the manipulated fortune context but, to their detriment, did not change strategy based on the probability of better or worse outcomes, despite the fact that the financial impact of the fortune and luck manipulations was comparable. We argue that, in a series of related choices, the salience of a strong pre-decision context largely drives choice strategy, whereas the valence of post-decision outcomes primarily affects impressions of the quality of the experience.
Email: Sandra Schneider, sandra@usf.edu

9:20-9:35 AM (148)

Consumer Choices Under Time Pressure. JON-PAUL CAVALLARO, REILLY INNES, and GUY E. HAWKINS, *University of Newcastle* (Presented by Guy E. Hawkins) – The subjective value, or utility, that people place on products and services is typically inferred from the choices they make in hypothetical stated choice scenarios. Conventional methods for identifying utility functions do not account for the role of decision time in the choice process. Across four experiments, we show that manipulations of time pressure, and hence decision time, systematically alter participant preferences. Conventional choice-based analyses attributed these changes to different latent utility functions. In contrast, a cognitive model of choices and response times attributed the changes to less cautious responding under high time pressure, with little-to-no corresponding change to the utility function; this result is consistent with decades of speed-accuracy tradeoff research in the speeded decision-making literature. We conclude that conventional analyses that rely exclusively on choice data may be misleading in applied contexts, and that integrated cognitive models may provide a more complete account of observed preferences.
Email: Guy Hawkins, guy.hawkins@newcastle.edu.au

Language Production

Celestin F, Saturday Morning, 8:00-10:00 AM

Chaired by Matt Goldrick, Northwestern University

8:00-8:15 AM (149)

Reading Aloud Reveals Aging Deficits in Speech Production and Monitoring. MATT GOLDRICK, *Northwestern University*, TAMAR GOLLAN, *University of California, San Diego* – While normal cognitive aging is widely assumed to result in

word-finding problems, it is unclear whether it increases the rate of other types of speech errors. To address this question, older and younger adults read aloud paragraphs. Older adults produced more speech errors overall than younger participants; however, while aging increased some error types (e.g., function word substitution errors; saying the instead of a), other types decreased (e.g., omission of content words), and the overall aging effect was significant only after controlling for aging-related increases in vocabulary knowledge. More robust was an aging deficit in spontaneous self-correction, a deficit that was observed even without controlling for vocabulary differences. These results suggest powerful effects of vocabulary knowledge on speech production, and a model of speech production in which attention-demanding processes are more involved in monitoring than in planning of speech, in turn leaving speech production relatively intact in aging.
Email: Matt Goldrick, matt-goldrick@northwestern.edu

8:20-8:35 AM (150)

Tone Slips in Cantonese: Evidence for Early Phonological Encoding. JOHN ALDERETE, QUEENIE CHAN, and HENNY YEUNG, *Simon Fraser University* – We examine tone errors in Cantonese with the aim of fleshing out a larger model for encoding phonological tone. We collected 2,479 speech errors, including 671 tone errors, from audio recordings of natural conversations. The structure of these errors was then probed as a way of distinguishing two contemporary theories of tone encoding. On the one hand, early phonological encoding predicts a relatively large number of contextual tone errors and a variety of feedback effects stemming from the activation dynamics of grammatical and phonological encoding. In contrast, diacritic encoding of tone predicts virtually no tone errors and no feedback effects. In our corpus, tone errors were found to be the second most common type of error, and the majority of them were contextual errors. In addition, the tone errors exhibited feedback effects in lexical selection, phonological encoding of segments, and in tone confusions themselves through phonological similarity effects.
Email: John Alderete, john.alderete@gmail.com

8:40-8:55 AM (151)

Competition Between Top-Down and Preceding-Item Cues in Speech Production. ZARA HARMON and VSEVOLOD KAPATSINSKI, *University of Oregon* (Presented by Vsevolod Kapatsinski) – Repetition is part of error correction and action preparation in all types of motor performance. Our focus is on speech production. We address two questions. First, what is the function of repetition? Second, what determines how much is repeated on any given occasion? We present a computational model of action sequence retrieval that learns to make optimal use of top-down and preceding-action cues to upcoming actions. In learning, cues compete to predict outcomes, with stronger cues overshadowing weaker ones. Competition between top-down and preceding-action cues means that if some action X is reliably preceded by another action A, A becomes increasingly sufficient and increasingly necessary to activate X. As a result, co-occurring actions cue each other, initial actions are more easily accessible from top-down input than other actions, and non-initial actions are difficult to initiate production from. From this perspective, repetition disfluencies do not merely buy time for lexical retrieval, but help lexical retrieval by cueing upcoming words and help initiation by allowing the speaker to restart production from the beginning of a practiced action sequence. The proposed model is tested using a corpus of repetition disfluencies.
Email: Vsevolod Kapatsinski, vkapatsi@uoregon.edu

9:00-9:15 AM (152)

Transfer Tests of Semantic Interference. PADRAIG O'SEAGHDHA, ALMUT HUPBACH, and JEFF HEFLIN, *Lehigh University* – Semantic interference in word production may entail short term selection difficulties as well as longer-term modulation of learned conceptual-lexical mappings. Some researchers have questioned the role of incremental learning in cyclic naming of small sets of related pictures (e.g., Belke, 2017). In contrast, Oppenheim et al. (2010) simulated interference in both cyclic and non-repetitive naming tasks through the same learning mechanism. Under this view, interference in one cyclic picture naming context (e.g., Taxonomic: stool = furniture) should transfer to another (e.g., Situational: stool used on fishing trip). In multi-phase experiments, interference occurred in different contexts but there was little transfer across them, and there was little evidence of cumulation within or across phases. Instead, recalibration of interference sometimes occurred when phases/contexts changed. These findings and accompanying computational modeling place strong bounds on the role of learning in cyclic picture naming.
Email: Padraig O'Seaghdha, pat.oseaghdha@lehigh.edu

9:20-9:35 AM (153)

The Effects of Priming Grief on Non-Word Pronunciation and Speech Disfluencies. LORI E. JAMES and TAMARA SAUNDERS, *University of Colorado, Colorado Springs* – Anxiety can decrease speech fluency, and grief can increase anxiety, so it is surprising that several previous studies found no effect of grief on word production. We tested the effects that thinking about grief has on various aspects of language production. Seventy-five young adults were randomly assigned to the grief or control (calmness) condition. Participants were primed with thoughts of the relevant mood by viewing a short movie clip, and then gave a 2- to 3-min speech about a personal experience with grief or calmness. Finally, participants pronounced aloud novel non-words as quickly and accurately as possible. Data from participants who reported not feeling the intended mood on a manipulation check were excluded. Both the pronunciation task and the autobiographical speeches provided outcome measures of interest. Mood condition did not affect non-word pronunciation accuracy or response times, similar to previous findings showing no effect of grief on word production. However, some disfluency types produced during the autobiographical speeches were more common for participants who described experiences of grief than those who described calmness. Possible reasons for the different patterns of effects are discussed.
Email: Lori E. James, ljames@uccs.edu

9:40-9:55 AM (154)

Syntactic Production Is Not Independent of Inhibitory Control: Evidence From Agreement Attraction Errors in a Referential Communication Task. NAZBANOU NOZARI, *Johns Hopkins University*, AKIRA OMAKI, *University of Washington* – Speakers can produce grammatical sentences fluently and with relatively few errors. These characteristics make the highly-practiced task of speaking a viable candidate for an automatic process, i.e., one independent of cognitive control. However, recent studies have suggested that some aspects of production, such as lexical retrieval and tailoring speech to an addressee, may depend on the speaker's inhibitory control abilities. Less clear is the dependence of syntactic operations on inhibitory control processes. Using both a direct manipulation of inhibitory control demands and an analysis of individual differences, we show that one of the most common syntactic operations, producing the correct subject-verb agreement, requires inhibitory control when a singular subject noun competes with a plural local noun as in "The snake next to the purple elephants is green." This finding calls for the integration of inhibitory control mechanisms into models of agreement production, and more generally into theories of syntactic production.

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Cognitive Aging

Celestin A, Saturday Morning, 8:00-10:20 AM

Chaired by Thorsten Pachur, Max Planck Institute for Human Development

8:00-8:15 AM (155)

How to Make Age Differences in Risk Attitude Disappear. THORSTEN PACHUR and VERONIKA ZILKER, *Max Planck Institute for Human Development* – The canonical conclusion from research on age differences in risky choice is that older adults are more risk averse than younger adults, at least in choices between options with possible gains. As we point out, most of the evidence for this conclusion is based on a rather specific type of decision problem: choices between a safe and a risky option. Safe and risky options, however, do not only differ in risk, but also in the amount of information that is available to be processed—that is, in their complexity. In a series of experiments, we demonstrate that differences in option complexity are a key driver of age differences in risky choice: When in a risky choice task the complexity of a safe option is increased, or when asked to choose between two risky options, older adults are no longer more likely to choose a less over a more risky option. Using eye tracking as well as computational modeling with cumulative prospect theory, we identify the specific mechanisms underlying the impact of option complexity on the construction of preference in risky choice. The results indicate that safe options create a bias in attention allocation and distort probability weighting; both effects can be removed by equating options in complexity.

Email: Thorsten Pachur, pachur@mpib-berlin.mpg.de

8:20-8:35 AM (156)

What Mistakes We Make When We Test Older Adults: The Effect of Sensory and Social Factors on the Validity of Neuropsychological Assessment. BOAZ M. BEN-DAVID, GALI MALKIN, HADAS EREL, *Interdisciplinary Center (IDC) Herzliya*, WILLIAM SABAN, *Interdisciplinary Center (IDC) Herzliya; Haifa University* – Older adults' performance on neuropsychological assessment tests sets the perspective on the capabilities of this population. Following a literature review and new data from our lab, we suggest that these tests are administered with two implicit assumptions: (a) the tests are a valid gauge of performance in older adults and (b) cognitive abilities decline in older age. We try to challenge the extent of these assumptions by discussing two sources that can bias these tests: the sensory and the social contexts. First, findings suggest that age-related decline in performance may reflect, at least in part, a sensory (visual and auditory) rather than a purely cognitive decline. Next, we discuss the negative effect of age-based stereotype threat. Both contexts may be present in daily testing of older adults in the clinic or the lab. Thus, targeting the sensory and social context in neuropsychological assessment may assist in reducing an age-bias.

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8:40-8:55 AM (157)

The Effect of Cognitive Load on Low-Level Hearing Is Modulated by Age. SVEN MATTYS, *University of York*, MELANIE FERGUSON, *National Institute for Health Research*, ANTJE HEINRICH, *University of Manchester* – Cognitive load (CL), e.g., a concurrent memory task, reduces speech perception accuracy. Here, we asked whether CL has a similar effect on pure-tone audiometry (PTA), a psychophysical measure of basic auditory processes that is often seen as encapsulated from cognition. Young and older adults performed a PTA test on .5, 1, 2, and 4 kHz pure tones under CL and no CL. CL consisted of a visual 2-back task running throughout the PTA test. The stimuli in the 2-back task involved either sub-vocal encoding or purely visual encoding. Young adults showed a significant 2 dB elevation of detection thresholds under CL, but only when CL involved sub-vocal encoding. CL had no effect when it involved purely visual encoding. In contrast, older adults showed elevated detection thresholds under both types of CL. The results indicate that CL disrupts basic auditory processes in certain conditions. The age difference in the CL condition involving purely visual encoding suggests important lifespan changes in the attentional regulatory system and sensory representations.

Email: Sven Mattys, sven.mattys@york.ac.uk

9:00-9:15 AM (158)

The Role of Cognitive Capabilities in Moderating Age-Related Positivity Effects. NOELLE LOPEZ, KRITI CADAMBI, SANTOS ALFEREZ, and SARAH BARBER, *San Francisco State University* (Presented by Sarah Barber) – As people get older they tend to favor positive over negative information in attention and memory. This tendency is known as the "positivity effect." It is often assumed that the positivity effect will only emerge if older adults have sufficient cognitive resources to effectively implement emotion regulation strategies. However, prior research has yielded mixed support for this conclusion.

To further investigate this, in this study younger and older participants completed an emotional episodic memory task, an emotional autobiographical memory task, and an emotional dot-probe task. These tasks provided measures of the positivity effect in episodic memory, autobiographical memory, and attention. Participants also completed the cognitive battery of the National Institute of Health (NIH) Toolbox. This provided measures of fluid and crystallized cognitive abilities. Results suggest that positivity effects are numerically greater in people with higher fluid cognitive abilities; however, these associations may be less robust than previously assumed.
Email: Sarah Barber, sbarber@sfsu.edu

9:20-9:35 AM (159)

Effects of Aging on Neural Recruitment During Reward-Enhanced Memory. HOLLY J. BOWEN and JACLYN H. FORD, *Boston College*, CHERYL L. GRADY, *Rotman Research Institute, Baycrest Centre*, JULIA SPANIOL, *Ryerson University* – A decade of research has led to a better understanding of the neural underpinnings supporting reward-modulated memory in younger adults, yet little is known about how age influences this neural circuitry. We examined the effects of healthy aging on neural activity associated with intentional memory formation for stimuli associated with a high or low monetary reward value. Sixteen younger and fifteen older adults performed the monetary incentive encoding task with images while in the fMRI scanner. Memory for these images was tested 24-hours later outside the scanner. Behaviorally, younger adults had better memory accuracy overall, and across age groups memory was more accurate for high compared to low value images. Whole-brain activation analyses during the reward cue phase revealed a 3-way interaction in three memory related regions. These regions showed the same pattern, with higher activation associated with successful encoding of high-value stimuli in younger adults, and reduced activation associated with successful encoding of these stimuli in older adults. These findings suggest that the mechanisms driving the motivation-cognition interface may change across the adult lifespan.
Email: Holly Bowen, holly.bowen@bc.edu

9:40-9:55 AM (160)

Evidence Against Increased Associative False Recognition in Older Adults. TANRADA PANSUWAN, LILLIAN SWANSON, FRIEDERIKE BREUER, SARA CUEVA, TARANAH GAZDER, ZEN LAU, MEGAN TAYLOR, MARA WILSON, and ALEXA M. MORCOM, *University of Edinburgh* (Presented by Alexa M. Morcom) – Older people are more prone to memory distortions and errors, but increases in false recognition are not always found. We tested whether associatively-driven false recognition is increased in the absence of prior recall in 2 preregistered studies. Experiment 1 (https://osf.io/gpu7b/) assessed associative and perceptual false recognition in a Deese-Roediger-McDermott (DRM) task variant (104 young, 85 older). There was strong Bayesian evidence against greater false recognition in older people, for groups for whom word lists were semantically associated to a critical lure, presented in the same fancy font as the lure, or both. However, although study lists were blocked, encoding was incidental and recognition tested after multiple lists. Experiment 2 (https://osf.io/vxym2/) used a standard procedure to replicate Tun, Wingfield & Blanchard's (1998) Experiment 2 but omitted the recall test. Interim results (32 young, 27 older) showed converging evidence against an age-related increase in critical lure false recognition.
Email: Alexa Morcom, alexa.morcom@ed.ac.uk

10:00-10:15 AM (161)

Improving the Effects of Working Memory Training in Young and Older Adults: The Effects of Gamification and Spacing. SUSANNE M. JAEGGI, *University of California, Irvine*, MARTIN BUSCHKUEHL, *MIND Research Institute,* ANJA PAHOR and AARON SEITZ, *University of California, Riverside*, PRITI SHAH, PATRICIA A. REUTER-LORENZ, and JOHN JONIDES, *University of Michigan, Ann Arbor* – The vast majority of our nation's population will experience some cognitive decline as a function of age. Therefore, the development of effective interventions to mitigate age-related cognitive decline is of critical importance in that those interventions might not only impact older adults' cognitive functioning, but ultimately, contribute to their health and quality of life. There is accumulating evidence that cognitive interventions targeting working memory are beneficial in that they show generalizing effects that go beyond specific training effects. Despite the promising results, more research is needed to make cognitive interventions more robust, and to uncover their underlying mechanisms. I will be presenting the results of several randomized controlled multi-site trials targeting older and young adults in which we focus on the interventions' optimal scheduling (i.e., spacing of training sessions) as well as the question of whether adding certain gaming elements might improve engagement, and ultimately, performance. Our interventions indicate promising effects that last up to 6 months after training completion. I will be discussing the implications of our findings for learning and plasticity across the lifespan.
Email: Susanne M. Jaeggi, smjaeggi@uci.edu

Spatial Cognition
Strand 13 AB, Saturday Morning, 8:00-9:40 AM
Chaired by Amy Shelton, Johns Hopkins University

8:00-8:15 AM (162)

Action and Cognition in Block Building. AMY LYNNE SHELTON, CATHRYN CORTESA, GREGORY HAGER, JONAHTHAN JONES, SANJEEV KHUDANPUR, and BARBARA LANDAU, *Johns Hopkins University* – Cognitive characterization of complex skilled actions, such as building a tower of blocks, can be difficult and data intensive but highly informative. We asked adults to copy several block constructions and used detailed quantification of individual actions and their sequences to understand how people plan their builds. We found substantial homogeneity in the construction paths on the macro level, suggesting common cognitive principles (e.g., building in layers). However, this was coupled with large variability in the micro level of individual actions that comprised each build path. We observed this pattern between individuals, as well as within individuals with repeated builds, suggesting that the same conceptual plan may be executed

with different specific actions. In addition, these macro-level construction principles are related to the speed and accuracy of construction, supporting the inference that these build patterns reflect underlying cognitive plans.
Email: Amy Lynne Shelton, ashelton@jhu.edu

8:20-8:35 AM (163)

Space-Evoking Properties of Objects Affect Scene Imagination. STEVEN BEIGHLEY, *Exponent*, HELENE INTRAUB, *University of Delaware* (Presented by Helene Intraub) – Mullally & Maguire (2013) proposed that objects rated as evoking a sense of surrounding space (space defining; SD) lend spatial coherence to imagined scenes. In their scene construction/deconstruction task, SD objects were chosen first during scene construction and removed last during scene deconstruction. However, SD objects are typically larger (e.g., a piano) than space-ambiguous objects (SA; e.g., a cup). Larger SD-objects within each object ensemble may simply have provided better landmarks. To test this, 20 photo-objects (10 SD and 10 SA) were individually presented, with onscreen size equated. Participants (N=32) imagined a scene around each, describing it aloud. Thus, each object-type served as the landmark for an imagined scene. Blank imagination-space onscreen was large (n=16) or small (n=16). Consistent with the spatial coherence hypothesis, SD objects (irrespective of imagination-space) elicited more spatial terms and more nouns in their scene descriptions than did SA objects. We discuss alternative explanations and implications.
Email: Helene Intraub, intraub@psych.udel.edu

8:40-8:55 AM (164)

An Evaluation and Comparison of Spatial Memory Assessments. BRENT C. CHAMBERLAIN, *Utah State University*, CONNER R. BRUNS, *Kansas State University* – Evidence shows that navigation aids can decrease our reliance on observation and reduce our memory of space. Numerous cognitive and recall assessments have been created to ascertain individual differences and identify preferential strategies for recalling an environment. Our focus is two-fold: 1) create an assessment to evaluate individual differences and 2) to ascertain similarities and differences between existing evaluations. We created a novel virtual environment with a navigation aid. Different groups are given different controls; one is guided on a fixed route, another is given route choice. Spatial elements and routes are highly controlled with users being exposed to the same elements in the same location regardless of their test group. We developed a map drawing assessment to evaluate an individual's ability to recall the route, landmarks and districts in the environment. We also used several spatial memory assessments and questionnaires to compare our method with existing evaluations. Results show that choice (cueing) increases spatial recall slightly; and, that there is little correlation between existing assessment of spatial abilities. These findings necessitate further investigation of spatial ability assessments.
Email: Brent Chamberlain, brent@brentchamberlain.org

9:00-9:15 AM (165)

Updating Headings and Positions in Human Navigation Using Landmarks and Path Integration. WEIMIN MOU, *University of Alberta* – During navigation, humans update their spatial relations relative to environments using path integration and familiar landmarks. Researchers examined participants' errors in localizing the origin of a path (homing error) after they walk the path to understand how people use path integration and landmarks in spatial updating. We instead examined participants' errors in localizing not only the origin of the path but also other targets so that we could measure participants' errors in estimating their facing direction (heading error) and location (position error) in the environment. Our results showed that a rotated distal landmark determined participants' heading estimates whereas path integration determined participants' position estimates; a displaced proximal landmark determined participants' position estimates whereas path integration determined participants' heading estimation. Moreover, when the rotational angle of landmarks was small, participants combine the heading estimates from path integration and the landmarks but there was no evidence of combination of homing estimates. All these results indicate that landmarks and path integration interact in estimations of people's heading and position prior to homing estimations.
Email: Weimin Mou, wmou@ualberta.ca

9:20-9:35 AM (166)

The Link Between Children's Concept of Spatial "Middle" and Their Math Performance. ALEXANDRA D. TWYMAN and MARK P. HOLDEN, *University of Calgary*, KETING CHEN, ALEXIS HAGSTROM, and CHANDRAMA MUKHERJEE, *University of Nebraska, Lincoln*, ANNA WASSENBERG, *University of Rochester* – Spatial ability is an important determinant of who will enter and remain in the STEM disciplines (Wai, Lubinski, & Benbow, 2009). By 1st grade, there are both SES- and sex-based differences in spatial ability (Levine, Vasilyeva, Lourenco, Newcomb, & Huttenlocher, 2005) which in turn predicts math performance. In this study, we explore the link between spatial and math development with a middle search task. We believe that "middle" is a concept that is important both for spatial performance (such as knowing how to parse the world into left and right, top and bottom, etc.) and for math performance (such as understanding fractions, symmetry, the midpoint on a number line, etc.). We gave 3- to 6-year-old children a linear array of 15 boxes where a sticker was hidden in the middle box between two bears that moved along the array from trial to trial (Spetch & Parent, 2006). Preliminary analysis suggests that children's search strategies change with age from confusion at age 3 to a relational vector strategy by age 6. Additionally, children's performance on the middle search task appears to predict math performance on a standardized test, after controlling for IQ.
Email: Alexandra D. Twyman, alexandra.twyman@gmail.com

Symposium IV: Medical Image Perception and Decision Making
Celestin E, Saturday Morning, 10:00 AM-12:00 PM
Chaired by Trafton Drew, University of Utah, USA

10:00-10:15 AM (167)
Appreciating the Role of the Observer in the Interpretation of Medical Images. ELIZABETH KRUPINSKI, *Emory University* – Medical images constitute a core portion of the information physicians utilize to render diagnostic and treatment decisions. At a fundamental level, the diagnostic process involves two aspects – visually inspecting images (perception) and rendering interpretations (cognition). Key indications of expert interpretation are consistent, accurate and efficient diagnostic performance, but how do we know when someone has attained the level of training required to be considered an expert? How do we know the best way to present images to the clinician in order to optimize accuracy and efficiency and avoid fatigue? The advent of digital imaging has dramatically changed the way that clinicians view images, how residents are trained, and thus potentially the way they interpret image information, emphasizing our need to understand how clinicians interact with the information in an image during the interpretation process. With improved understanding we can develop ways to further improve decision making and thus improve patient care.
Email: Elizabeth Krupinski, elizabeth.anne.krupinski@emory.edu

10:20-10:35 AM (168)
The Influence of Prior Expectation and Expertise on Attentional Cueing in Medical Images. ANN J. CARRIGAN, KIM M. CURBY, DENISE MOEREL, and ANINA N. RICH, *Macquarie University* – Radiologists make critical decisions based on searching and interpreting medical images. Prior expectations may set a search strategy or attentional bias, as the probability of a lung nodules differ across anatomical regions within the chest. Using a modified attention-cueing paradigm, we investigated the potential for information in medical images to cause attention shifts in radiologists and control participants. For the radiologists, the results showed that there was no underlying bias of attention when shown normal chest radiographs as primes. Attention was spatially cued by a nodule within a chest radiograph when the images were presented in an upright orientation, and a reversed effect was seen when the image was inverted. For the control participants, no cueing effects were seen, which suggests that the attentional cueing we see for the radiologists is likely due to their experience with medical images. These findings have clinical implications and teaching benefits.
Email: Ann J. Carrigan, ann.carrigan@mq.edu.au

10:40-10:55 AM (169)
Why Doesn't That Clever Computer Aided Detection System Work as Well as Theory Says It Should? JEREMY M. WOLFE, *Harvard Medical School/Brigham and Women's Hospital, USA* – The future of radiology is a future where radiologists collaborate with technology to detect and identify pathology. While computer aided detection and diagnosis systems have been part of radiology for decades, recent advances in machine learning have led some to suggest that AI will replace radiologists. For the foreseeable future, however, it is more plausible that "Machine Learning is the Next Chapter of Radiology, Not the Last." Unfortunately, at present, the combination of expert radiologists with expert AI does not produce as much of a benefit as theory might lead us to suspect. There are many ways for an AI to deliver its information to a human. These different methods can produce very different results and those results will be profoundly shaped by the structure of the specific task. I will describe a methodology for studying and improving the human-AI interaction, starting with non-expert observers and moving to radiologists.
Email: Jeremy M. Wolfe, jwolfe@partners.org

11:00-11:15 AM (170)
Using Cognitive Psychology Tools to Understand Breast Cancer Detection in Segmented-3D Displays. STEPHEN MITROFF AND STEPHEN H. ADAMO, *The George Washington University*, – Tomosynthesis is a new technique in breast cancer detection that creates a segmented-three-dimensional (3D) image of breast tissue, allowing radiologists to move through layers of depth. Compared to mammography, where all breast tissue is compressed into one 2D image, tomosynthesis reduces unnecessary patient callbacks by ~20% while increasing detection rates. However, tomosynthesis can take ~2x longer than mammography alone. To better understand segmented-3D search and the implications for radiology, we have created a testing platform that examines differences between 2D and segmented-3D search. Critically, this paradigm shows a similar pattern in performance to radiological findings, is flexible, and can be run with non-expert populations (which are easier and cheaper to recruit). The goal is to test ideas with the paradigm and then bring the most promising findings to the clinic. We will discuss an example where multiple-target visual search errors are different in segmented-3D searches compared to 2D searches.
Email: Stephen Mitroff, mitroff@email.gwu.edu

11:20-11:35 AM (171)
From Interaction to Inspiration: Clinical Experience to Spark and Cultivate Research. JOANN ELMORE, *University of California, Los Angeles* – Physicians' clinical judgment and diagnostic accuracy are fundamental to delivering high-quality patient care. As a primary care physician, my interactions with patients have inspired the trajectory of my research. My prior work has documented extensive variability among radiologists' in their interpretations of mammograms and low levels of accuracy among pathologists in the diagnosis of breast and skin biopsies. The potential reasons for such considerable variability are intriguing, as our diagnostic accuracy is impacted by various intervening factors such as clinical experience, fear of malpractice, and tolerance of ambiguity, to name a few. In this talk, I will describe how my clinical experiences as a practicing physician critically informs my research program, which is devoted to improving cancer detection rates.
Email: Joann Elmore, jelmore@uw.edu

11:40-11:55 AM (172)

Interruption in Radiology: Quantifying Differential Cost in Response to Different Types of Interruption. TRAFTON DREW, LAUREN WILLIAMS, WILLIAM AUFFERMAN, and MEGAN MILLS, *University of Utah* – Radiologists are often interrupted during diagnostic image interpretation, where mistakes can be life threatening. We know from the cognitive psychology literature that interruptions lead to a wide array of negative outcomes. However, not all interruptions are created equal. We think an inadvertent tap on the shoulder is less distracting than being told a patient has stopped breathing, but there is essentially no data to evaluate the accuracy of this belief. In a series of three studies with radiologist observers reading real medical cases, we sought to address this gap in the literature. To evaluate the cost of interruption, we examined time spent per case and what structures were fixated using mobile eye-tracking. We were surprised to find that some interruptions yielded no observable cost in any of these metrics. More generally, the interruption cost increased with the disruptiveness of the interruption, consistent with our hypothesis.
Email: Trafton Drew, trafton.drew@Psych.utah.edu

Metacognition
Celestin BC, Saturday Morning, 10:00 AM-12:00 PM
Chaired by Ruth Day, Duke University

10:00-10:15 AM (173)

Cognition vs. MetaCognition Gaps: Life and Death Situations. RUTH S. DAY, *Duke University* – People sometimes think they understand something well but do not. This gap between metacognition (what people think they know) vs. cognition (what they actually know) has been demonstrated using carefully-controlled laboratory materials such as word lists. This research examines naturally-occurring materials in the everyday world, where failure to understand, remember, and use information accurately can have serious consequences. Participants read various types of patient-directed information – about a prescription medication, an auto-injector (used to deliver medication in an emergency), or an informed consent form. They saw the information in either its Standard version (prepared by healthcare professionals) or an Enhanced version (that we developed using cognitive and design principles). The results show that people substantially overestimate their knowledge of medical information, that this overestimation can have serious health consequences including death, but Enhanced displays can both increase cognition and reduce the cognition-metacognition gap.
Email: Ruth S. Day, ruthday@duke.edu

10:20-10:35 AM (174)

The Zoo Task: Metacognition in Problem Solving for Older Children. JWALIN PATEL, AMANDA ALDERCOTTE, and MARIA TSAPALI, *University of Cambridge*, TERESA PARR and ZEWELANJI SERPELL, *Virginia Commonwealth University*, MICHELLE ELLEFSON, *University of Cambridge* (Presented by Michelle Ellefson) – Metacognition is important for monitoring and regulating cognitive processes, decision-making, problem-solving and learning. There are limited ways of measuring it in children. Some qualitative and observational measures exist, but they are restricted by their scalability, range of metacognitive components measured and use different measurement metrics compared to tasks used with adults. We introduce a new task and evaluate its reliability and validity using a large sample of 8 to 10-year old children (n= 182). We compare it to a standard metacognition of memory task, more commonly used with children, and other tasks measuring cognitive skills that are associated with metacognition. Our results indicate the zoo task is a reliable and valid measure of metacognition in children. It couldbridge between existing qualitative and quantitative measures of metacognition in children and it has to potential to be developed further to promote comparison of metacognitive skills across a wider age of children and adults.
Email: Michelle Ellefson, mre33@cam.ac.uk

10:40-10:55 AM (175)

Confidence Judgments by a Chimpanzee, and Evidence for a Metacognitive Illusion. MICHAEL J. BERAN, *Georgia State University*, BONNIE M. PERDUE, *Agnes Scott College*, AUDREY E. PARRISH, *The Citadel* – Chimpanzees and human children have demonstrated "confidence movements" that involved moving away from a primary test area and toward a reward distribution area before receiving any external feedback about the outcome of their responses to cognitive tests. They moved more often on correctly completed trials than incorrectly completed trials. We gave one chimpanzee a new test of quantity discrimination to assess the generality of these movements, and we assessed a possible metacognitive illusion by presenting trials with a perceptual decoy stimulus that produced more errors in a size discrimination task. The chimpanzee moved to the reward dispenser prior to getting feedback more often on correctly completed trials than incorrectly completed trials in the quantity discrimination task. However, when the decoy stimulus increased choice errors in the size discrimination task, the chimpanzee moved more often on those incorrect trials than on correct trials, suggesting a form of metacognitive illusion.
Email: Michael Beran, mberan1@gsu.edu

11:00-11:15 AM (176)

Predicting Others' Knowledge: Knowledge Estimation as Cue-Utilization. JONATHAN TULLIS, *University of Arizona* – Predicting what others know is vital to countless social and educational interactions. For example, the ability of teachers to accurately estimate what knowledge students have has been identified as a crucial component of effective teaching. I propose the knowledge estimation as cue-utilization framework, in which judges use a variety of available and salient metacognitive cues to estimate what others know. In three experiments, I tested three hypotheses of this framework: namely, that participants do not automatically ground estimates of others' knowledge in their own knowledge, that judgment conditions shift how participants weight different cues, and that participants differentially weight cues based upon their diagnosticity. Data show that predictions of others' knowledge were dynamically generated by judges who weighed a variety of available and salient cues. Just as the accuracy of metacognitive monitoring of one's own learning depends upon the conditions

under which judgments of self are elicited, the bases and accuracy of metacognitive judgments for others depended upon the conditions under which they were elicited.
Email: Jonathan Tullis, tullis@email.arizona.edu

11:20-11:35 AM (177)

Did You Wash Your Hands? Evaluating Memorability for Objects Touched by Individuals With Contagious and Non-Contagious Diseases. MARK J. HUFF and MATTHEW R. GRETZ, *The University of Southern Mississippi* – Accumulating evidence suggests that cognitive functions are tuned to items or events that may compromise survival. This processing has been suggested to engage a disease-avoidance system (i.e., behavioral-immune system) designed to circumvent pathogenic sources by rendering them more memorable (Fernandes, Pandeirada, Soares, & Nairne, 2017). We evaluated whether memorial benefits of diseased sources were contingent upon sources that were contagious or non-contagious. Participants studied videos depicting an actor interacting with objects. Prior to study, participants were informed that the actor was diagnosed with a contagious disease (influenza), a non-contagious disease (cancer), or was healthy, followed by a free-recall test and a source-recognition test to parse recollections for touched and non-touched objects. Recall was equivalent across disease groups; however, source recognition was greatest for touched items in the influenza group, demonstrating enhanced memory for items touched by a contagious-disease source. Further, touched-item recognition was positively related to participants' assessed germ aversion—supplemental evidence that contagious-disease threats may facilitate source recollections.
Email: Mark Huff, mark.huff@usm.edu

11:40-11:55 AM (178)

Translating (Lack of) Memories Into Reports: The Role of Context. ALEKSANDRA KROGULSKA, *University of Warwick*, ALAN SCOBORIA, *University of Windsor*, MACIEJ HANCZAKOWSKI, *SWPS University*, KATARZYNA ZAWADZKA, *University of Sheffield* (Presented by Katarzyna Zawadzka) – When queried about events in the past, a person may face questions that concern details that have been witnessed – answerable questions – and details that have not been witnessed – unanswerable questions. For answerable questions, the person's willingness to answer these questions increases as a function of not only information available about the queried detail itself, but also as a function of contextual information. The present research assesses whether the willingness to report specific – and thus incorrect – answers when facing unanswerable questions also increases with the amount of available contextual information. We manipulated context information at the time of questioning for both answerable and unanswerable questions by 1) reinstating the encoding context for the queried detail, 2) presenting a familiar context from encoding that mismatched the queried detail, or 3) presenting a novel context not present at encoding. Both reinstated and familiar contexts affected the willingness to provide answers to both answerable and unanswerable questions. This shows how greater access to contextual information – commonly associated with better memory for answerable questions – can lead to memory errors for unanswerable questions.
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Event Cognition

Celestin GH, Saturday Morning, 10:00 AM-12:00 PM

Chaired by Ken McRae, University of Western Ontario

10:00-10:15 AM (179)

Using Graph Theory to Understand the Structure of Event Knowledge in Memory. NICKOLAS K. CHRISTIDIS, *University of Western Ontario*, JEFFREY L. ELMAN, *University of California, San Diego*, KEN MCRAE, *University of Western Ontario* (Presented by Ken McRae) – People's knowledge of common events plays a critical role in many aspects of cognition. Despite numerous theoretical proposals such as scripts, schemas, and stories, the complex and variable nature of event knowledge has been a barrier to characterizing the structure of event knowledge in memory. We used graph theory to develop empirical profiles of the structure of common events and test assumptions underlying theories of event knowledge. We established profiles for 81 common events to determine the range and importance of activities within an event, group activities into hierarchical scenes (network communities), and characterize the temporal structure (order of activities) within and between scenes. We found that events differ considerably in terms of their range of activities and temporal structure, and therefore grouped events on the basis of similar empirical network profiles. Graphical analyses provide a novel solution for characterizing the complex structure of event knowledge in memory.
Email: Ken McRae, kenm@uwo.ca

10:20-10:35 AM (180)

Long-Term Memory for Naturalistic Scenes: Audition Enhances Vision, but Vision Controls Audition. OLIVER JAGGY, *Leibniz-Institut fuer Wissensmedien*, FRANK PAPENMEIER, *University of Tuebingen*, HAUKE S. MEYERHOFF, *Leibniz-Institut fuer Wissensmedien* (Presented by Hauke S. Meyerhoff) – Recognition performance is more accurate for audio-visual scenes than their unimodal counterparts, however, the origin of the benefit is still a matter of debate. We present a series of old/new recognition experiments investigating the impact of semantic congruency during encoding on long-term memory for naturalistic scenes. During a study session, our participants attended to brief unimodal or audio-visual excerpts of movies. Critically, in the audio-visual conditions, auditory and visual information were semantically congruent or incongruent. Following a retention interval of one day, all studied excerpts were presented unimodally. Semantic congruency increased recognition performance for visual scenes, however, semantic incongruency had no harmful effect on visual memory relative to a purely visual baseline. We observed a similar benefit for auditory memory due to semantically matching visual information. In contrast, however, memory for auditory excerpts was at chance level when the visual information was semantically incongruent during study.

These findings indicate that audio-visual interactions during encoding shape the long-term memory representations of naturalistic scenes.
Email: Hauke S. Meyerhoff, h.meyerhoff@iwm-kmrc.de

10:40-10:55 AM (181)

Cryptic Emotions and the Emergence of a Metatheory of Mind in Popular Film Making. JAMES E. CUTTING and KACIE L. ARMSTRONG, *Cornell University* – Hollywood movies can be deeply engaging yet easy to understand. They employ many editing techniques with strong psychological underpinnings. We explore the origins and development of one of these, the reaction shot. This shot typically shows a single, unspeaking character with modest facial expression in response to an event or to the behavior or speech of another character. In a sample of 24 movies from 1940 to 2010, we show that the prevalence of one type of these shots – which we call the cryptic reaction shot – has grown dramatically. These shots seem designed to enhance viewers' emotional involvement with characters. They depict a facial gesture that reflects a slightly negative and slightly aroused emotional state. Their use at the end of conversations helps to leave viewers in a state of speculation about what the character is thinking and what her thoughts may mean for the ongoing narrative.
Email: James E. Cutting, jec7@cornell.edu

11:00-11:15 AM (182)

Action Goal Changes Caused by Agents and Patients Both Induce Global Updating of Event Models. FRANK PAPENMEIER and ANNIKA BOSS, *University of Tübingen*, ANNE-KATHRIN MAHLKE, *University of Cologne* – Observers represent everyday actions in event models along multiple dimensions such as space, time, or goals. We investigated goal changes during ongoing actions by presenting participants short action clips showing goal-directed actions – such as handing over a book – as self-paced slideshows. Those action sequences contained either no goal change or a goal change caused by either the agent or the patient of the action. We measured viewing times (Experiments 1-3) and verbal action descriptions (Experiment 3). The action descriptions revealed that patients causing a goal change turned into agents in the event model. Despite the update of the additional dimension (protagonist) for goal changes caused by patients, goal changes caused by agents and patients were associated with a similar updating effort as indicated by viewing times and number of clauses. We conclude that goal changes cause a global updating of event models independent of the source of the goal change.
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11:20-11:35 AM (183)

To See Ourselves as Others See Us: Insights From Continuous Evaluation of Instruction With DARMA. KEVIN FRANCIS MILLER, INAH MIN, and AIYA SAAD, *University of Michigan* – We often ask students to evaluate teachers, but it is hard to use this information to understand what students are responding to. I will present results from a new method (DARMA - Dual Axis Rating and Media Annotation, Girard & Wright, 2017) that uses a joystick to collect continuous evaluations of events. I will discuss two studies using this technique. In Study 1, college students watched simulated lectures that were designed to give either good/bad first impressions followed by good/bad lectures. Results showed the materials had the predicted effects, but also revealed other systematic variations in student responses. In Study 2, we asked experienced graduate student instructors to perform the task as they thought an undergraduate would. As expected, grad students were more positive than undergrads, but results for the two dimensions of evaluation were quite different. Evaluations of the quality of instruction were highly correlated between the two groups (r=.75), but evaluations of the instructor showed no correlation (r=-.01). Implications for using evaluations to improve instruction and for issues such as gender and other bias in instructional evaluations will be discussed.
Email: Kevin F. Miller, kevinmil@umich.edu

11:40-11:55 AM (184)

Degree of Learning and Linear Forgetting. JERRY S. FISHER, and GABRIEL A. RADVANSKY, *University of Notre Dame* (Presented by Gabriel A. Radvansky) – Memory retention is commonly fit to a negatively accelerating power function. However, under experimental conditions that involve complex materials that are learned to a sufficient degree, linear retention patterns are reliably present. Prior work suggests that one of the critical factors that needs to be present for linear forgetting to be observed is the degree of original learning. Specifically, linear forgetting is more likely to be present with better-learned materials. We assessed this by having different groups of participants learn sets of sentences to different degrees. Memory was then assessed using a recognition test. We found that linear forgetting was more likely with higher degrees of learning, consistent with our hypothesis.
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Attention: Visual Search
Celestin D, Saturday Morning, 10:20 AM-12:00 PM
Chaired by Geoffrey Woodman, Vanderbilt University

10:20-10:35 AM (185)

Context Triggers the Retrieval of Long-Term Memories to Guide Attention. SIRAWAJ ITTHIPURIPAT and GEOFFREY F. WOODMAN, *Vanderbilt University* (Presented by Geoffrey F. Woodman) – When you look out on a playground, does this context trigger the retrieval of representations of your kid's from long-term memory so you are automatically prepared to look for those familiar targets? Here we tested for the hypothesized existence of automatic long-term memory retrieval using contextual information. We had subjects search for the same sets of objects on every trial when viewing a given colored background context. For example, one subject would look for 1 object on the red background, two different objects on the green background, four other objects on the brown background, and so forth. We found that subjects became proficient at these context specific searches across trials, and that this proficiency was accompanied by neural indices of retrieving the number of possible targets from long-term memory, into working

memory. Specifically, we found that the amplitude of the posterior negativity elicited by the appearance of a background color tracked the number of possible targets that were possible in the background color context. Our findings demonstrate one way that different memory mechanisms interact to control attentional deployment to targets in complex scenes.
Email: Geoff Woodman, geoff.woodman@vanderbilt.edu

10:40-10:55 AM (186)

Pitfalls and Possibilities in the Visual Search for Complex Social and Emotional Stimuli. D. VAUGHN BECKER, *Arizona State University* – Finding a face in a crowd is clearly an act visual search, but extending visual search methodology to complex social stimuli is rife with potential pitfalls. We need look no further than the well-cited notion that angry faces "pop-out" of crowds to find evidence that random item effects can lead to incorrect inferences. Indeed, long before the recent replication crisis in social psychology, poor stimulus control led to repeated demonstrations of spurious effects that were misattributed to adaptive cognitive design. I will review how researchers refuted these errors with systematic "face in the crowd" experiments. I will then contend that these more careful studies revealed something that may actually be adaptive, but at the level of the signal: happy facial expressions seem designed to be detected efficiently. And lest we throw the baby out with the bathwater, I will discuss two new experiments that use ideal strategy manipulations to reveal adaptive efficiencies and speed-accuracy trade-offs in the search for specific targets in crowds. Because stimulus-level effects are held constant across such manipulations, they afford strong inferences about the psychological underpinnings of searching for complex social stimuli like faces.
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11:00-11:15 AM (187)

Neoteny Cues Attention Among Non-Neotenous Distractors in Visual Search. KARIN MACHLUF and P. DOUGLAS SELLERS II, *Pennsylvania State University*, AMANDA C. HAHN, *Humboldt State University*, BENEDICT C. JONES, *University of Glasgow* – Children exhibit neotenous, or physically immature, features, such as a large rounded head, relatively large eyes, round cheeks, and small chin. Bowlby (1969) proposed that these features enhance offspring survival. Lorenz (1943) argued that adults are particularly attracted to these features, triggering a cognitive system that enhances motivation to engage in caretaking behaviors. One way a child could trigger this proposed mechanism is by capturing an adult's attention. Content-specific visual detection is a quick and efficient way to orient an individual to evolutionarily-relevant stimuli (Lobue & DeLoache, 2008). Indeed, there is evidence that evolutionarily relevant stimuli facilitates the speed with and likelihood that it will be processed (Jiang et al. 2006). Research finds that neotenous stimuli have a facilitating effect on the attentional system (Borsch et al.,2007). The goal of this present study is to extend this research by examining whether infant faces will attract adult attention more so than adult faces in a visual search task, with neotenous, infant faces showing an attentional bias over non-neotenous, adult faces. Data collection is still underway and is expected to be completed in September..
Email: Karin Machluf, kxm5600@psu.edu

11:20-11:35 AM (188)

Color and Visual-Spatial Working Memory Contribute to Recognition of Distractors From Visual Search. STEPHANI M. FORAKER, *State University of New York, Buffalo State*, ELISA CANE, *University of Trento* – We investigated how the color of background distractors during visual search affected later surprise recognition for those distractors, and whether visual-spatial WM resources contributed. While eye fixations were tracked, participants first saw a word to search for and then a complex natural scene (e.g., Times Square) containing the target word and a red, yellow, or blue distractor, followed by a recognition test for the distractors. The automated symmetry span task assessed visual-spatial WM. Regression analyses (glmer) indicated that more fixations and dwell time on the distractor led to higher accuracy, although color did not affect recognition accuracy (overall mean = .41). However, an interaction of these factors indicated that fewer fixations and less dwell time on red distractors were needed for correct recognition, vs. yellow or blue. Best fit models also indicated that visual-spatial WM modulated recognition, particularly for red distractor images. These results are consistent with research indicating that red has particular perceptual importance.
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11:40-11:55 AM (189)

Understanding the Relationship Between Intertrial Priming in Visual Search and Visual Working Memory Capacity. CARLY J. LEONARD and AMBER JOHNSON, *University of Colorado, Denver* – There is widespread evidence that spatial attention allocation during visual search is influenced by a combination of top-down, bottom-up, and intertrial factors. Intertrial priming even influences search when the target is known to be a bottom-up salient singleton in the array. However, many questions remain about how this priming relates to other forms of memory and how it varies between individuals. In a previous study, people with schizophrenia showed increased intertrial priming and priming magnitude correlated with visual working memory capacity (Leonard et al., in prep). The current work investigates this relationship in the typical population, finding large variability in priming magnitude and a negative correlation with working memory capacity. This relationship was altered in an additional condition that modulated likelihood of target-color repeat. These results are discussed in terms of better understanding the relationship between different guidance factors and how their contributions may vary between individuals.
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Numerical Cognition
Celestin A, Saturday Morning, 10:40 AM-12:00 PM
Chaired by Thomas Faulkenberry, Tarleton State University

10:40-10:55 AM (190)
Modeling Individual Difference Structures in the Size Congruity Effect. THOMAS J. FAULKENBERRY, KRISTEN A. BOWMAN, and SABRINA HETZEL, *Tarleton State University* – When people are asked to choose the physically larger of a pair of numerals, they are often slower when relative physical size is incongruent with numerical magnitude. This size congruity effect is usually assumed as evidence for automatic activation of numerical magnitude. However, some recent results have questioned this assumption. Inspired by the recent work of Haaf and Rouder (2017), we look at the size congruity effect through the lens of individual differences and ask whether everyone exhibits the effect. We develop a class of hierarchical Bayesian mixed models with varying levels of constraint on the individual size congruity effects. The models are then compared via Bayes factors. In two experiments, the winning model was one in which the population-level size congruity effect was constrained to be positive. This indicates that, at least in a physical comparison task with numerals, everyone exhibits a size congruity effect.
Email: Thomas J. Faulkenberry, faulkenberry@tarleton.edu

11:00-11:15 AM (191)
One and "v" Is "2": Evidence for Separate Underlying Numerical Representations for Symbolic and Non-symbolic Numbers. BERT REYNVOET, MILA MARINOVA, and DELPHINE SASANGUIE, *University of Leuven* – In numerical cognition research, it has been traditionally assumed that symbolic (e.g. digits) and non-symbolic numbers (e.g. numerosities) are processed by one common underlying numerical representation. The presence of ratio effect (i.e., the smaller the ratio between two numbers is, the harder it is to distinguish them) in both symbolic and non-symbolic numerical tasks, is considered as evidence for this claim. Here, we assessed the ratio effect in four audiovisual numerical comparison tasks. Results showed a ratio effect in the tasks containing at least one non–symbolic number (i.e., tones – dots, number word – dots, and tones – digits), but the ratio effect was absent in the pure symbolic condition (i.e. number word – digit). The present data is not in line with an account assuming the same underlying representations for symbolic and non-symbolic numbers and provide further evidence for separate systems.
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11:20-11:35 AM (192)
Leftmost Digits Strongly Influence Numerical Estimates. HILARY BARTH, *Wesleyan University* – Hundreds if not thousands of published studies use simple number line estimation (NLE) tasks to draw conclusions about the nature and development of numerical reasoning, and to understand foundational skills and abilities that contribute to performance on standardized math tests. NLE performance is usually assumed to depend on the overall numerical magnitudes of presented numerals, not the specific digits that comprise those numerals, because presented numerals are thought to be translated into mental representations of their magnitudes. I will describe a series of studies testing adults and children ranging in age from 5-11 in a variety of task contexts. These studies show, with large effect sizes, that the specific digits presented in NLE tasks (rather than justtheir numerical magnitudes) strongly influence estimates both in children and in mathematically experienced adults. Developmental change and individual difference will be discussed, as will implications for interpreting related research.
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11:40-11:55 AM (193)
Risk Aversion: Preference or Perceptual Bias? BENJAMIN SCHEIBEHENNE, *University of Geneva*, SEBASTIAN OLSCHEWSKI, *University of Basel*, BENJAMIN R. NEWELL, *University of New South Wales* – The perception and integration of numbers are elementary cognitive processes, for example in decision from experience. A typical finding based on this paradigm is that people are risk averse. In economics, risk aversion is typically captured through compressive value functions. However, similarly shaped functions are also common in psychophysical research to describe perceptual biases. Hence, the question arises in how far (risk) preferences are driven by perceptual biases in number perception or integration. To test this, participants in an experiment repeatedly sampled from continuous monetary outcome distributions that varied in expected value, variance, and skewness. Participants either estimated the mean (a perceptual measure) or the value (a preferential measure) of these distribution. Results show that distributions with highly variable outcomes are valued below their respective arithmetic mean, indicating risk-averse preferences. However, a similar though less pronounced pattern was also found in the matched estimation task. This suggests that part of the seeming risk aversion was due to a bias in number perception or integration. This pattern was strongest for right-skewed distributions.
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Learning and Memory
Celestin F, Saturday Morning, 10:20 AM-12:00 PM
Chaired by Ciara Greene, University College Dublin

10:20-10:35 AM (194)
Flashbulb Memories of a National Referendum on Abortion. CIARA M. GREENE, *University College Dublin*, ELIZABETH LOFTUS, REBECCA HOFFSTEIN GRADY, and LINDA LEVINE, *University of California, Irvine*, GILLIAN MURPHY, *University College Cork* – We investigated 'flashbulb' memories surrounding a referendum that took place in Ireland in May 2018 to remove a constitutional ban on abortion. The referendum was highly polarizing, providing a natural experiment in which the same event is perceived positively or negatively by different participants. 1900 participants were tested one week after polling day. 65% of participants were classified as having a vivid and detailed 'flashbulb' memory of hearing about the referendum result. Pro-choice and pro-life voters differed significantly in their interpretations of the event, but not in

the frequency of flashbulb memories. Flashbulb memory vividness, detail and self-reported accuracy were predicted by participants' investment in the outcome of the referendum, and by their level of surprise and emotional intensity upon hearing the result. Objective memory accuracy for specific details of the event did not predict flashbulb memory formation. Follow-up assessments at 3 months (August 2018), 6 months and 1 year will evaluate whether flashbulb memories and memory for factual details decay at the same rate for those who experienced the referendum as a positively or negatively valenced event.
Email: Ciara Greene, ciara.greene@ucd.ie

10:40-10:55 AM (195)

Retrieval-Induced List Isolation in Dual-List Free Recall: Working Memory Capacity and Context Change. CHRISTOPHER N. WAHLHEIM, TIMOTHY R. ALEXANDER, and MICHAEL J. KANE, *University of North Carolina at Greensboro* – The present experiment examined interactions between retrieval-induced context change and individual differences in working memory capacity (WMC). Ninety-seven participants studied two word lists separated by interpolated retrieval from either long-term memory (LTM; category exemplar generation task) or short-term memory (STM; 2-back task). Externalized free recall was used to assess effects on response accessibility and monitoring when selectively recalling from only one list. Individual differences in WMC were assessed using three complex span tasks. High-WMC individuals recalled more words correctly in the early List 1 positions of serial-position and probability-of-first-recall curves when interpolated retrieval was from STM rather than LTM. Participants rejected List 1 intrusions more effectively when recalling from List 2 when interpolated retrieval was from LTM rather than STM. Retrieval from LTM and higher WMC cooperated to accelerate between-list context change and retrieval from LTM improved monitoring of retrieved context. Implications for models of free recall will be discussed.
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11:00-11:15 AM (196)

Validity of Researcher Inference in Recognition Memory: A Blinded Validation Study. CAREN M. ROTELLO, JEFFREY J. STARNS, and ANDREA M. CATALDO, *University of Massachusetts* – In memory research, theoretical and practical conclusions often hinge on the ability to determine whether an empirical effect is produced by changes in memory acuity, changes in response bias, or both. A wide variety of analysis tools are available to distinguish memory and bias, including measurement models and calculated indices. We report a blinded validation study to 1) determine which of the many available tools researchers use to distinguish memory and bias when they are free to choose and 2) assess whether these tools support valid inferences about the cognitive processes underlying an effect. We collected a large data set from a recognition task and manipulated well-established variables that affect memory and bias. We then sent smaller data sets sampled from the full data set to memory researchers for analysis. Each data set had two unlabeled conditions, and contestants were asked to apply the analysis method of their choice to determine if the conditions varied in terms of memory acuity, response bias, neither, or both. We assessed these inferences in terms of overall accuracy, variability across researchers, and variability across analysis techniques.
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11:20-11:35 AM (197)

Super-Overdistribution in Episodic Memory. C. J. BRAINERD, K. NAKAMURA, M. CHANG, D. M. BIALER, and V. F. REYNA, *Cornell University* – Memory is subadditive over mutually exclusive reality states (e.g., old vs. new), which is known as overdistribution. Overdistribution has been the impetus for quantum memory models because it violates the disjunctive axiom of classical probability. These models implement the distinction between verbatim and gist traces, treating them as incompatible cognitive states that obey the Bohr complementarity principle. A paradoxical form of subadditivity, super-overdistribution, is a property of these models. This property specifies that it will be easier to remember that items belong to a subordinate reality state than to remember that they belong to a superordinate state that self-evidently contains the subordinate state. The models specify conditions under which super-overdistribution should occur and classes of items that are more vs. less likely to exhibit it. We detected super-overdistribution in 3 lines of research and, as expected, it was more pronounced for some classes of items than for others.
Email: Charles J. Brainerd, cb299@cornell.edu

11:40-11:55 AM (198)

Modeling Learning and the Decision to Stop Learning in Large-Scale Data From Lumosity. MARK STEYVERS, *University of California, Irvine*, AARON BENJAMIN, *University of Illinois at Urbana-Champaign* – Large-scale data sets from online training and game platforms offer the opportunity for more extensive and more precise investigations of human learning than is available from work in the laboratory. However, because people make their own choices about participation -- when to schedule their learning sessions, and when to stop learning -- any investigation into learning using these data sets must simultaneously model performance and participation. Using a data set of 54 million gameplays from the online brain training site Lumosity, we show that learning functions of participants grouped by age are systematically biased by participation policies that vary with age. Older adults who are poorer performers are likely to drop out earlier than older adults who perform well. Younger adults show no such effect. We develop computational models based on survival analysis that predict when users decide to stop learning based on ongoing performance as well as a number of temporal features. Overall, we argue that these computational models that explain high-level decisions about participation and dropout lead to learning models that can extend to real-world situations
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Lunchtime Workshop: Psychonomics Digital Activities

Strand 12 A/B, Saturday, 12:00-1:30 PM

Symposium V: What Speech Prosody Can Tell Us About Cognition
Celestin E, Saturday Afternoon, 1:30-3:30 PM
Chaired by Cassandra Jacobs, University of California, Davis

1:50-2:05 PM (199)
What Can Prosody Tell Us About Language Production? DUANE WATSON, *Vanderbilt University* – Language production is fast, context dependent, and driven by communicative intentions, which makes it difficult to study in a controlled laboratory environment. Historically, researchers have used measures such as reaction time and speech errors to understand the mechanisms that underlie language production. In this talk, I will argue that we can better understand the language production system by measuring an utterance's prosody. Specifically, I will show that the mechanisms engaged in lexical access and phonological encoding affect how an utterance is realized. I will also present evidence that different levels of language production (e.g. lexical access vs. phonological encoding) have differing effects on where speakers speed up and slow down over the course of an utterance. Thus, an utterance's prosody, i.e. how an utterance is produced, can provide a window into the workings of language production.
Email: Duane Watson, duane.g.watson@vanderbilt.edu

2:10-2:25 PM (200)
Variability and Inferences in Pragmatic Interpretation of Speech Prosody. CHIGUSA KURUMADA and ANDRÉS BUXÓ-LUGO, *University of Rochester* – How humans cope with uncertainty in information processing has been a persistent puzzle in cognitive sciences. In language comprehension, naturally produced speech sounds are noisy and variable, creating uncertainty in mappings between the signal and underlying representations (phonemes, words). Additionally, inferences supporting these mappings are informed by comprehenders' beliefs about the world and contextually induced, not directly observable, factors such as the talkers' goals and intentions. How can we investigate the multifaceted process involving different levels of inferences? We discuss this problem by focusing on comprehension of speech prosody, which conveys much information about the talker's pragmatic intentions (e.g., questions vs. statements). Drawing on recent models of human perception (e.g., Ideal observer models), we present a framework in which listeners optimizes their pragmatic interpretation of prosody by leveraging: 1) implicit knowledge of statistical structures of acoustic cues learned over past experiences; and 2) contextual inferences over possible and likely meanings.
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2:30-2:45 PM (201)
Focus and Disfluencies in Spoken Language Comprehension. FERNANDA FERREIRA, *University of California, Davis* – A word is considered focused if it sits in a prominent syntactic position, or is spoken with prosodic emphasis—if it is accented relative to other words in an utterance. Focused constituents attract listeners' attention and activate a set of alternate forms. For example, when listeners hear "John wanted not only a dog but also a…___", they generate a set of dog alternates likely to fill the upcoming slot. Our work on the processing of disfluent speech has shown that sequences involving a speech error and correction behave similarly: When listeners identify a word as a speech error, they generate a set of alternates likely to serve as the repair, (e.g., "John wanted a dog um I mean a…___"). These findings suggest that the tendency to predict is equally strong in disfluency and in focus constructions, indicating that disfluent and fluent speech are processed using similar mechanisms.
Email: Fernanda Ferreira, fferreira@ucdavis.edu

2:50-3:05 PM (202)
Implicit Prosody in Reading Relies on Similar Cognitive Mechanisms as Explicit Prosody. MARA BREEN, *Mount Holyoke College* – In addition to the evidence that prosody influences the comprehension of spoken language, recent empirical work suggests that implicit prosodic representations are activated during silent reading. Using methods similar to those employed for visual imagery, we have demonstrated evidence for implicit prosody in the form of behavioral similarities between auditory perception and auditory imagery. In addition, we've observed correlations between individual speaker's patterns of explicit speech production and their (silent) reading proficiency. Most recently, we've observed neuroimaging evidence of overlap in the electrophysiological responses to prosodic manipulations implemented in spoken and signed languages. These results inform fundamental questions about the representations that underlie language processing, the domain-generality of prosodic representations, and the role of individual differences in cognitive processing.
Email: Mara Breen, mbreen@mtholyoke.edu

3:10-3:25 PM (203)
Panel Discussion. CASSANDRA JACOBS, *University of California, Davis* – Different prosodic properties of an utterance, such as disfluencies, intonation and speech rate can inform listeners about the speaker's internal state. Prosody also provides an additional perspective on the mechanics of language comprehension and production. Many of the same mechanisms that are involved in processing the visual world appear to help listeners understand spoken and written language. At the same time, many open questions remain. Are the abilities that allow listeners to predict what a speaker will say domain-general? If not, what are the limitations to the parallels we can draw between language and other aspects of cognition and why is language different? If prosodic processing engages language-specific abilities, do these abilities differ from other dimensions of language processing, such as speech perception? Finally, how

might we use prosody in experiments to better understand other facets of cognition, such as expertise, skill learning, and category learning?
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Collaborative Remembering and Collective Memory
Celestin BC, Saturday Afternoon, 1:30-3:10 PM
Chaired by Henry L. Roediger, Washington University in St. Louis

1:30-1:45 PM (204)
A Cognitive Approach to the Study of Collaborative Remembering. SUPARNA RAJARAM, *Stony Brook University* – Over a century of experimental research on memory has focused on individuals working in isolation. I will present research that leverages principles and findings derived from this body of rigorous work, to investigate how people remember in groups. Collaborative remembering shapes not only the memories of each member within an interacting group but also of the group at a collective level. The talk will include laboratory-based experimental findings to illustrate the impact of what people remember (e.g., emotionally salient or neutral information) and the structure of the social network (e.g., who talks to whom and how often) on memory transmission and on changes in individual and group memory. This work considers cognitive mechanisms that shape memory contagion, similarity, and divergence in groups.
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1:50-2:05 PM (205)
The Formation of Collective Memories Through Conversational Interactions: The Role of Forgetting and Social Presence. WILLIAM HIRST and MARTIN FAGIN, *New School for Social Research* – The conversations people have about the shared past can reshape memories so that those participating in the conversation converge on a shared mnemonic representation. In this way, conversational interactions can serve as a means of promoting the formation of collective memories. We review recent work studying how selective collaborative remembering can elicit mnemonic convergence through inducing selective forgetting. Specifically, we examine the role of group membership and social presence in moderating these socially shared retrieval-induced forgetting (SSRIF) effects. For instance, SSRIF is greater when speakers can be observed over a video or listeners have a picture of the speaker than when the recounting is done by a disembodied voice. The implication for the dynamics through which different forms of communication can play a role in shaping collective memories is discussed.
Email: William Hirst, hirst@newschool.edu

2:10-2:25 PM (206)
Collective Memories of World War II: Remembering the 10 Most Important Events. MAGDALENA ABEL, *University of Regensburg*, SHARDA UMANATH, *Claremont McKenna College*, JAMES V. WERTSCH and HENRY L. ROEDIGER, *Washington University in St. Louis* – World War II as a global war affected almost all nations. The events that took place during the war and the consequences of these events are still being debated today, decades after the war ended in 1945. In this study, we examined how 1,338 people from different countries remembered the war. We asked over 100 people from each of 11 countries (Australia, Canada, China, France, Germany, Italy, Japan, New Zealand, Russia, the UK, and the US) to recall the 10 most important events of World War II. The results demonstrate great overlap in which events are considered to be the most important, but also some striking differences. In particular, Russia's narrative seems quite different from that of its former allies and enemies.
Email: Magdalena Abel, magdalena.abel@ur.de

2:30-2:45 PM (207)
From Hero to Villain: Stability and Change in Popular Beliefs About Christopher Columbus. AMY CORNIN, and HOWARD SCHUMAN, *University of Michigan* – During the second half of the 20th century, elites and activists increasingly turned away from idealized portrayals of Columbus, emphasizing instead the destructive consequences for indigenous peoples of his arrival in the Americas. Tensions over how – indeed, whether – to celebrate Columbus's landfall intensified as the 1992 quincentennial approached. Still, a survey conducted in 1998 showed that few among the general population had adopted critical views of Columbus: most respondents continued to see him in mildly positive terms as "the discoverer of America." Public debate over Columbus's proper place in history has persisted, however, and recent surveys show evidence of change, particularly in the views of respondents too young to have participated in the initial survey. We interpret these results as similar to a "critical years" effect observed for memory of national and world events, and consider possible roles of the media and school instruction in fostering change in collective memory.
Email: Amy Corning, corninga@umich.edu

2:50-3:05 PM (208)
Collective Future Thinking. KARL SZPUNAR*, *University of Illinois at Chicago* – Much like investigations of human memory, the history of research on the capacity to think about the future has mostly focused on the personal future with little consideration of how people think about the future of groups. I will summarize research from a series of recent experiments with participants from the United States and Canada demonstrating a valence-based dissociation between personal and collective future thinking. Specifically, our findings indicate that people tend to anticipate more positive than negative events in their personal future, but more negative than positive events in the collective future of their country. I will further demonstrate that this valence-based dissociation also emerges in the context of comparisons between personal and collective memory, and that it may have consequences for how people think about the world around them.
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Decision Making III
Celestin F, Saturday Afternoon, 1:30-3:30 PM
Chaired by David Budescu, Fordham University

1:30-1:45 PM (209)

Optimal Forecasting Teams. DAVID V. BUDESCU and YIZHI (ROXANNE) ZHANG, *Fordham University*, BARBARA MELLERS, *University of Pennsylvania*, EVA CHEN, *Good Judgment Inc.* – A surprising result of recent large scale geopolitical forecasting tournaments (Mellers et al., 2014) is that small teams were, on average, more accurate than individuals. This seems to contradict the expectation of the "wisdom of crowd" approach that highlights the importance of independence between forecasters. We study how large should teams be to show this positive "teaming effect." In other words, if one has access to n forecasters, is it better to divide them into many small teams, or to group them together? We re-analyzed data of the teams and the individuals who participated in Year 4 of the tournament, as well as from a new experiment that manipulated systematically team size. Smaller teams (n=5) were more active than larger teams (n=15) but also less accurate. In order to improve accuracy without sacrificing activity level, we composed synthetic teams by aggregating forecasts of members of smaller teams. These recomposed teams matched the activity level of the smaller teams and the accuracy of the larger teams. We consider the implications of these results for optimal teaming.
Email: David V. Budescu, budescu@foreham.edu

1:50-2:05 PM (210)

Variables Affecting Go/No-Go Discrimination and Response Bias. MICHAEL E. YOUNG and ANTHONY W. MCCOY, *Kansas State University*, STEVEN C. SUTHERLAND, *University of Houston at Clear Lake* – Despite the ubiquity of go/no-go tasks in the study of behavioral inhibition, there is a lack of evidence regarding the impact of key design characteristics, including the go/no-go ratio, stimulus onset asynchrony, and number of types of go stimuli, on go/no-go discriminability and response bias. In the present study we examined the trial dynamics of signal detection theory's sensitivity and bias using a generalized multilevel linear model. In Experiment 1, sensitivity showed a small increase across trials whereas bias increased dramatically across trials as participants' learned the ratio of go to no-go trials. Both bias and sensitivity increased with greater SOA between stimulus presentations likely due to the increased rate at which participants learned the go/no-go ratio. In Experiment 2, an increase in the number of types of go stimuli decreased sensitivity, but only when moving from 1 to multiple (2, 3, or 4) types; bias was unchanged across the number of types.
Email: Michael Young, michaelyoung@ksu.edu

2:10-2:25 PM (211)

How Performance in a Cognitive Test Is Influenced by the Test Itself vs. by the Participants' Abilities. LAURA WALL, *University of Newcastle*, ROBERT KOHN and DAVID GUNAWAN, *University of New South Wales*, SCOTT D. BROWN, *University of Newcastle* (Presented by Scott D. Brown) – Performance in cognitive tasks is more and more often measured by model-based analyses which estimate parameters corresponding to different aspects of cognition. This approach is applied across many kinds of cognitive task, and measurements are sometimes interpreted as more general properties of the participants (e.g. measures of their ability). Is this interpretation reasonable? It entails an untested assumption, that the parameter estimates identify latent cognitive processes regardless of the task choice. We tested this assumption by examining relationships between parameter estimates for the same individuals across three tasks: a visual search task, a stop-signal task and a match-to-memory task. The tasks were constrained to have the same stimuli and corresponding within-subject manipulations of decision difficulty. Although there were some important difficulties in modelling stop-signal data, we still found strong evidence of correlations in both the data and parameter estimates across the tasks.
Email: Scott Brown, scott.brown@newcastle.edu.au

2:30-2:45 PM (212)

The Cost of Imperfect Memory in Social Interactions. MINOU GHAFFARI, and SUSANN FIEDLER, *MPI for Research on Collective Goods*, BETTINA VON HELVERSEN, *University of Zurich* (Presented by Bettina von Helversen) – Memory is crucial for cooperation: Remembering whether a person cooperated or defected in a previous interaction enables decision makers to avoid being exploited by free-riders. From an evolutionary perspective, the ability to remember an interaction partner's behavior and avoid exploitation should be particularly important for prosocial individuals. Following this idea, we investigated whether the ability to remember how a social interaction partner behaved is related to an individual's social preference in three studies. In the studies participants first observed other players' choices in decomposed games and then made their own decisions. Subsequently, participants were asked to recall the behavior of each observed player. We then used participants' social value orientation to predict their memory performance. We found that prosocial participants were more likely to recall previous players' behavior than proself participants. Moreover, a mediation analysis indicated that those differences were partly driven by the extent of information search during encoding.
Email: Bettina von Helversen, b.vonhelversen@psychologie.uzh.ch

2:50-3:05 PM (213)

Do Police Record Styles Influence Credibility Judgments? ANITA EERLAND and TESSA VAN CHARLDORP, *Utrecht University* – A written statement of an interrogation with a suspect is an important piece of evidence in criminal cases. For example, in the Netherlands this so called police record can be one of two pieces of evidence needed to convict a suspect of a crime. By law, a police record must be written in a suspect's own words as much as possible. Apart from that, police officers are relatively free in how they write down the interrogation leading to variations. In the Netherlands and Belgium, three different recording styles can be distinguished. They differ with respect to the reported sources of information (i.e., suspect and/or officer) and the perspectives that are offered (i.e., suspect or suspect

and officer). In a series of studies, using authentic materials, we investigated whether the style used influences judgments of credibility and reliability of the police record and the suspect. We found that recording style can influence credibility and reliability judgments of the suspect. The effect of recording style seems to depend on other factors such as the complexity of the case and whether or not people believe the suspect is guilty of the described crime.
Email: Anita Eerland, anita.eerland@gmail.com

3:10-3:25 PM (214)

Seepage and Influence: An Evidence-Resistant Minority Can Affect Scientific Belief Formation and Public Opinion. STEPHAN LEWANDOWSKY, *University of Bristol*, JENS MADSEN, *University of Oxford*, TOBY D. PILDITCH, *University College London* – Well-established scientific findings can be subject to denial when they challenge political views or economic interests. For example, the tobacco industry denied the harms of smoking for decades, and the clear evidence about climate change is currently being denied by some politicians and think tanks. We present an agent-based model of the processes by which denial of climate change occurs, and how it can affect the scientific community and public discourse. The model involves a community of Bayesian agents, representing the scientific community, that are presented with the emerging historical evidence of climate change and that also communicate the evidence to each other. Over time, the scientific community settles on the belief that the climate is changing with virtual certainty. When a minority of agents is introduced that is resistant to the evidence, but that enter into the scientific discussion, the scientific community still acquires firm knowledge but at a slightly reduced rate. When both types of agents are communicating with the general public, the public remains ambivalent about the reality of climate change. The model captures the evolution of scientific and public opinion during the last 40 years.
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Attention I

Celestin D, Saturday Afternoon, 1:30-3:30 PM
Chaired by Raymond Klein, Dalhousie University

1:30-1:45 PM (215)

Testing the Networks of Attention: From the ANT to the Attention-Trip. RAYMOND M. KLEIN, SWASTI ARORA, COLIN R. MCCORMICK, and SANA REHAN, *Dalhousie University* – Even though William James asserted that "everyone knows what attention is" the term, attention, is not a single, simple concept. Rather, attention refers to several basic neuro-cognitive processes. Perhaps the most influential taxonomy of attention, according to which there are three isolable networks of attention (alerting, orienting and executive control), has been advanced by Posner and colleagues. The Attention Network Test (ANT) was developed to serve as a quick and easy to administer assay of these networks. The ANT has been widely used to measure the efficacy of these three attention networks in a wide variety of experiments. World-wide interest in this test will be described and some limitations will be discussed. Our development of a more engaging version, that we call the Attention-Trip, will be presented along with some recent data we have collected using this game-like task.
Email: Raymond M. Klein, ray.klein@dal.ca

1:50-2:05 PM (216)

Individual Differences in new Learning via Fast Mapping. IRENE P. KAN, ANNA B. DRUMMEY, KENDRA ANDREW, and KATHRYN CUSHING, *Villanova University* – In the word learning literature, "fast mapping" (FM) refers to the rapid acquisition of novel label-object pairings. In the standard FM paradigm, a novel label is presented alongside a novel object and a familiar object, and subjects are asked to identify the item that corresponds to the label. Memory for novel label-object pairings is subsequently assessed. It has been argued that both the presence of the familiar context item (which provides semantic support) and the active rejection of the familiar item as one associates the novel item with the novel label (which engages disjunctive syllogism) are crucial to FM. We recently demonstrated that although both processes contribute to FM, neither is crucial. Here, we explored whether the learning benefit often associated with FM is modulated by individual differences in attention orienting. We found a negative relationship, suggesting that FM may be most helpful for those with relatively poor orienting abilities.
Email: Irene P. Kan, irene.kan@villanova.edu

2:10-2:25 PM (217)

Multiple Object Awareness. JEREMY M. WOLFE and CHIA-CHEN WU, *Harvard Medical School, Brigham & Women's Hospital* – In classic Multiple Object Tracking (MOT) experiments, observers (Os) try to track N out of M identical objects as they move around. Typical capacity is ~3-4 objects. In Multiple Identity Tracking (MIT), Os view N distinct moving objects. When the objects are occluded, Os are asked to click on the location of one specific object (Where is the cat?). Capacity is actually lower: ~2-3. Both methods ignore imperfect information even though, in the real world, you might know the approximate, but not the exact location of the cat. Our new Multiple Object Awareness (MOA) paradigm, measures this partial information. Os view N distinct, moving objects. At test, they are asked to locate the target. They click on as many items as needed to find the target. Guessing requires (N+1)/2 clicks on average. Fewer clicks mean more knowledge. Number of clicks required can be used to derive a MOA capacity. The capacity is much bigger (~8-10) because imprecise knowledge is still knowledge. MOA capacity may be more closely related to your ability to find your friend at a party than either MOT or MIT.
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2:30-2:45 PM (218)

Tenacious Instructions: Automatic Impact of Unexecuted Instructions That Are No Longer Relevant. BAPTIST LIEFOOGHE, *Ghent University* – A growing body of research indicates that instructions impact behavior automatically, even when these instructions have never been overtly applied before.

Automatic effects of instructions are, however, conditional on the prospective intention to execute instructions in the near future. Here, we test to what extent the automatic impact of instructions occurs when the intention to execute these instructions is relaxed before they have been executed. We report two experiments demonstrating that instructions, which were never overtly applied, still automatically impact behavior when the intention to execute these instructions is relaxed, because the participant either could infer (Experiment 1), or was explicitly cued (Experiment 2) that the instructions were no longer relevant. We conclude that whereas intention is needed to create a representation on the basis of instructions, its automatic effect is difficult to cancel out.
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2:50-3:05 PM (219)

Effects of Divided Attention During Memory Retrieval: Further Data. FERGUS I.M. CRAIK, ELDAR EFTEKHARI, and MALCOLM A. BINNS, *Rotman Research Institute at Baycrest* – Division of attention (DA) at the time of memory encoding has large detrimental effects on subsequent memory performance, but DA at retrieval has little effect (Baddeley, Lewis, Eldridge & Thomson, 1984; Craik, Govoni, Naveh-Benjamin & Anderson, 1996). This is a puzzling result given that retrieval processes are known to be resource-demanding. One obvious possibility is that participants maintain performance on the retrieval task by neglecting the concurrent task, but there is evidence against this simple trade-off notion. However, Baddeley et al. found that DA at retrieval was associated with longer retrieval latencies, suggesting the possibility of a trade-off between time and accuracy within the memory task itself. The present experiment replicated the findings that neither DA nor differential emphasis between a recognition task and a concurrent continuous reaction-time (CRT) task affected recognition accuracy, but also found evidence for a lawful trade-off in decision latencies between recognition and CRT performance. Further analysis showed that the relationship between response rates on the two tasks was well described by a linear function, and that this function was demonstrated by the majority of individual participants.
Email: Fergus Craik, fcraik@research.baycrest.org

3:10-3:25 PM (220)

ADHD Reflects Impaired Externally-Directed and Enhanced Internally-Directed Attention. BRADLEY S. GIBSON, *University of Notre Dame*, M. KARL HEALEY, *Michigan State University*, DAWN M. GONDOLI, *University of Notre Dame* – Individuals can direct their attention to objects in the external world or to thoughts and memories in their internal world. The present study used a verbal immediate free recall task to assess the integrity of externally- and internally-directed attention (EDA and IDA, respectively) in a sample of 111 adolescents, 50 with study-confirmed diagnoses of ADHD and 61 without. The ADHD group was found to have significantly worse scores on outcomes that depend on EDA during encoding (serial position), and significantly better scores on outcomes that depend on IDA during retrieval (lag-conditional response probabilities). In addition, the Retrieved Context Model of memory search suggested that, during encoding, the ADHD group had slower mental context drift, indicative of weaker EDA to the list items, as well as deficiencies in their ability to allocate and sustain attention when the study list first appeared. During retrieval, in contrast, the model suggested that the ADHD group had faster mental context drift indicative of stronger IDA to retrieved context. These findings provide novel evidence that ADHD reflects impaired EDA and enhanced IDA, and they reinforce the clinical relevance of distinguishing EDA and IDA in future studies.
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Working Memory: Vision and Neural Mechanisms

Celestin GH, Saturday Afternoon, 1:30-3:10 PM

Chaired by Michael Pratte, Mississippi State University

1:30-1:45 PM (221)

Precision Effects in Visual Working Memory Are Due to Retrieval Limitations, not an Averaging of Slots. MICHAEL S. PRATTE, *Mississippi State University* – In their prominent "slots plus averaging" model, Zhang and Luck (2008) amended discrete capacity theories by proposing that duplicate memory representations are averaged when set sizes are below capacity. This addition was made to allow the model to account for observed declines in memory precision with increasing set size, in addition to the expected increases in guessing. However, we found equivalent set size effects on precision in a task that did not require working memory storage, ruling out storage mechanisms such as slot averaging as the cause of precision declines. Precision also declined when stimuli were presented sequentially, ruling out encoding limitations. We found, however, that precision continued to decline well beyond working memory capacity limits when iconic memory allowed for several items to be available at retrieval. Taken together, these results suggest that set size effects on memory precision reflect a retrieval limitation, not an encoding or storage process.
Email: Michael Pratte, prattems@gmail.com

1:50-2:05 PM (222)

Psychological Scaling Reveals a Single Parameter Framework for Visual Working Memory. TIMOTHY BRADY, MARK SCHURGIN, and JOHN WIXTED, *University of California, San Diego* – Limits on the storage capacity of working memory have been investigated for decades, but the nature of those limits remains elusive. Here, we show that the relationship between physical distance in stimulus space and the psychological confusability of items as measured in a perceptual task is non-linear. Taking into account this relationship leads to a parsimonious conceptualization of visual working memory, greatly simplifying the models needed to account for performance, allowing generalization to new stimulus spaces, and providing a mapping between tasks that have been thought to measure distinct qualities. Performance across a variety of tasks can be explained by a one-parameter model implemented within a signal detection framework. Moreover, despite the system-level distinctions between working and long-term memory, after taking into account psychological scaling we find

a strong affinity between the theoretical frameworks that guide both systems, as performance is accurately described using the same straightforward signal detection framework.
Email: Timothy Brady, timbrady@ucsd.edu

2:10-2:25 PM (223)

When Does Working Memory for Visuospatial Arrays Get Better With Repetitions? Unlocking the Hebb Effect. ALESSANDRA S. SOUZA, CLARA S.R. OVERKOTT, and KLAUS OBERAUER, *University of Zurich* – Working memory (WM) for verbal and spatial materials is often tested through sequential presentation of short lists, with immediate forward serial recall of the list. Repetition of the same list promotes its acquisition in long-term memory, thereby improving serial recall ("Hebb effect"). Visual WM is traditionally tested through briefly presented visuospatial arrays, of which a single item is tested. Remarkably, previous studies found little or no improvement for repeated visuospatial arrays. Across five experiments, we investigated which factors promote visuospatial learning by testing all combinations of variables distinguishing between visual WM tasks (brief + multi-item array + single-item test) and Hebb tasks (slow + sequential presentation + serial recall of all items). For all experiments, participants did not profit from repetitions in single-item tests, whereas they learned when all items were tested. Hence the key to unlock visuospatial long-term learning is to require participants to fully retrieve all information in WM.
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2:30-2:45 PM (224)

Group Differences of Working Memory Capacities in the Resting State Brain Networks: An fMRI Study. MARIKO OSAKA, *NICT, National Institute of Information and Communications Technology*, MIZUKI KANEDA and MIYUKI AZUMA, *NICT*, KEN YAOI, *Kanazawa University*, NAOYUKI OSAKA, *Kyoto University* – Using fMRI, group difference of working memory capacity during resting state was investigated. Group difference of working memory capacity was estimated by reading span test (RST) and word span test (WST). All participants performed both tests outside scanner. An fMRI activation was measured while the participants were in the resting state with eyes closed for eight minutes. The participants were divided into high and low working memory capacity groups based on the RST estimates. We analyzed four networks; default-mode, salience, dorsal attention and front to parietal networks. Results showed significant group differences mainly in the salience network; correlations (Z-scores) between ACC and PCC, Anterior Insula were larger in high span group than low span group. However, the differences of WST between groups was not confirmed. These findings suggest that group difference is based on works of salience network which switches attention of executive function of working memory.
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2:50-3:05 PM (225)

Scientific Arguments in the Airwaves and Inside the Head: Payoffs of an Adversarial Collaboration on Working Memory. NELSON COWAN and STEPHEN RHODES, *University of Missouri, Columbia*, JASON M. DOHERTY and AGNIESZKA JAROSLAWSKA, *University of Edinburgh*, CLEMENT BELLETIER, *University of Fribourg*, MOSHE NAVEH-BENJAMIN, *University of Missouri, Columbia*, PIERRE BARROUILLET, *University of Geneva*, VALERIE CAMOS, *University of Fribourg*, ROBERT H. LOGIE, *University of Edinburgh* – We contemplate how science progresses with reference to our project, Working Memory Across the Adult Lifespan: An Adversarial Collaboration (WoMAAC; Google it). Using our joint results, we explore the nature of theoretical advances in experimental psychology. Our general observation is that each researcher is committed to his or her theoretical view based not on any one critical experiment, but on years of fitting literature, results, and experiences together. Nevertheless, one's world view can evolve gradually, based on new evidence. In an interpersonal contest, new results do not usually convince a researcher to surrender his or her view. They can, however, set in motion smaller adversarial contests inside investigators' heads, between different versions of a theoretical model. Through that process of internal conflict, different researchers' theories gradually evolve to become more like one another, as needed to explain evidence. The value for the field is illustrated in the case of dual-task experiments.
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Sensation and Perception II
Celestin A, Saturday Afternoon, 1:30-3:10 PM
Chaired by Andrew Gallup, SUNY Polytechnic Institute

1:30-1:45 PM (226)

Carotid Artery Temperature Modulates the Expression of Contagious Yawning. ANDREW C. GALLUP, *State University of New York Polytechnic Institute*, VALENTINA RAMIREZ, *Nova Southeastern University*, COLLEEN RYAN, *University of Rome Tor Vergata*, OMAR TONSI ELDAKAR, *Nova Southeastern University* – The existence of yawning across diverse species has led many researchers to postulate about its evolutionary significance. One hypothesis which has garnered recent support posits that yawns function to cool the brain by forcing hyperthermic blood away from the skull while simultaneously introducing cooler arterial supply. This study was designed to test whether alterations in brain/skull temperature modify yawning in humans. Participants were instructed to hold either a hot (40oC), cold (4oC) or room temperature (22oC) pack firmly to their neck, just over one of their carotid arteries, prior to and during exposure to a contagious yawning stimulus. Immediately thereafter, participants self-reported on their behavior during testing. As predicted, results showed that contagious yawning varied significantly across conditions. Consistent with the brain cooling hypothesis, both the urge to yawn and overall contagious yawn frequency were highest in the hot condition and lowest in the cold condition.
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1:50-2:05 PM (227)

A Hidden Factor Explains Failures of Color and Brightness Constancies. ADAM REEVES, *Northeastern University*, KINJIRO AMANO, *University of Manchester* – The perceptual

constancies, of brightness, shape, color, and size, are thought to be critical for object recognition; objects should in some sense 'look the same', even when the conditions of lighting and viewing are altered. Yet the constancies are imperfect, their extent differing over individuals and tasks. In the case of color constancy, variations are marked, from near zero to near 80% of the ideal, even when the observers are tasked to match object colors rather than lights at the eye (Arend & Reeves, 1986). Is this imperfection just due to random variation, or is there a principled reason? Reeves (2018) showed that as the color of a sample becomes purer and purer, color constancy should decline, whereas brightness constancy should improve, based on a novel theoretical analysis of the underlying physics. We have re-analyzed extensive raw data from color and brightness matches made across differently illuminated 'Mondrian' displays by the 20 observers of Foster, Amano & Nascimento (2001), and have found support for these theoretical predictions. Accounts of constancy need to consider hidden sensory variables (in this case, sample saturation) as well as instructions, even given the inevitable individual differences.
Email: Adam Reeves, reeves@neu.edu

2:10-2:25 PM (228)

Relational Properties Represented in Inferred Color-Concept Mappings. KAREN B. SCHLOSS and SHANNON SIBREL, *University of Wisconsin, Madison*, LESLIE WELCH and YUN-HSUAN LAI, *Brown University* – In visual communication, designers encode concepts in visual features and observers decode those encoded mappings. Decoding is easier when the encoded mappings match observers' inferred mappings. But, what determines inferred mappings? Using a paradigm in which participants learned new color-concept associations, we investigated whether inferred mappings were based on surface or relational representations. Participants saw a series of fictitious lecture slides on 32 topics, three slides per topic. For each topic, the first two slides contained a 2x2 bar graph with the same encoded color-concept mappings (learning trials). In the third slide (test trial), the encoded color-concept mappings varied relative to learning trials: same-colors/same-lightness relation, same-colors/opposite-lightness relation, different-colors/same-lightness relation, or different-colors/opposite-lightness relation. Responses to questions about the graph were faster in the test trial when the encoded color-concept mappings preserved lightness relations from the learning trials, even if those mappings contradicted surface-based matches. Therefore, inferred color-concept mappings represented relational properties.
Email: Karen B. Schloss, kschloss@wisc.edu

2:30-2:45 PM (229)

Mental Processing of Visual and Haptic Cues in Augmented Balance Perception. DEVIN M. BURNS, *Missouri University of Science and Technology* – Although research in augmented perception is booming, little is understood about the information processing characteristics that underly the integration of these additional signals. In this experiment, Systems Factorial Technology was employed to examine the architecture, stopping rule, and workload capacity of participants when making use of vibration cues from a belt in combination with visual cues on a computer screen. In order to support the application of this vibration belt to improving balance in populations at risk of falling, this experiment used a novel lean-to-respond methodology rather than a traditional response pad. Participants stood on a Wii Balance Board and reacted to cues by leaning in the direction indicated. Results show that the majority of participants appear to use an unlimited capacity parallel processing architecture, thus benefiting from the addition of vibrational cues while suffering no decline in their ability to attend to visual cues. However, individual differences were found, with one third of participants using a serial architecture with limited capacity. Nonetheless, even these participants continued to benefit from the redundant information in the augmented cues.
Email: Devin Burns, BurnsDe@mst.edu

2:50-3:05 PM (230)

Velocity of Change and Generative Transmission of Force and Causality. TIMOTHY L. HUBBARD, *Arizona State University, Grand Canyon University*, SUSAN E. RUPPEL, *University of South Carolina, Upstate* – In prior studies of generative transmission of force and causality, a launcher (an initially moving object) contacted one end of a set of contiguous intermediary (stationary) objects, and a target (an initially stationary object) subsequently moved away from the other end of that set of intermediary objects. Experiments 1 and 2 replicated these methods. Also, upon contact from the launcher, intermediary objects could sequentially change color in ways consistent or inconsistent with a transfer of influence from the launcher through the intermediary objects to the target, and the velocity of color change across intermediary objects varied. Increases in velocity increased ratings of force but not ratings of causality. Ratings of force and ratings of velocity were highest when color change of intermediary objects preserved the color of the launcher, lower when color change did not preserve the color of the launcher, and lowest when intermediary objects did not change color. Implications for theories of perception of force and theories of phenomenal causality are considered.
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Consciousness

Celestin BC, Saturday Afternoon, 3:30-5:30 PM

Chaired by Michael K. McBeath, Arizona State University

3:30-3:45 PM (231)

Who Touched the Basketball Last? Consciously Planned Actions Are Perceived Prior to Unplanned Actions by Others. MICHAEL K. MCBEATH and TY Y. TANG, *Arizona State University* – For temporal order judgments, such as who touched a basketball last before it went out of bounds, players must integrate perceived planned action-events (their own touch) with unexpected ones (their opponent's touch). We examine if such conscious voluntary actions are systematically perceived to occur earlier than unplanned events. In three experiments, participants played a timing game which cued them to touch a partner or surface, and then they judged if their touch occurred before (Exp.1) their partner touched them, (Exp.2) a mechanical solenoid touched them, or (Exp.3) a sound

beep occurred. In all three experiments, an omnibus logistic regression reveals a robust bias to report "I touched first." The bias consistently led to perception of self-generated actions about 50 msec prior to simultaneous externally-determined events. The results are consistent with findings on intentional binding, as well as the 20 Hz temporal fusion thresholds of flicker-fusion in vision, lowest pitch in audition, and repetition-limits for motor-activities like drumming. The findings confirm that if two players simultaneously hit a basketball out of bounds, both are likely to robustly perceive that they touched it first, which can lead to arguments.
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3:50-4:05 PM (232)

Testing The Validity of Probed Mind-Wandering Reports. MICHAEL J. KANE, and BRIDGET A. SMEEKENS, *University of North Carolina at Greensboro*, MATT E. MEIER, *Western Carolina University*, MATTHEW S. WELHAF, *University of North Carolina at Greensboro* – Cognitive psychologists' and neuroscientists' interest in mind-wandering has bloomed amid replicable empirical findings that speak to theoretical and applied questions about consciousness. Most of these findings come from studies assessing task-unrelated thoughts (TUTs) during ongoing activities by unpredictably signaling subjects to report their immediately preceding thought content. Unfortunately, as interest has grown, so has a (mostly) uncritical proliferation of thought-probe methods (Weinstein, 2018). Despite psychologists' general skepticism regarding introspective self-report, few studies have explicitly tested the validity of TUT reports. These few studies find that TUT rates vary modestly across different probe types. However, they haven't addressed the crucial scientific question: Do different probe types affect the relation of TUT rates to experimental manipulations or with individual-differences variables? We report a laboratory study testing >1000 subjects (>250 in each of 4 thought-probe conditions) to investigate whether probe type affected TUTs' associations with ongoing task performance, executive-control ability, or personality facets.
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4:10-4:25 PM (233)

Cognitive Mechanisms of Visual Awareness: The Role of Non-Perceptual Information. MICHAŁ WIERZCHOŃ, *Jagiellonian University* – How do we know what we are aware of? Does anything besides the stimulus-related evidence influence our conscious experience? Here, I present a set of behavioural studies aiming to investigate this problem in the context of visual awareness. Our previous studies show that visibility judgments are more strongly related to task accuracy when given after than before stimulus discrimination. In the series of follow up experiments, we have tried to interpret this basic finding investigating the influence of the stimulus-related evidence accumulation, stimulus-related decision accuracy, motor response and error monitoring on subjective visibility judgments. We have shown that all those variables influence visibility. I will interpret the findings in line with hierarchical theories of consciousness and decisional models.
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4:30-4:45 PM (234)

Role of Visual Consciousness in Perceptual Organization. RUTH KIMCHI, *University of Haifa* – Perceptual organization is the process by which disjoint bits of visual information are structured into a meaningful scene composed of objects and their interrelations. Can perceptual organization unfold in the absence of visual awareness? The answer to this question has turned out to be complicated. I will present studies examining different organization processes, using a priming paradigm and two methods to render the prime invisible, continuous flash suppression and sandwich masking under matched conditions. Results demonstrate: a) some perceptual organization processes, such as grouping elements by color similarity or by connectedness into a vertical/horizontal pattern can occur without awareness, whereas other processes, such as grouping elements into a global shape cannot; b) whether a process can occur without awareness is dependent on the level at which the suppression induced by the method used for rendering the stimulus inaccessible to awareness takes place.
Email: Ruth Kimchi, rkimchi@univ.haifa.ac.il

4:50-5:05 PM (235)

Measuring the Dynamics and Phenomenology of Visual Mental Imagery. BARUCH EITAM, *University of Haifa* – I report 4 experiments which introduce and utilize 2 novel paradigms to measure the temporal dynamics and phenomenology of visual mental imagery. Both paradigms minimize 'demand characteristics' that have plagued the empirical study of imagery. Using them we uncovered both involvement of domain specific (visual) and general purpose processes in the generation of mental images, the duration of generating and stability of mental images. We also began to explore the mechanisms underlying individual differences in visual imagery and their relationship with extant, self report, measures of visual imagery such as the VVIQ. These novel paradigms are presented as tools for objective study of the intriguing phenomenon of our ability to generate 'sensation-like' images and as a new "door" for uncovering the functions of visual consciousness.
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5:10-5:25 PM (236)

Consciousness? Contrasting Roles in Cognitive and Mentalistic Metatheories. DONELSON E. DULANY JR., *University of Illinois* – Relevance to issues that divide currently controversial literatures. What carries over from behavioral and cognitive revolutions. (1) Cognitive metatheory: Computational and information processing variants (e.g. Newell & Simon, 1961, Neisser, 1967) (a) Symbolic representation by unconscious states or by both conscious and unconscious states. (b) Explicit and implicit processing as conscious and unconscious processing. What in cognitive metatheory seems influenced by a central thesis of behaviorism. (2) Mentalistic metatheory: (e.g. Dulany, 1997 to 2014). (a) Conscious states as sole carriers of symbolic representation, their adaptive significance. (b) Explicit processing as deliberative mental episodes—non-conscious operations interrelating consciously represented propositions. Implicit processing as associative mental episodes—non-conscious activation interrelating consciously represented

sub-propositional contents. Common to both metatheories are non-conscious sensory and motor transduction systems and non-conscious memories in neural networks. We can see the relevance of these metatheories in various controversial literatures—for example, learning, or perception, or volitional control interpreted as unconscious.
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Human Learning and Instruction II
Celestin GH, Saturday Afternoon, 3:30-5:30 PM
Chaired by Janet Metcalfe, Columbia University

3:30-3:45 PM (237)
Learning From Errors: Testing Versus Instruction in Preparation for a Test That Counts. JANET METCALFE and MATTI VUORRE, *Columbia University* – Many studies have demonstrated beneficial effects on learning from having students take tests and then receive feedback. And, much recent research has shown that the generation of errors—a factor historically believed to impair learning-- actually has beneficial effects. But few studies have investigated testing effects in relation to anything but rote memory. And the testing condition, in virtually all past studies, has been compared to self-study by the students. In the experiment we report, we targeted the learning of mathematics. We contrasted a 'testing' condition in which testing was followed by teacher feedback directed at the errors, with a 'business as usual' condition consisting of direct instruction by highly skilled teachers. Both conditions focused on preparing participants for the New York State Common Core Algebra 1 Regents test, a high stakes test that all New York public school students must pass in order to graduate from high school.
Email: Janet Metcalfe, jm348@columbia.edu

3:50-4:05 PM (238)
A Framework of Updating After Retrieval. BRIDGID FINN, *Educational Testing Service* – A large body of literature from the cognitive and neurocognitive traditions has shown that retrieval can facilitate new learning. However, there is also evidence demonstrating that retrieval can impair new learning (Finn & Roediger, 2013). Accounts of episodic retrieval should accommodate findings showing that retrieval can both facilitate and impair learning of new information presented after the retrieval attempt. I will discuss a recently proposed framework of episodic updating (Finn, 2017), which attempts to provide an account of when retrieval will facilitate or hinder updating with new learning. The framework describes a post-retrieval processing phase of retrieval as involving interactive metamemory processes that monitor and control facets of the retrieval process with respect to the current goals for retrieval. Two experiments will be presented that test predictions of this framework by examining whether self-paced study of corrective feedback after retrieval influences retrieval-induced impairments of new learning.
Email: Bridgid Finn, bfinn@ets.org

4:10-4:25 PM (239)
Can Textbook Annotations Serve as an Early Predictor of Student Learning? ADAM WINCHELL, *University of Colorado*, ANDREW LAN, *Princeton University*, PHILLIP GRIMALDI, *Rice University*, HAROLD PASHLER, *University of California, San Diego*, RICHARD BARANIUK, *Rice University*, MICHAEL MOZER, *University of Colorado* (Presented by Michael Mozer) – When engaging with a textbook, students are inclined to highlight key content. We explore the hypothesis that a student's choice of text for highlighting may serve as a window into their mental state--their level of comprehension, grasp of the key ideas, reading goals, etc. In two experiments, subjects read sections from a college-level biology text, briefly reviewed the text, and then took a quiz. During initial reading, subjects were able to highlight text; these highlights were displayed along with the complete text during the subsequent review. Consistent with past research, the amount of highlighted material is unrelated to quiz performance. However, our goal is to examine highlighting as a data source for inferring student understanding. We explored multiple representations of the highlighting patterns and tested Bayesian linear regression and neural network models, but we found only a modest relationship between a student's highlights and quiz performance. Our long-term goal is to design digital textbooks that serve not only as conduits of information into the mind of the reader, but also allow us to draw inferences about the reader at a point where interventions may increase the effectiveness of the material.
Email: Michael C. Mozer, mozer@colorado.edu

4:30-4:45 PM (240)
Stage-Specific Desirable Difficulty: Evidence From Pupillometry. SCOTT WATTER and MELISSA J. PTOK, *McMaster University* – The desirable difficulty effect is described by situations where conflict during initial learning leads to better encoding of to-be-remembered information. We use a stage-specific approach to determine what task elements produce this later benefit. Across several experiments, we find that these effects strongly depend on additional cognitive control at a semantic categorization processing stage. The objective of this study was to provide further evidence of this stage-specific account. To address this, pupil dilation (which has been used as an index of cognitive work/attentional investment) was measured during a congruency-priming task where participants categorized male or female names while ignoring distractor word primes. This was followed by a memory test. We found a dissociation of general attentional effort – as seen by more pupil dilation for incongruent versus congruent trials across experiments. However, this only led to a memory benefit when semantic processing (rather than response processing) was the focus of conflict.
Email: Scott Watter, watter@mcmaster.ca

4:50-5:05 PM (241)
Examining the Relationship Between Executive Control and Student Learning Behaviors. JARED LINCK, TRACY TOMLINSON, MEGAN MASTERS, ALIA LANCASTER, MARTYN CLARK, and MICHAL BALASS, *University of Maryland* – A notable increase in the use of instructional technology has been observed across all sectors of higher

education. Such technology potentially increases the efficiency of instruction and positively impacts learning processes. However, it is unclear whether academic technology is being introduced in a cognitively-appropriate way, given that individual differences in cognitive processing abilities may impact how effectively learners interact with the technology. To address this issue, we examined the relationship between specific cognitive processes (e.g., working memory, inhibitory control), instructional technology usage, and learning outcomes in two university Psychology courses (n = 120). Students completed a battery of cognitive and perceptual measures and consented to share their course grades and data logs from the online course management system (Canvas). We report results of theory-based predictions concerning executive control, learning behaviors, and course outcomes. We consider the implications of applying information on individual differences in cognitive processes to usage of instructional technology in real-world contexts.

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5:10-5:25 PM (242)

The Incomplete Tyranny of Dynamic Stimuli: Cognitive Contributions to Eye Movements in Screen-Captured Instructional Videos. DANIEL T. LEVIN, ADRIANE E. SEIFFERT, KELLY E. CARTER, JOSHUA W. LITTLE, and ANNA M. MARSHALL, *Vanderbilt University* – Although extensive research has linked eye movements with representation and comprehension of text and still images, less work has explored these links for more dynamic stimuli such as videos. Some recent work has demonstrated that sensory properties of dynamic stimuli strongly drive eye movements, overwhelming more subtle cognitive influences. However, this hypothesis has been tested in only a limited range of circumstances. We therefore tested the degree to which eye movements could predict learning in a particularly prevalent form of new media: screen-captured instructional videos. We recorded eye movements in 80 participants as they viewed a set of screen-captured videos. Fixation duration and saccade amplitude failed to predict learning, but correlations between gaze position and cursor position predicted learning. More general comparisons successfully linked between-participant eye movement similarity with test-item-response similarity. We argue that eye movements can effectively reveal cognition and learning during naturalistic viewing of dynamic stimuli, but we agree that these links may be subtle compared with the large impact of perceptual salience.

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Speech Perception
Celestin A, Saturday Afternoon, 3:30-5:30 PM
Chaired by Viorica Marian, Northwestern University

3:30-3:45 PM (243)

Language Experience Changes Audio-Visual Integration: Evidence From the McGurk Effect in Bilinguals. VIORICA MARIAN and SAYURI HAYAKAWA, *Northwestern University*, TUAN Q. LAM, *Loyola University*, SCOTT R. SCHROEDER, *Hofstra University* – Can language experience change audiovisual perception? We answer this question by examining whether bilinguals and monolinguals differ in their likelihood of experiencing the McGurk effect. When people hear a speech sound ("ba") but see an incongruent lip movement ("ga"), they often perceive a different sound altogether ("da"). This illusion demonstrates that what we hear is profoundly influenced by what we see. In this study, participants identified sounds after being presented with congruent and incongruent audiovisual speech. When processing incongruent stimuli, bilinguals experienced significantly more McGurk effects than monolinguals, revealing that language experience alters cross-modal integration. Furthermore, this integration was not associated with proficiency, suggesting that the increased reliance on visual information is not driven by difficulty understanding auditory speech. Instead, we propose that learning and using multiple languages can alter how individuals process auditory and visual inputs and that our experiences can shape even basic sensory perception.

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3:50-4:05 PM (244)

Older and Younger Adult Differences in Error Type When Perceiving Foreign-Accented Speech. ERIN M. INGVALSON and KAITLIN L. LANSFORD, *Florida State University* – In our previous research we demonstrated that older adults were less accurate than younger adults at identifying words produced by talkers with a foreign accent (Ingvalson et al., 2017). The aim for the current effort was to further explore those data and determine if those differences in accuracy rates could be tied to differences in the types of errors older and younger adults made when perceiving foreign-accented speech. Older adults' total error rates were higher than younger adults, as would be expected by older adults' lower accuracy rates. When examining the correlations between accuracy rates and error rates, we found that whereas younger adults' accuracy performance was predicted only by their omission error rates, older adults accuracy performance was predicted by a combination of omission error rates and lexical boundary error rates.

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4:10-4:25 PM (245)

The Role of Timing in Perceptual Learning of Non-Native Speech Sounds. MELISSA M. BAESE-BERK, *University of Oregon*, ARTHUR G. SAMUEL, *Stony Brook University* – Previous work suggests that, in some circumstances, perception can disrupt perceptual learning of non-native speech sounds during training. In two experiments, we provide evidence that one source of this disruption is the timing with which participants alternate between a perception and a production task. When alternating between these two tasks immediately (i.e., repeating a token as soon as they have heard it), participants show a very large disruption. In Experiment 1, we introduce a brief delay (i.e., 500 to 3500 msec). When participants briefly delay their productions, the disruption is smaller. In Experiment 2, we introduce a larger delay (i.e., 2500 to 5500 msec). When we introduce this delay, participants show no disruption to perceptual learning, performing equally in perception to learners who have not produced tokens during

training. These results suggest that timing plays an important role in formation and disruption of perceptual learning of unfamiliar speech sounds.
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4:30-4:45 PM (246)

Better Than Native: Cantonese-English Bilinguals Outperform Native English Speakers on Judging English Lexical Stress. ARTHUR G. SAMUEL, *Basque Center on Cognition, Brain, and Language; Stony Brook University*, WILLIAM CHOI, *Experimental Psychology, University of Oxford*, XIULI TONG, *University of Hong Kong* – Native-like performance in a second language (L2) is the ultimate goal of L2 learning. No previous study has reported that L2 learners perform better than natives on L2 speech perception. The present study demonstrates that adult Cantonese-English bilinguals perform better than native English listeners on English lexical stress perception. Cantonese-English bilinguals and native English listeners were asked to discriminate English lexical stress patterns under various phonotactic/lexical and acoustic conditions. When the pitch cue to stress was present, Cantonese-English bilinguals demonstrated greater English stress sensitivity than native English listeners across all phonotactic/lexical conditions. The performance gap expanded when lexical information was included. The findings highlight the facilitative effect of Cantonese tone language experience on English stress perception, presumably due to Cantonese listeners' expertise in lexical pitch perception.
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4:50-5:05 PM (247)

Perceptual Learning for Speech and Individual Differences in Speech Perception Under Adverse Listening Conditions. KAREN BANAI and LIMOR LAVIE, *University of Haifa* – Speech recognition is amenable to perceptual learning, but the role of this learning in speech recognition under adverse conditions is poorly understood. Motivated by the hypothesis that rapid perceptual learning supports adaptation to adverse listening scenarios, we tested the prediction that individual differences in rapid perceptual learning and in speech recognition are related. The outcomes of 3 experiments suggest that in young normal-hearing listeners, rapid learning over the course of 10 time-compressed sentences accounted for upwards of 10% of the variance in speech-in-noise and natural-fast speech recognition. In older adults with age-normal hearing, rapid learning accounted for more than 20% of the variance in speech-in-noise recognition and 40% of the variance in natural-fast speech recognition. Finally, in older adults with age-related hearing loss, rapid learning was poorer than that of older adults with age-normal hearing, but this learning still accounted for nearly 40% of the variance in fast speech recognition. Together these findings are consistent with the idea that age-related declines in rapid learning could play a role in age-related declines in speech recognition.
Email: Karen Banai, kbanai@research.haifa.ac.il

5:10-5:25 PM (248)

Hearing Sex at the Cocktail Party: Biased Sex Ratios Influence Vocal Attractiveness. JOHN G. NEUHOFF, and TAYLOR N. SIKICH, *The College of Wooster* – Visual exposure to unbalanced sex ratios influences perceived facial attractiveness for opposite-sex faces. When opposite-sex faces are scarce they are rated as more attractive than when they are plentiful. The current work examines a vocal-auditory analog of this effect. Participants were assigned to either a high or low opposite-sex vocal exposure condition and reported summary statistics by estimating the percentage of male and female voices in an array of simultaneous talkers. Participants then rated the attractiveness of individual opposite-sex voices. Those in the low opposite-sex exposure condition rated subsequent individual voices as significantly more attractive than those who were in the high opposite-sex exposure condition. The findings demonstrate that a core visuo-perceptual aspect of mate selection preference also occurs in the auditory domain. The results are consistent with the idea that the attractiveness of opposite-sex partners is an honest signal of fitness and involves multimodal processes that are quickly modulated by the perceived availability of opposite-sex partners in a local environment.
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Conceptual Processes
Strand 13 AB, Saturday Afternoon, 3:50-5:30 PM
Chaired by Brad Wyble, Pennsylvania State University

3:50-4:05 PM (249)

Rapid Covert Visual Attention to Conceptual Targets. BRAD WYBLE, MICHAEL HESS, and CHLOE CALLAHAN-FLINTOFT, *Pennsylvania State University*, CHARLES FOLK, *Villanova University* – One can search for a hat without knowing its shape or color but it remains unclear whether finding such a target involves shifts of covert attention. Two experiments tested whether images containing conceptually defined targets such as dinner food or four-legged animal elicited behavioral and electrophysiological signifiers of visuospatial attention. The paradigm minimized learning and intrinsic salience confounds by presenting each target image only once per participant, and counterbalancing target sets across subjects. The pre-registered behavioral experiment showed that when two targets were presented in rapid sequence, subjects reported the second target more often when it was in the same spatial location as the first. The second pre-registered experiment demonstrated that the N2pc and P3 EEG components were only elicited by images that matched the conceptually specified target set. These results indicate rapid, selective deployment of spatial attention to images that match current search goals at a conceptual level.
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4:10-4:25 PM (250)

Integrating Knowledge Abstraction With Retrieval From Memory: A Learning Approach. JANINA A. HOFFMANN, *University of Konstanz*, REBECCA ALBRECHT, *University of Basel*, BETTINA VON HELVERSEN, *University of Zurich* – When making a judgment, it has been argued that people shift between a knowledge abstraction process and a similarity-

based retrieval of past instances. How people develop these strategy preferences has attracted less attention. We instantiated global and item-specific strategy preferences within a learning model and tested the distinct predictions for accuracy and familiarity judgments in a task requiring knowledge abstraction and exemplar retrieval. In line with the idea that people may develop a global strategy preference, participants learned to accurately judge objects consistent with abstracted knowledge, but objects similar to past exemplars were more difficult to judge. Importantly, new instances requiring retrieval were not more familiar to participants than new instances requiring feature-based knowledge, ruling out trial-by-trial strategy shifts. In sum, these results suggest that a learning model integrating knowledge abstraction and exemplar retrieval may provide a suitable tool for understanding learning processes in human judgment.
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4:30-4:45 PM (251)

Using the IAT to Measure the Dark Side of Conceptual Metaphor Theory. FRANK H. DURGIN and TINA O. ZHU, *Swarthmore College* – The Implicit Association Test (IAT) is treated as a measure of individual bias, but may be a measure of cultural association. We sought to use the IAT to measure conceptual metaphor strength along dimensions identified by Lakoff and Johnson (1980), such as the mapping of happy-sad and more-less to vertical orientation (up-down). We contrasted this family of orientation metaphors with a family of surface lightness metaphors which map onto terms used for race (i.e., white and black) and for morality (good-evil; clean-dirty). We contrasted the predictions of conceptual metaphor theory with statistical vector models of linguistic similarity (LSA and word2vec). Our principal result is that conceptual metaphor theory was supported inasmuch as statistical models of semantic content were insufficient to predict the strong associations measured by the IAT within each metaphoric cluster (vertical orientation and surface lightness). Within-cluster association was much stronger than between-cluster association. The dark side of conceptual metaphor is that racial bias may be culturally amplified by conceptual metaphors linking surface lightness to moral value - metaphors that may arise from the association of darkness and danger.
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4:50-5:05 PM (252)

Young Children's Collaboration in an Active Category Learning Task. ANDREW G. YOUNG, *Occidental College*, LU OU and VANESSA R. SIMMERING, *ACTNext by ACT, Inc.* (Presented by Vanessa R. Simmering) – Collaborative learning, valued as a 21st-century skill, enables individuals to learn from each other and solve complicated problems together. However, it can impose challenges on children who are still developing skills for coordinating shared representations with others, leading to inefficient or ineffective collaborative learning. The current study is a secondary analysis of data from Young's (2016) study comparing younger (5-6 years) and older (7-8 years) children's category learning across three between-subjects conditions (individual, unconstrained-collaborative, constrained-collaborative). Children played a novel board game in which they sampled exemplars from a continuous two-dimensional category space in order to learn the categorical preferences of a puppet (e.g., liking big, not small toys). Analyses of children's category boundary learning showed that collaboration was beneficial only for older children. We are currently modeling additional data on children's sampling and verbal communication over time to differentiate dyads that achieved effective collaboration from those who did not.
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5:10-5:25 PM (253)

Piagetian Liquid Overconservation in Grey Parrots (*Psittacus erithacus*). IRENE M. PEPPERBERG and FRANCESCA M. CORNERO, *Harvard University* – An understanding of Piagetian liquid overconservation was investigated in four Grey parrots (Psittacus erithacus), ages ranging from four to 23 yrs old. They were tested on the ability to choose between greater or lesser quantities of a desirable liquid in identical containers, and to track unequal quantities of liquid that had undergone various kinds of transformations: controls in which different amounts in same-sized containers were transferred into transparent or opaque same-sized containers to ensure birds were tracking transformations (Experiment 1); different amounts in transparent or opaque containers that were transferred into containers that were altered such that amounts then looked equal (Experiment 2). All birds succeeded in both Experiments. The birds' responses demonstrated that they were choosing based on inferential and not perceptual evaluations of the quantities. Additional experiments are in progress to further delineate their capacities.
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Statistics: Reproducibility
Celestin D, Saturday Afternoon, 3:50-5:30 PM
Chaired by Catherine Fritz, University of Northampton

3:50-4:05 PM (254)

Precision: A More Accurate and Generalizable Metric Than Power or Statistical Significance. CATHERINE O. FRITZ, *University of Northampton*, PETER E. MORRIS, *Lancaster University* – Estimated parameters are often imprecise, even with high power. Precise estimates provide more trustworthy information about the population effect and are more likely to replicate with similar sized effects. When planning research, an anticipated effect size (ES) is estimated, but is often a guess. Incorrect guesses have substantial impacts on the power-sample-size relationship, but far less impact on sample size required for a level of precision. We contrast the relationship among precision, ES, and sample size with that among power ES, and sample size, demonstrating the greater stability of sample size requirements based on precision. We report observed precision for an effect from the first study in every empirical Psychonomic Society journal article published in 2017. (See also Morris & Fritz, poster.) The estimated ES Confidence Interval exceeded the observed effect size in roughly 50% of the cases. We argue for planning based on precision and suggest useful calculators.
Email: Catherine Fritz, c.fritz99@gmail.com

4:10-4:25 PM (255)

Numeracy Components and Decision Making: Development and Validation of Numeracy Component Test (BNT-C). SAIMA GHAZAL, JINAN N. ALLAN, and EDWARD T. COKELY, *University of Oklahoma*, ROCIO GARCIA-RETAMERO, *University of Granada* – Numeracy—i.e., one's practical understanding of mathematics in context—is one of the strongest predictors of general decision making skill. Despite notable scientific progress in numeracy and decision making, cognitive sciences have yet to investigate individual differences in component numeracy skills (e.g., algebra versus probability). Building off of an established theoretical framework and using Item Response Theory models, we develop the Berlin Numeracy Components Test (BNT-C). The BNT-C efficiently measures full-scale numeracy and component numeracy skills (i.e., operations, probability, geometry, and algebra) with superior psychometric properties (e.g., difficulty, discriminability, and sensitivity). The test is validated using data (n=300) from one of the most integrative studies of cognitive abilities (RiskLiteracy.org). Predictive modeling demonstrates that the BNT-C (especially operations and probability) explains risk literacy and decision making skill better than most other individual ability assessments (e.g., intelligence, other numeracy tests). Discussion focuses on theoretical and practical implications of the relations between component numeracy and superior decision making.
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4:30-4:45 PM (256)

Disappearing Dissociations in Experimental Psychology: Using State-Trace Analysis to Test for Multiple Processes. RACHEL STEPHENS and BRETT HAYES, *University of New South Wales*, DORA MATZKE, *University of Amsterdam* (Presented by Dora Matzke) – Claims about the existence of multiple distinct psychological processes or systems are often based on dissociations: the demonstration that manipulations such as working memory load, mood or instructions, have differential effects on task performance often identified by a significant interaction term. However, such an inference depends on the strong – and probably often false – assumption that underlying psychological variables map linearly onto the observable dependent variables. State-trace analysis offers an alternative approach to test for dissociations that avoids the linearity assumption. We apply state-trace analysis to databases of studies from category learning and from reasoning that have been cited as evidence for qualitatively distinct processes. We show that many of the dissociations thought to reflect the operation of distinct processes disappear against the stricter criteria of state-trace analysis. We argue that it is important for experiments to be designed with state-trace analysis in mind, and for statistical tools to be developed so that the approach can be readily applied. This will lead to a more rigorous foundation for theoretical claims about distinct underlying psychological mechanisms.
Email: Dora Matzke, d.matzke@uva.nl

4:50-5:05 PM (257)

A Bayesian Method to Assess Reproducibility That Includes Likely Experimenter Biases. RICHARD SHIFFRIN and SUYOG CHANDRAMOULI, *Indiana University* – The 'reproducibility crisis' concerns reliability of reported data patterns. We recently published an extension of Bayesian inference that assigns posterior probabilities to distributions of potentially true data outcomes. We use this system to assign posterior probabilities to the size of a data statistic such as a mean, an interaction, or a contrast. The inference is based on three factors: 1) the likelihood of the observed data statistic. 2) our prior knowledge (such as the results of earlier studies and theories). 3) our estimate of a variety of biases (experimenter-induced or otherwise) that often distort the truth and affect the validity of the reported data. Taking into account biases such as selective deletion of data, programming errors, and selective publication are critical for valid scientific inference. We illustrate by applying the method to results from an ESP experiment, showing how conclusions change in accord with the beliefs and viewpoints of ESP proponents and skeptics.
Email: Richard Shiffrin, shiffrin@indiana.edu

5:10-5:25 PM (258)

Computing Bayes Factors for Cognitive Models: A Caveat on the Savage-Dickey Density Ratio. DANIEL W. HECK, *University of Mannheim* – The Savage-Dickey density ratio is a simple method for computing the Bayes factor for an equality constraint on one or more parameters of a statistical model. In regression analysis or cognitive modeling, this includes the important scenario of testing whether one or more covariates have an effect on the dependent variable or parameter of interest. However, the Savage-Dickey ratio only provides the correct Bayes factor if the prior distribution under the nested model is identical to the conditional prior under the full model. This assumption does not hold for multiple regression models with a Jeffreys-Zellner-Siow (JZS) prior, which has been proposed as a default prior in psychology. Besides standard regression models, this limitation of the Savage-Dickey ratio is especially relevant when analytical solutions for the Bayes factor are not available. This is the case for generalized linear models, nonlinear models, or cognitive process models with regression extensions. As a remedy, the correct Bayes factor can be computed using a generalization of the Savage-Dickey ratio.
Email: Daniel W. Heck, heck@uni-mannheim.de

Perception, Memory, and Skilled Performance
Celestin F, Saturday Afternoon, 3:50-5:30 PM
Chaired by Brooke Macnamara, Case Western Reserve University

3:50-4:05 PM (259)

The Moderating Role of Task Characteristics on Skill Acquisition and Performance. BROOKE N. MACNAMARA, *Case Western Reserve University*, DAVID J. FRANK, *Texas A&M University, Commerce* – For over a century, researchers have investigated individual differences in performance. These investigations typically focused on either differences in practice or differences in cognitive resources. However, the predictive

power of practice or cognitive resources varies considerably across different types of tasks. Hoffman et al. (2014) proposed task characteristics that hinder learning—e.g., dynamic features (v. static), simultaneous demands (v. sequential), stimuli on continua (v. discrete categories). We are the first to empirically test this theory. Across five experiments, each manipulating a unique task characteristic, participants played five rounds of a game similar to the popular video game Plants vs. Zombies, where both cognitive load and a task characteristic were manipulated. Learning and/or efficiency were generally hindered in the theoretically more difficult conditions, especially when under cognitive load. Our results suggest that task characteristics moderate the relative importance of cognitive resources and practice on predicting learning and performance. Implications for the areas of skill acquisition and expertise will be discussed.
Email: Brooke N. Macnamara, brooke.macnamara@case.edu

4:10-4:25 PM (260)

Breaking the Law of Practice: Evidence From Tasks That Exhibit Process Shifts. TIMOTHY C. RICKARD, EDWARD VUL*, and JARRETT T. JOVELETT, *University of California, San Diego* – Tasks that exhibit a transition from a slow to a faster process (e.g., arithmetic) have been a focus of recent work on cognitive skill learning. Such tasks allow for fine-grained, quantitative model development at the trial level (i.e., with no data averaging), can provide insight into skill learning in more complex tasks, and encompass simpler component tasks as special cases. We report hierarchical Bayesian fits of two models – the process shift model and the delayed exponential model – that are applicable to this class of tasks and that are also among the most promising candidates for a generalizable quantitative "law of practice." The results support the process shift model and are consistent with prior experimental work confirming a core psychological claim of that model: that process (or strategy) execution is not parallel, but rather involves a choice at the outset of each trial.
Email: Timothy C. Rickard, trickard@ucsd.edu

4:30-4:45 PM (261)

Awe-inspiring: Time Perception Slows in Vast Spaces. DEVIN M. GILL, JEANINE K. STEFANUCCI, ZACHARY OLPIN, and WILLIAM B. THOMPSON, *University of Utah* (Presented by Jeanine K. Stefanucci) – Feelings of available time can expand as a result of experiencing awe. Vast spaces, which extend seemingly without limit, may evoke awe. Because metric depth cues lose utility in vast spaces, we propose investigating the perception of vastness through time perception. We hypothesized that vast landscapes might be perceived as being viewed for longer durations than less vast landscapes, especially if they also evoked awe. In three experiments, we examined the relationship between vastness, awe, and perceived time. Participants viewed images of landscapes of varying degrees of vastness and rated them for awe after recreating their perceived duration. Greater vastness led to higher awe scores and expansion of perceived duration. In two follow-up experiments, we also show that the cognitive appraisal of the scene may play a role in expansion of perceived duration.
Email: Devin Gill, devin.gill@psych.utah.edu

4:50-5:05 PM (262)

It's Time to Look Into the Future: Anticipatory Saccades Show That Proactive Monitoring of Future Effects Is Temporally Coupled With the Time of the Effect and the Time of the Action. CHRISTINA U. PFEUFFER and ANDREA KIESEL, *University of Freiburg* – Our eyes often saccade towards locations we expect the consequences of our actions to appear at. Such spontaneous anticipatory saccades are guided by bi-directional associations between action and effect and presumably reflect a proactive monitoring process that prepares a later comparison of expected and actual effect. Here, we systematically varied the temporal delay between manual actions and their subsequent visual effects on the right/left side. Importantly, both the effect´s location and temporal delay could be predicted based on prior experience. We found that the latency of anticipatory saccades was shorter for short as compared to long action-effect delays. These findings indicate that not only the location of the effect, but also its temporal delay were anticipated and proactively monitored. Additionally, correlations between manual reaction times and saccade latencies suggested that the time of manual, effect-generating actions additionally affected anticipatory saccades. This was confirmed in a second experiment manipulating manual reaction times. We conclude that manual action selection and proactive effect monitoring are dissociable, yet interacting functions of human goal-directed action control.
Email: Christina U. Pfeuffer, christina.pfeuffer@psychologie.uni-freiburg.de

5:10-5:25 PM (263)

A Dynamical Systems and Bayesian Model of Interpersonal Coordination of Perception and Memory. ALEXANDRA PAXTON, *University of Connecticut*, TOM GRIFFITHS, *Princeton University* – Dynamical systems (DST) modeling and Bayesian modeling are increasingly influential in psychology and cognitive science, but these two types of models have remained largely distinct until now. However, we believe that blending DST and Bayesian perspectives could provide powerful new opportunities to formalizing time-, context-, and constraint-dependent human cognitive and behavioral processes. To that end, we provide such a model describing interpersonal coordination (that is, the well-established phenomenon in which individuals influence one another's behavior and cognition as a result of their interaction) in a simple, one-dimensional game played between two-people. Following up on our previous experimental results (Paxton, Morgan, Suchow, & Griffiths, 2018), we here present a model that combines foundational DST concepts—like temporal dynamics and contextual constraints—and Bayesian formalizations to capture the interpersonal coordination dynamics of perception and memory.
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Business Meeting

Bolden 6, Second Floor, Saturday Evening, 5:10-6:00 PM

John Dunlosky, Kent State University, Chair, Governing Board

Presentation of the Psychonomic Society 2018 Clifford T. Morgan Best Article Awards, Graduate Travel Awards, and J. Frank Yates Student Travel Awards

Test Effects on Memory
Strand 11 B, Sunday Morning, 8:00-10:00 AM
Chaired by Andrew Butler, Washington University in St. Louis

8:00-8:15 AM (265)

Using Retrieval Practice to Improve the Durability of Conceptual Change. ANDREW C. BUTLER, *Washington University in St. Louis* – Two classroom experiments investigated the longevity of the conceptual change produced by the refutation method and the use of retrieval practice as a post-refutation activity to increase its durability. Students rated their belief in various myths on a pre-course survey and then watched videos throughout the semester, each of which targeted a single myth using the refutation method. The manipulation consisted of the post-refutation learning activity: spaced retrieval practice or no further exposure (i.e. refutation only). Either one or six months later, students re-rated their belief in the myths and answered questions about the correct information that refutes the myths. Relative to receiving the refutation only, retrieval practice led to a greater decrease in belief ratings in myths for which students initially held misconceptions. Belief change was greater after one month than six months. Retrieval practice also produced greater performance on the post-course questions relative to receiving the refutation only.
Email: Andrew Butler, andrew.butler@wustl.edu

8:20-8:35 AM (266)

Retrieval Practice Improves Item Memory but Not Source Memory in the Context of Stress. AMY SMITH, F. CAROLINE DAVIS, and AYANNA THOMAS, *Tufts University* – In a recent study, participants learned information using retrieval practice or study practice, and returned a day later for stress induction and a subsequent recall test. Those who learned using study practice showed stress-related memory impairment, but those who engaged in retrieval practice did not. In the present experiment, we tested one potential mechanism underlying the utility of retrieval practice in the context of stress. We hypothesized that, relative to study practice, retrieval practice would improve post-stress memory by increasing access to both item and source information. Participants learned two temporally segregated word lists, and returned a week later for stress induction followed by a recognition test with accompanying list-discrimination judgments. Relative to study practice, successful retrieval practice during learning improved item memory but not source memory on the post-stress test. These results have implications for both current theories of stress effects and current theories of retrieval practice effects.
Email: Amy Smith, amy.smith@tufts.edu

8:40-8:55 AM (267)

Testing the PCR Model of Recall: Retrieval Practice Produces Faster Recall Success but Also Faster Recall Failure. WILLIAM J. HOPPER and DAVID E. HUBER, *University of Massachusetts, Amherst* (Presented by David E. Huber) – The Primary and Convergent Retrieval (PCR) model assumes that successful recall not only boosts associations between the item and retrieval cues, but additionally strengthens associations within the item (i.e., between the features of an item), speeding the rate of information retrieval from memory. The latter effect is termed convergent retrieval learning and is a unique benefit of retrieval practice (i.e., the 'testing effect'). Prior work confirmed the prediction that retrieval practice produces faster recall than restudy practice even if accuracy is higher following restudy. The current study replicated this result, but also examined the down-side of retrieval practice: that after a failure to recall during practice, participants should be faster to give up on a subsequent recall test. This prediction was confirmed in a multi-session cued recall experiment that collected accuracy and recall latency measurements following no practice, retrieval practice, or restudy, with an immediate or delayed final test. The LBA model was fit to latency distributions and model comparison determined that these effects reflect differences in drift rates, as predicted by the PCR model.
Email: David Huber, dehuber@psych.umass.edu

9:00-9:15 AM (268)

The Role of Retrieval in Answering Multiple-Choice and Matching Questions. JERI L. LITTLE, *California State University, East Bay* – Retrieval-based tests (e.g., cued-recall) promote learning, but multiple-choice tests are presumed to rely more upon recognition processes which are less beneficial for learning. However, learners sometimes use retrieval when answering multiple-choice questions, and using this strategy is associated with positive learning outcomes. Evidence suggests that matching questions (i.e., four prompts with five alternatives to choose from) can produce even better learning advantages than those induced by basic multiple-choice questions, but it is unclear whether different processes underlie the advantages for these two types of questions. In the present research, participants answered multiple-choice and matching questions and self-reported their thought processes. Retrieval of information pertaining to incorrect alternatives occurred with both types of questions. For the matching questions, however, participants were also less likely to rely solely on familiarity strategies, more often making use of elimination strategies. Both types of tests improved later recall of tested and related information. The present results have implications for effective testing—especially when learning potentially confusable factual information.
Email: Jeri Little, jerilittle@gmail.com

9:20-9:35 AM (269)

Why Can't I Remember the Capital of Canada? Fluctuations in the Accessibility of General Knowledge. LISA K. FAZIO, *Vanderbilt University*, CLAUDIA C. VON BASTIAN, *University of Sheffield* – When asked the same general knowledge question on multiple occasions, people often give conflicting responses. For example, on trivia night, I may be able to remember that the capital of Canada is Ottawa, but the following week I incorrectly respond that it is Toronto. Across two studies, we examined these natural fluctuations in knowledge accessibility. On average, participants gave differing answers to 10% of repeated questions. We find that correct answers are more stable than incorrect or don't know responses, switches are more common for more difficult questions, and repeated retrieval increases stability. In contrast, the length of time between repetitions (1 vs. 2 vs. 4 weeks) did not affect the likelihood of participants

changing their answer. While we often think that people "know" or "don't know" a specific fact, in reality, the accessibility of our general knowledge is constantly in flux.
Email: Lisa K. Fazio, lisa.fazio@vanderbilt.edu

9:40-9:55 AM (270)

Generalized vs. Pair-Specific Test-Potentiated-Learning Effects for Swahili-English Translations. JAMES H. NEELY, STEPHANIE CROCCO, DEANA VITRANO, and CAROL BOLTE, *University at Albany* – In Cho, Neely, Crocco, and Vitrano (2017, QJEP), participants learned two lists of Swahili-English translations; the second list contained all the "old" pairs from List 1 and new pairs. After List 1, the "old" pairs were tested or restudied. In a final test given after List 2, the robust test-potentiated-learning (TPL) effect for untested new pairs (a generalized TPL) was equivalent to the pair-specific TPL effect for tested "old" pairs when testing vs. restudy was manipulated between subjects; a small pair-specific TPL effect occurred when testing vs. restudy was manipulated within subjects. Here, we manipulated testing vs. restudy both between- and within-subjects. After List 1, all "old" pairs were restudied in one group and only half of them were tested in another group. Generalized TPL effects of equal magnitudes occurred for untested "old" and new pairs, but the pair-specific TPL effect for tested "old" pairs was null between-subjects and negative within-subjects. Thus, the extant data show that generalized TPL effects are robust and considerably greater than pair-specific TPL effects.
Email: James H. Neely, jneely@albany.edu

Bilingualism II

Strand 11 A, Sunday Morning, 8:00-10:00 AM

Chaired by Debra Titone, McGill University

8:00-8:15 AM (271)

Do Bilinguals Exhibit Cross-Language Syntactic Activation During Bilingual Reading? Eye Movement Evidence for Adjective-Noun and Pronoun Constructions. DEBRA TITONE, NAOMI VINGRON, PAULINE PALMA, and JASON GULLIFER, *McGill University*, VERONICA WHITFORD, *University of Texas, El Paso*, DEANNA FRIESEN and DEBRA JARED, *Western University* – We investigated whether bilinguals activate non-target language syntax while reading as a function of construction overlap across languages and individual differences in bilingual language experience. English usually places adjectives before nouns ("a red truck"), whereas French usually places adjectives after nouns ("un camion rouge"). In contrast, English always places direct-object pronouns after the verb ("she fixes it"), whereas French cliticizes pronouns, placing them before ("elle le répare"). To compare cross-language activation for these constructions, 84 French-English bilinguals read English sentences that were intact or that had violations consistent or inconsistent with French (respectively, "the truck red" vs. "red the truck"; "she it fixes" vs. "fixes she it") while their eye movements were monitored. Consistent with the Unified Competition Model (McWhinney, 2005), participants showed cross-language activation for adjective-noun constructions (i.e., shorter fixation durations for French-consistent vs. French-inconsistent violations), but generally no cross-language activation for pronoun constructions. Individual differences in daily language mixing modulated comprehension for both construction types.
Email: Debra Titone, debra.titone@mcgill.ca

8:20-8:35 AM (272)

Reading in Noise: Simultaneous Auditory Language Immersion Supports L2 Reading Comprehension. MEGAN ZIRNSTEIN and KAREN JARANILLA, *University of California, Riverside*, MELINDA FRICKE, *University of Pittsburgh*, ZHAOQI ZHANG and TAOMEI GUO, *Beijing Normal University*, JUDITH F. KROLL, *University of California, Riverside* – Second language (L2) environments, whether naturalistic or experimentally induced, can provide support for the L2 (Elston-Güttler et al., 2005; Linck et al., 2009), but may also help bilinguals regulate the more dominant first language (L1) by signaling that the L1 is not required. Under this hypothesis, immersion in any language other than the L1 should support L2 performance. In the current study, we assessed the impact of auditory immersion (e.g., listening to eight-talker babble in the L2 and a never-studied language) on online L2 comprehension. Thirty-five Chinese-English bilinguals read sentences in English while their eye movements were recorded. Online L2 comprehension was influenced by multiple factors, including L2 proficiency, semantic constraint of the sentence, and the auditory immersion context. Across levels of L2 proficiency, immersion in an unknown language most highly supported L2 comprehension, suggesting that previous findings may be attributed to contextual support for language regulation or suppression mechanisms.
Email: Megan Zirnstein, megan.zirnstein@ucr.edu

8:40-8:55 AM (273)

How Finnish Morphology Confuses the L2-Speaker. RAYMOND BERTRAM, *University of Turku*, ROSA SALMELA and MINNA LEHTONEN, *Abo Akademi University*, SEPPO VAINIO, *University of Turku* – Finnish has complex morphology as witnessed by a large number of affixes and abundance of stem alterations (ilta 'evening' => illa+lla 'in the evening'). These changes obscure the stem and may complicate the decomposition process - segmenting complex word into constituent morphemes before lexical access. In the current study we compared processing performance of L1-speakers and L2-speakers in three conditions: monomorphemic nouns (lääkäri 'doctor'), inflections (aamu+lla 'in the morning') and inflections with stem alteration (illa+lla: the morphophonological condition). The lexical decision results of Experiment 1 showed that all groups displayed longer RTs for the morphophonological condition, but only L2-speakers showed increased error rates. The eye movement results of Experiment 2 showed that L1'ers are not affected by morphophonological variation in context, but L2'ers reading speed is slowed down. The results underline the notion that idiosyncratic characteristics of a language challenge the L2 learner and require extra attention in educational settings.
Email: Raymond Bertram, rayber@utu.fi

9:00-9:15 AM (274)

Spanish-English Bilinguals Perceive Less-Familiar English Metaphors as Being More Familiar Than Do English-Spanish Bilinguals and English-Speaking Non-Bilinguals. GARY E. RANEY, *University of Illinois at Chicago*, SPENCER J. CAMPBELL, *Augustana College*, CESAR RIANO RINCON, KRISTA A. MILLER, and ANDRIANA L. CHRISTOFALOS, *University of Illinois at Chicago* – Campbell and Raney (2016) found that non-native English speaking bilinguals rated less-familiar English metaphors (e.g., A fisherman is a spider) as being more familiar than did native English speakers. They did not, however, control the language background of the non-native English bilinguals. We extended their study by specifically comparing native English speaking non-bilinguals, native English speakers who are Spanish bilinguals, and native Spanish speakers who are English bilinguals. Participants rated the familiarity of 60 English metaphors, how related were the two content words, and how many interpretations they could think of. For low- and mid-familiarity metaphors, familiarity ratings were larger for Spanish-English bilinguals than for English-Spanish bilinguals, which were larger than for English non-bilinguals. There were no differences for high-familiarity metaphors. The same pattern occurred for word relatedness ratings. There were no differences between groups in number of interpretations. We suggest that as diversity of linguistic experience increases, the ability to perceive relationships between words increases, which leads to greater perceived familiarity for less-familiar metaphors.
Email: Gary E. Raney, geraney@uic.edu

9:20-9:35 AM (275)

Durability of the Impact of Visual and Auditory Comprehension Exposures on Bilingual Word Production. WENDY S. FRANCIS and ERIKA L. GUEDEA, *University of Texas at El Paso* – Two bilingual experiments tested whether the benefits of comprehension exposures to words on later spoken production are a short-term or long-term phenomenon. In Experiment 1, (N = 56), all words were presented in the visual modality, and in Experiment 2 (N = 56), all words were presented in the auditory modality. In the encoding phase, in order to practice comprehension processes, participants read (listened to) words and translated words that were presented in the language that would be used to name pictures at test. In order to practice production processes, they translated other words to the language that would be used to name pictures at test. We measured repetition priming by comparing picture-naming RTs for new and repeated items. The effects of retention interval, processes practiced, language proficiency, word frequency and comprehension modality were assessed. Supported by NSF Grant BCS-1632283.
Email: Wendy S. Francis, wfrancis@utep.edu

9:40-9:55 AM (276)

Enigmatic Inhibition of Cognitive Competitors in Attention, Action, and Language. IRING KOCH and ANDREA M. PHILIPP, *Institute of Psychology RWTH Aachen University* – A widely held belief in cognitive psychology is that cognitive conflict in selective attention tasks is resolved by inhibiting the competing representation(s). Evidence for such inhibitory control comes from studies using language and task switching. For example, larger switch costs when switching into the "dominant" language (L1) is often explained by assuming that the L1 requires more inhibition to enable performing in the non-dominant L2, and that this inhibition persists over time. However, switch-cost asymmetries are open to alternative explanations in terms of persisting activation of the "weaker" task, whereas N-2 repetition costs (i.e., worse performance in ABA relative to CBA sequences) demonstrate persisting inhibition in language switching unambiguously. However, the nature of this inhibition remains enigmatic. The trigger of inhibition is selection conflict (i.e., it is reactive), but it is less clear whether inhibition dissipates passively, whether it can occur proactively, and whether it is intraindividually stable over time.
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Cognitive Control

Strand 12 B, Sunday Morning, 8:00-9:45 AM

Chaired by Richard Carlson, The Pennsylvania State University

8:00-8:15 AM (277)

What Am I Doing? It Depends: Relating Agency and an Identification. CORY A. POTTS and RICHARD A. CARLSON, *The Pennsylvania State University* (Presented by Richard A. Carlson) – Actions can be identified at a range of levels. Imagine that you are typing a manuscript and someone asks what you are doing. You might respond with a high-level, outcome-related description—you are 'expressing thoughts.' Now imagine that the keyboard is difficult to use. You might instead respond with a lower-level, movement-related description—you are 'pressing keys.' But at which level would you feel a stronger sense of control (agency) over the task? Here we addressed the relation between agency and the level of action identification using a hierarchical task modeled from typing. Participants memorized letter sequences, and reported them by moving a cursor to targets that contained letters. To manipulate lower level (aiming) difficulty, the targets were either large or small. To manipulate higher level (memory) difficulty, the letter sequences were either constant or random within a block. We found effects of higher and lower-level difficulty on agency and action identification. Moreover, we found interactive effects of higher and lower-level difficulty on performance. We discuss these findings in terms of contributions to the study of agency, and some differences from the results of previous studies of action identification.
Email: Richard A. Carlson, racarlson@psu.edu

8:20-8:35 AM (278)

Paradox Resolved: Stop Signal Race Model With Negative Dependence. HANS COLONIUS, *University of Oldenburg* – The stop-signal paradigm is a popular tool to study response inhibition. Participants perform a response time task and, occasionally, the go stimulus is followed by a stop signal after a variable delay, indicating subjects to withhold their response. The main interest of modeling is in estimating the unobservable stop-signal processing time, that is, the covert latency of the stopping process. In the independent race model the stop-signal

task is represented as a race between independent go and stop processes. The model allows to estimate the mean time to cancel a response. Neural studies on countermanding eye movements, however, have shown that the neural correlates of go and stop processes consist of networks of mutually interacting gaze-shifting and -holding neurons. This is a major challenge for linking propositions between behavioral and neural findings. We propose a dependent race model that postulates negative stochastic dependence between go and stop activation. The model is consistent with the concept of interacting processes while retaining the simplicity and elegance of the distribution-free independent race model. For mean data, the dependent model's predictions remain identical to those of the independent model.
Email: Hans Colonius, hans.colonius@uni-oldenburg.de

8:40-8:55 AM (279)

Conditioning Cognitive Control. SENNE BRAEM, *Ghent University* – According to recent learning perspectives on cognitive control, we should be able to selectively reinforce specific control functions, if such general control representations exist. Here, a series of experiments focused on the act of task switching (i.e., cognitive flexibility), and investigated the effects of disproportionally rewarding task alternations or repetitions in a cued task switching paradigm on subsequent voluntary task switching behavior (i.e., when participants could choose which task to perform). The results show that subjects that were more rewarded for task alternations showed more task switching behavior, despite their inability to report on the reward contingencies. Follow-up experiments show that these effects were independent of response alternations, and generalized across different task sets. Together, these results suggest that reward can reinforce more abstract cognitive control representations, beyond low-level stimulus or response representations.
Email: Senne Braem, senne.braem@ugent.be

9:00-9:15 AM (280)

The Nature of Rule-Based Action Selection. ATSUSHI KIKUMOTO and ULRICH MAYR, *University of Oregon* (Presented by Ulrich Mayr) – How do abstract rules constrain our thoughts and actions? One possibility is a strictly hierarchical flow of control from higher-level to lower-level representations (Kleinsorge & Heuer, 1999). Alternatively, rules and lower-level settings might mutually constrain each other within integrated representations. We decoded task-relevant dimensions (cues, rules, stimuli, responses) from the spectral-temporal profile of the EEG signal while subjects performed simple actions that were governed by changing, abstract S-R rules (Mayr & Bryck, 2005). Trial-by-trial, time-resolved information about the quality of each representation allowed us to determine via representational similarity analyses, when different codes are active and to what degree they predict behavioral performance (RTs). We found strong evidence in favor of conjunctive representations that combined rules and stimulus-response codes. Further, these highly integrated representations emerged as the strongest predictors of trial-to-trial variability in RTs and of rule-specific, S-R repetition-priming effects. We conclude that control representations on different hierarchical levels do not function independently, but rather constrain each other during action selection.
Email: Ulrich Mayr, mayr@uoregon.edu

9:20-9:35 AM (281)

On the Neural and Mechanistic Bases of Self-Control. BRANDON TURNER, *The Ohio State University*, CHRISTIAN RODRIGUEZ, *Stanford University*, QINGFANG LIU and FIONA MOLLOY, *The Ohio State University*, SAMUEL MCCLURE, *Arizona State University* – Intertemporal choice requires a dynamic interaction between valuation and deliberation processes. While evidence identifying candidate brain areas for each of these processes is well established, the precise mechanistic role carried out by each brain region is still debated. In this paper, we present a computational model that clarifies the unique contribution of frontoparietal cortex regions to intertemporal decision making. The model we develop samples reward and delay information stochastically on a moment-by-moment basis. As preference for the choice alternatives evolves, dynamic inhibitory processes are executed by way of asymmetric lateral inhibition. We find that it is these lateral inhibition processes that best explain the contribution of frontoparietal regions to intertemporal decision making exhibited in our data.
Email: Brandon Turner, turner.826@gmail.com

Decision Making IV

Strand 10 B, Sunday Morning, 8:00-9:40 AM

Chaired by Andrew Cohen, University of Massachusetts, Amherst

8:00-8:15 AM (282)

Context Effects and the Comparison Process. ANDREA M. CATALDO and ANDREW L. COHEN, *University of Massachusetts, Amherst* (Presented by Andrew L. Cohen) – Context effects are changes in preference that occur when alternatives are added to a choice set. Models that account for context effects typically assume a within-dimension comparison process, however, the presentation format of a choice set can influence comparison strategies. The present study jointly tests the influence of presentation format on the attraction, compromise, and similarity effects in a within-subjects design. Participants completed a series of choice sets designed to elicit each of the three context effects, with either a by-alternative or by-dimension format. Whereas the by-alternative format elicited a standard similarity effect, but null attraction and reverse compromise effects, the by-dimension format elicited standard attraction and compromise effects, but a reverse similarity effect. These novel results are supported by a re-analysis of the eye-tracking data collected by Noguchi & Stewart (2014) and demonstrate that flexibility in the comparison process should be incorporated into theories of preferential choice.
Email: Andrea M. Cataldo, amcataldo@psych.umass.edu

8:20-8:35 AM (283)

Fast and Slow Thinking: Electrophysiological Evidence for Early Conflict Sensitivity. WIM DE NEYS, *CNRS & Paris Descartes University*, DARREN FREY, *Science Po Paris*, GRÉGOIRE BORST, OLIVIER HOUDÉ, JULIE VIDAL, and BENCE BAGO, *Paris Descartes University* – Popular dual process models have characterized reasoning as an interplay between fast, intuitive (System 1) and slow, deliberate (System 2) processes, but the precise nature of the interaction between the two systems is much debated. Here we relied on the temporal resolution of electroencephalogram (EEG) recordings to decide between different models. We adopted base-rate problems in which an intuitively cued stereotypical response was either congruent or incongruent with the correct response that was cued by the base-rates. Results showed that solving problems in which the base-rates and stereotypical description cued conflicting responses resulted in an increased centro-parietal N2 and frontal P3. This early conflict sensitivity suggests that the critical base-rates can be processed fast without slow and deliberate System 2 reflection. Findings validate prior EEG work and support recent hybrid dual process models in which the fast System 1 is processing both heuristic belief-based responses (e.g., stereotypes) and elementary logico-mathematical principles (e.g., base-rates).
Email: Bence Bago, bencebagok@gmail.com

8:40-8:55 AM (284)

Moderators of Framing Effect in Asian Disease Kind Problems: Time Constraint, Need, and Disease Type. ADELE DIEDERICH and MARC WYSZYNSKI, *Jacobs University Bremen*, ILANA RITOV, *The Hebrew University of Jerusalem* – This study examined framing effects in decisions concerning public health. Tversky and Kahneman's famous Asian Disease Problem served as experimental paradigm. Participants chose between a sure and a risky option presented either as gains (saving lives) or as losses (dying). The amount of risk varied in terms of different probabilities. The number of affected people varied on a small and a large scope. Additionally, the decisions were linked to three different types of diseases (unusual infection, AIDS, leukemia). Finally, two different time constraints were implemented during which the participants had to give a response. The data analysis assuming a linear mixed effects model revealed significant effects of framing, probabilities, and small versus large scope. Furthermore, the type of disease and time constraints were moderating the framing effect. Across the different diseases, framing effects were amplified when decision time was short.
Email: Adele Diederich, a.diederich@jacobs-university.de

9:00-9:15 AM (285)

The Mere Exposure Effect in the Social Evaluation. NATALIA ANDRIYANOVA and KARINA BAKULEVA, *Saint-Petersburg State University* – The mere exposure effect was shown in different stimuli, including photographs of persons (e.g., Zajonc, 1968; Bornstein, D'agostino, 1992; Newell, Shanks, 2007). The aim of the study is to investigate the role of mere exposure effect in the social evaluation. In the first part of the experiment participants should judge facial gender of 40 portrait photos of people presented one by one. 20 photos were presented 5 times, the other 20 photos were presented 1 time. On the second part participants were shown 40 photos of the same people in different social situations (shopping, housework, etc.). Participants should evaluate these people using 6 scales of Personal Differential methodic. 40 photos of people in social situations were 20 pairs (20 photos of people in situations, whose portrait photos were presented previously at once, and 20 photos of other people in the same situations, whose photos were presented earlier by five times). The results showed that people who were presented five times earlier were evaluated as more confident, friendlier and more scrupulous. Thus, participants take their sense of familiarity for the positive evaluation of person.
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9:20-9:35 AM (286)

Value Information, Outcome Order, and Salience Drive Risk Taking in Decisions From Experience. JARED M. HOTALING, *University of New South Wales*, ANDREAS JARVSTAD, *University of Oxford*, CHRIS DONKIN and BEN R. NEWELL, *University of New South Wales* – Attention and memory play crucial roles in decisions from experience because one must learn about options by observing their outcomes. In a set of experiments investigating the links between attention, memory, and decision making, participants made a series of choices between pairs of risky gambles represented as urns containing different mixtures of blue and red balls. Participants began each trial by sampling balls from each urn. After observing a representative sample from each, participants chose an urn to draw from for a consequential payment. Our findings point to several factors influencing people's choices: i) individuals place greater weight on rare events when outcome values are absent during sampling, ii) highlighting a rare reward increases its salience when outcome values are present, and iii) individuals place greater weight on more recently experienced outcomes. We discuss the implications of these findings on our understanding of the interplay between attention, memory, and choice.
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Recognition and Recall
Strand 12 A, Sunday Morning, 8:00-9:40 AM
Chaired by Adam Osth, University of Melbourne

8:00-8:15 AM (287)

The Extralist Feature Effect in Recognition Memory: Re-Evaluating Constraints on Global Matching Models. ADAM F. OSTH, ASPEN YANG, SIMON LILBURN, and DANIEL LITTLE, *University of Melbourne* – The dominant theoretical framework for recognition memory is global matching, where decisions are based on the summed similarity between a probe and the contents of memory. Mewhort and Johns (2000) directly tested this framework by manipulating the feature composition of studied items and test probes using combinations of various colors and shapes. They found that rejection of unstudied probes was 1.) strongly determined by extralist features in the probe and 2.) did not worsen when features matched multiple study items rather than a single item, both of which are contrary to

the predictions of summed similarity. One possible explanation was their usage of separable stimuli which allows for decision making to be on the basis of component features. We conducted experiments with multidimensional integral stimuli and factorially varied 1.) whether a probe contained an extralist feature while holding summed similarity constant 2.) the overall summed similarity between the probe and the contents of memory. Strong summed similarity effects were found for both types of probes, and no extralist feature was found. The results were consistent with the Exemplar Based Linear Ballistic Accumulator model (EB-LBA: Donkin & Nosofsky, 2012).
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8:20-8:35 AM (288)

Guessing in Working Memory and Long-Term Memory. JOHN T. WIXTED, MARK W. SCHURGIN, and TIMOTHY F. BRADY, *University of California, San Diego* – In both working memory and long-term memory, the nature of the underlying memory signal has been investigated for decades. In both lines of research, a key issue is whether the signal is continuous (ranging from weak to strong, as in signal detection theory) or discrete (involving a mixture of signal and no-signal trials, as in threshold theories). In recent years, there has been a resurgence in the use of mixture models to characterize memory performance. According to these models, memory signals that fall below the threshold result in random, signal-free guessing. Participants in a memory experiment undoubtedly guess on some trials, and it is widely believed that signal detection theory denies that guessing occurs. In truth, signal detection theory denies signal-free guessing. In other words, the theory assumes that decisions are always based on a memory signal, even when that signal provides no information and even when participants report having guessed. We use data from studies of long-term memory to illustrate this point.
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8:40-8:55 AM (289)

Linking Repetition Priming, Recognition, and Source Memory: A Single-System Model. NICHOLAS LANGE, CHRISTOPHER J. BERRY, and TIMOTHY J. HOLLINS, *University of Plymouth* – We present new behavioral data and modeling that links repetition priming, recognition, and source memory. In four experiments, the magnitude of the priming effect, as measured with identification response time in a gradual clarification task, was 1) greater for studied items receiving correct source decisions than incorrect source decisions, and 2) tended to increase as confidence in the source decision increased. Building on the framework for modeling recognition and priming proposed by Berry, Shanks, Speekenbrink, and Henson (2012), we developed a single-system signal-detection model in which source memory decisions are driven by the same memory strength signal as recognition and priming. A version of this model that allows source-rating criteria to converge with greater recognition confidence, and allows the variances of old and new item strength distributions to be unequal, provided the best qualitative and quantitative account of the data, and was preferable to a "multiple-systems" version of the model.
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9:00-9:15 AM (290)

Restudy-Induced Forgetting of Object Pictures: Testing an Inhibition Account of Forgetting. ASHLEIGH M. MAXCEY, *Ohio State University* – The logic of the inhibition account of retrieval-induced forgetting relies on the pairing of multiple stimuli to the same cue, such that practice accessing some stimuli requires other related items to be suppressed, and consequently forgotten. It follows then that, according to the inhibition theory, if there is no practice, there should be no forgetting. Here I employed a paradigm where one picture is presented on the screen at a time in the study phase, followed by an identical restudy phase. The subjects were instructed to study the objects rather than to practice recognizing any of them. Although inhibition theory predicts that induced forgetting will be eliminated under these circumstances because suppression is not required without a recognition task, I found robust forgetting of objects. Indeed, the magnitude of the forgetting effect with restudy was no different whether people restudied some of the objects or recognized them. These findings suggest that different mechanisms of forgetting and retrieval may mediate our interactions with visual versus verbal memory representations.
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9:20-9:35 AM (291)

The Roles of Confidence and Interactive Imagery in the Emotional Impairment of Association Memory. JEREMY B. CAPLAN, *University of Alberta*, TOBIAS SOMMER, *University Medical Center Hamburg-Eppendorf*, CHRISTOPHER R. MADAN, *University of Nottingham*, ESTHER FUJIWARA, *University of Alberta* – Although emotion enhances memory for items, memory for associations between items is impaired for negative, emotionally arousing compared to neutral stimuli. We tested two possible explanations: 1) higher confidence in one's own ability to memorise negative pairs may cause participants to under-study negative pairs; 2) neutral pairs may be more conducive to interactive imagery, known to be effective for association-memory. Using pictures in a 5-choice associative recognition task, we replicated the impairment for negative relative to neutral pairs. We also replicated the finding that confidence, during study, in future memory was higher for negative pairs. However, judgements of learning were positively correlated with association memory success for both negative and neutral pairs. Interactive imagery ratings were higher for neutral pairs than negative pairs, and showed a stronger relationship to successful association memory. In sum, differences in memory confidence do not lead participants to under-study negative pairs. Instead, association memory may be lower for negative than neutral information because interactive imagery is less effective during encoding of negative pairs.
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Statistics and Methodology II
Strand 13 A, Sunday Morning, 8:00-9:20 AM
Chaired by Jeremiah Folsom-Kovarik, Soar Technology, Inc.

8:00-8:15 AM (292)

Data Analytics Can Make Existing Web-Delivered Assessments More Informative. JEREMIAH T. FOLSOM-KOVARIK and DAR-WEI CHEN, *Soar Technology, Inc.* – The Virtual Environment for Social Information Processing (VESIP) uses web-delivered interactive scenarios to help practitioners assess social skills in children. Assessments reflecting the Crick and Dodge (1994) social information-processing (SIP) model offer practitioners evidence about SIP domain performance during ecologically valid simulations. VESIP assessments are objective, reliable, and informative (Russo-Ponsaran et al., 2018). However, additional context could give VESIP, or other similar systems, even more evidence from the same scenarios. The burgeoning field of data analytics suggests that indicators already available in virtual environments may support fine-grained understanding of children's observable performance and inferred factors underlying performance. Specific indicators that can be captured without additional instrumentation include dwell time, keyboard or mouse movements, and replaying or response changing behaviors. Specific inferences these indicators may enable include affect, engagement, and effort. Applying data analytics methods to VESIP can give practitioners new tools to help understand children's SIP skills and needs.
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8:20-8:35 AM (293)

The Dominance of Individual Differences and Short-Term Adaptation: Insights From "Big Data". DWIGHT JACOB KRAVITZ, MICHELLE R. KRAMER, PATRICK H. COX, and STEPHEN R. MITROFF, *The George Washington University* – In studying cognitive mechanism, "Big Data" is most often used to provide massive inferential power and quantitative precision in ascertaining the difference between conditions (e.g. number of distractors). But here, we use big data to reveal surprising and highly reliable structure in the variability not explained by those differences. Using data from Airport Scanner, a mobile app wherein players perform visual searches, we highlight several key findings. First, at the trial level, large portions of the unexplained variance in the data are attributable to consistent effects of a) individual differences and b) behavioral adaptations resulting from the preceding trials. Second, these sources of variance show a much stronger effect than the condition of interest (i.e., the signal). Third, there is a remarkable level of systematicity to the effects of the preceding trials, suggesting an efficient cognitive system that optimizes behavior to local contexts. These results show that average condition effects are only a small part of observable replicable behavior; implications for basic and applied cognitive research will be discussed.
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8:40-8:55 AM (294)

Due Process in Dual Process. CHARLOTTE E.R. EDMUNDS, *University of Plymouth*, FRASER MILTON, *University of Exeter*, ANDY J. WILLS, *University of Plymouth* – Behavioral evidence for the COVIS dual-process model of category learning has been widely reported in over a hundred publications. It is generally accepted that the validity of such evidence depends on the accurate identification of individual participants' categorization strategies, a task that usually falls to Decision Bound analysis. Here, we examine the accuracy of this analysis in a series of model-recovery simulations. In several simulations, we show that this ubiquitous analysis is biased towards falsely finding participants complete categorization tasks in the optimum manner. Implications for due process in the future evaluation of dual-process theories, including recommendations for future practice, are discussed.
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9:00-9:15 AM (295)

Comparing Preregistered Effect Sizes: A New Tool for Statistical Inference. PETER DIXON, *University of Alberta*, SCOTT GLOVER, *Royal Holloway University of London* – A core problem in statistical inference is that, while the mean under the null hypothesis is known, the mean under the alternative is not. Indeed, the various approaches to inference can be distinguished on the basis of how this problem is addressed. However, under many circumstances, researchers may have good, a priori knowledge about how large a theoretically interesting effect would be in the paradigm being investigated. We propose that researchers preregister this effect size, and then use the results to make a straightforward statistical comparison between two models: one assuming that the effect is zero and one assuming that the effect is large enough to be theoretically interesting. This technique is conceptually appealing, has a simple interpretation, allows for sequential sampling, and is generally more efficient than the common approaches to statistical inference.
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Working Memory II
Strand 10 B, Sunday Morning, 10:00AM-12:00 PM
Chaired by Anna Manelis, University of Pittsburgh

10:00-10:15 AM (296)

Prefrontal Cortical Activation During Anticipation of Working Memory Task Performance Predicts Task Performance and Is Related to Lifetime Mood Symptoms. ANNA MANELIS, ERIN RODGERS, HOLLY A. SWARTZ, and MARY L. PHILLIPS, *University of Pittsburgh* – Activation in the ventrolateral prefrontal (VLPFC) and anterior cingulate cortices (ACC) normally increases for more difficult n-back tasks. However, it decreases during anticipation of more difficult tasks. This anticipatory effect may represent a mechanism to free cognitive and neural resources before the difficult task. Individuals with mood disorders have biased anticipation of future events and have difficulty with managing their cognitive resources. In this study, we examined the relationship between mood symptom severity (e.g., depression, hypo/mania) and

brain activation during anticipation and performance of the n-back task across mood disordered individuals (n=26). We found that anticipation-related activation in the VLPFC and ACC was related to n-back task performance and also depression and mania spectra. Anticipation-related and task-related VLPFC activation together with the RT changes from easy to difficult n-back task explained 47% of variance in lifetime mania scores. Our findings confirm the importance of task anticipation and suggest that mood symptoms affect cognitive functioning by altering anticipation-related processes thus making allocation and redistribution of cognitive resources more challenging.
Email: Anna Manelis, anna.manelis@gmail.com

10:20-10:35 AM (297)

Covert Retrieval 10 Years Later: Where Are We Now and What's Next? VANESSA M. LOAIZA, *University of Essex* – Since McCabe (2008) first showed a long-term advantage of words studied during complex span relative to simple span, there has been growing interest in the long-term consequences of the processes argued to underlie working memory (WM). McCabe originally argued that covertly retrieving memoranda by cumulatively reactivating each item after attention has been distracted serves to promote long-term retention in episodic memory (EM). Alternative explanations have since been advanced, including attentional refreshing, greater time and elaboration of memoranda, and greater retrieval demands for complex span compared to simple span. The current experiments investigated these alternative explanations by disentangling refreshing and retrieval demands (Experiment 1) and varying the timing (Experiment 2) of the secondary task, investigating the influence of strategies (Experiments 3 and 4), and varying the demands of immediate recall (Experiment 5). The results collectively indicate that several of these factors may partly moderate the McCabe effect, thereby suggesting that a myriad of processes underlying WM may contribute to retention in EM. Furthermore, the paradigm continues to be useful for disambiguating key features in models of WM.
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10:40-10:55 AM (298)

Does the Experimenter Presence Impact Working Memory? VALERIE CAMOS and CLÉMENT BELLETIER, *Université de Fribourg* – Recent studies suggest that the social presence undermines performance in difficult tasks, because the presence of others would automatically capture the attention needed to achieve these tasks. Here, we tested whether the attentional capture caused by an experimenter presence impacts working memory (WM). Several models suggest that WM maintenance relies on an attentional mechanism, while another non-attentional verbal rehearsal could specifically maintain verbal information. In Experiment 1, we varied the presence of the experimenter while participants had to memorize letters during a short retention interval. Moreover, a secondary task was introduced in some conditions to reduce the availability of attention. Experiment 2 replicated Experiment 1 with the addition of a concurrent articulation to prevent the use of verbal rehearsal. Results showed that participants in the presence of the experimenter recalled less letters that participants that stayed alone in the cubicle, but only in Experiment 2. These findings are the first evidence that social presence hinders attentional, but not non-attentional, WM maintenance. They have strong methodological implications and for understanding WM and the impact of social presence.
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11:00-11:15 AM (299)

Boosting Cognitive Capabilities Through Enhanced States During Gaming. MARIA KOZHEVNIKOV, *National University of Singapore* – We report the existence of enhanced cognitive states in which dramatic improvements in certain cognitive capabilities (temporal aspects of attention and visual-spatial tasks requiring focused attention) were exhibited by participants who played either action video-game (First-Person Shooter) or adventure physical games (Escape rooms, in which a team of players solve a series of puzzles). The cognitive enhancements were transient (no longer observed after 30 minutes of rest following gaming) and were exhibited only by those participants who were directly involved in the activity (not observers) and whose skills matched the level of the game. Furthermore, using EKG methodology, we showed that arousal, indicated by the activation of the sympathetic nervous system, is a necessary condition underlying these states. Overall, the results suggest that the observed enhancements cannot be simply due to the activity of gaming per se, but might rather represent an enhanced cognitive state resulting from specific conditions (heightened arousal in combination with active engagement and optimal challenge), resonant with what has been described in previous phenomenological literature as "flow" or "peak experience".
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11:20-11:35 AM (300)

Contralateral Delay Activity Indexes the Maintenance of Content-Free Object Files. EDWARD AWH, NICOLE HAKIM, KIRSTEN ADAM, and EDWARD VOGEL, *University of Chicago* – Kahneman, Treisman and Gibbs (1992) elucidated the concept of an object file, a temporary episodic representation that is formed when a visual scene is parsed into individuated items. Critically, object file theory posits a distinction between this episodic representation – indexed by spatial and temporal coordinates – and the (e.g., color, orientation) associated with the object. Here, we present evidence that contralateral delay activity (CDA), a well-known neural marker of storage in working memory (WM), may index the maintenance of object files and not just the maintenance of visual information. In a key experiment, subjects either memorized the positions of the items in the sample array (WM task), or directed spatial attention to those positions without maintaining the cueing item itself (Attention task). Critically, the stimulus displays were identical for the two tasks. Although both tasks required active maintenance of the same spatial information, only the WM task elicited a robust CDA that was sensitive to the number of items in the sample array. Given the equivalent storage requirements in the two tasks, we conclude that CDA activity directly indexes the voluntary maintenance of object files.
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11:40-11:55 AM (301)

Cognitive Load in Working Memory Affects Categorical and Continuous Representation. GAEN SARAH PLANCHER, *University of Lyon*, KIRAN KUMAR and RICHARD SHIFFRIN, *Indiana University* – Working memory performance for categorical items such as letters is a linear function of the cognitive load of a concurrent task, giving evidence that memory traces are maintained through attentional refreshing. The present study tested the effect of a concurrent load upon categorical memory for letters and precision of memory for the color of each letter. Letters in color were presented simultaneously on a screen, immediately after which participants processed either two or six digits in the same fixed time interval. Then memory for a given colored letter was assessed, with letter recall and color memory tested in random order. Color was indicated with a point response on a color wheel, and a confidence interval on that wheel. Letter memory showed an effect of load. Load affected the distance of the point estimate of color to the corect color, but not the width of the confidence interval.
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Prospective Memory
Strand 11 B, Sunday Morning, 10:20 AM-12:00 PM
Chaired by Michael Scullin, Baylor University

10:20-10:35 AM (302)

Strategic and Perfunctory Processes in Prospective Memory Encoding. MICHAEL K. SCULLIN, COURTNEY KURINEC, and WINSTON JONES, *Baylor University* – Prospective memory (PM) researchers conceptualize intention formation (encoding) as a strategic, resource-demanding process. Alternatively, some aspects of PM encoding may be perfunctory/transient, occurring "in passing" with few cognitive resources. We had participants encode a categorical prospective memory task (press Q for "fruits" during a lexical decision task), respond to thought probes on encoding quality (e.g., whether they encoded specific-exemplar cues), and perform a test block. At encoding, we manipulated divided attention (Experiment 1, N=94) and duration (15-sec versus 40-sec; Experiment 2, N=95). Dividing attention and shortening encoding duration did not impair participants' ability to generate specific-exemplar cues or remember the PM task on a post-experimental questionnaire. Nevertheless, dividing attention and shortening encoding duration lowered PM test block performance. Thus, encoding is perfunctory for some PM components (e.g., specific-exemplar cue generation), but resource-demanding processes are still needed for binding, rehearsing, or otherwise strengthening the contents of PM intentions during encoding.
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10:40-10:55 AM (303)

How Do Prior Experiences Affect Prospective Memory Performance? KARA MOORE, *Knox College*, JAMES LAMPINEN, *University of Arkansas*, ERYN ADAMS, *University of Missouri* – The purpose of this study was to examine how prior experience encountering prospective memory cues affected attention to event-based prospective memory tasks. We tested this by examining prospective memory performance after participants did prospective memory tasks in which the cues were or were not present. Participants (N=205) performed four ongoing tasks with prospective memory tasks. For half of participants cues were displayed during each task whereas for the other half of participants cues did not appear during the first three tasks. Participants who did not encounter cues on the first three tasks were less likely to respond to cues on the final task than participants who always encountered cues. Using multinomial modeling, we found that participants who previously encountered cues used more preparatory attention than participants who did not indicating that not encountering cues decreased the resources devoted to the prospective memory task leading to poorer prospective memory performance.
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11:00-11:15 AM (304)

The Utility of Auditory and Visual Cues for Facilitating Strategic Monitoring in Prospective Memory. JILL T. SHELTON, *University of Tennessee at Chattanooga*, MICHAEL K. SCULLIN, *Baylor University*, THOMAS VORWERK and JESSICA Y. HACKER, *University of Tennessee at Chattanooga* – We examined how contextual cues moderate the strategic allocation of attention towards the execution of future intentions, or prospective memory. In Experiment 1, college students were randomly assigned to either the: 1) auditory cue, 2) implementation intention, or 3) standard encoding condition. While seated at an eye-tracking computer, participants engaged in an ongoing visual search task, and in a prospective memory block, were told to respond to a particular image presented in a separate region of the screen. Attention monitoring was operationalized as the number of fixations on the target region. Importantly, sounds occurred throughout the task, with a lawnmower sound always occurring on target trials. Only participants in the auditory cue condition were told that the prospective memory target would be accompanied by the lawnmower sound. While similar levels of prospective memory accuracy were observed across conditions, the auditory cue group achieved comparable levels of performance with significantly less monitoring. In Experiment 2, we assessed the utility of both visual and auditory cues and found converging evidence that contextual cues facilitate strategic monitoring in support of prospective memory.
Email: Jill Shelton, jill-shelton@utc.edu

11:20-11:35 AM (305)

Adult-Age Differences in Remembering Gain- and Loss-Related Intentions: A Motivational Perspective. SEBASTIAN S. HORN and ALEXANDRA M. FREUND, *University of Zurich* – Prospective memory (PM) refers to remembering intended actions at some point in the future. A large body of research has examined cognitive and emotional processes underlying age-related differences in PM. In contrast, there is little work on the impact of motivational change on PM across adulthood. We present research on adult-age differences and gain-loss motivational influence on PM. In one study, a lifespan sample of N =155 younger, middle-aged, and older adults (18 to 86 years) received either initial monetary gain-frame or loss-frame instructions for a PM task that was embedded in a larger

online questionnaire. PM performance was moderately high and decreased with increasing age. Notably, the age effects were moderated by the instructional gain-loss framing, indicating that middle-aged and older adults were more accurate for loss-related than gain-related PM, whereas no such framing difference was observed in younger adults. The findings in this study with a cross-sectional sample show that gain-loss motivational influence on PM differs as a function of age: As theoretically expected from motivational lifespan research, preventing losses appears to be more relevant for older than younger adults in event-based PM tasks.
Email: Sebastian Horn, horn@psychologie.uzh.ch

11:40-11:55 AM (306)

Wait a Second...Boundary Conditions on Delayed Responding Theories of Prospective Memory. HUNTER BALL, *University of Texas, Arlington*, ANNE E. VOGEL, *University of Mississippi*, DEREK M. ELLIS and GENE A. BREWER, *Arizona State University* – Recent research suggests that forcing participants to withhold responding for as brief as 600ms eliminates one of the most reliable findings in prospective memory (PM): the cue focality effect. This result undermines the conventional view that controlled attention processes support PM cue detection, and instead suggests that PM cue detection results from increased response thresholds that allow more time for PM information to accumulate. In three experiments, having participants withhold responses across various intervals reduced but did not eliminate the difference between focal and nonfocal cue detection. In a final individual differences study, having participants withhold responses failed to attenuate correlations between PM cue detection and attention control measures. Together these results suggest that any theory of PM that considers only a delay mechanism may not fully capture the dynamic attention processes that support cue detection and intention fulfillment.
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Attention II

Strand 12 A, Sunday Morning, 10:00 AM-12:00PM
Chaired by Willem Verwey, University of Twente

10:00-10:15 AM (307)

The Simon Effect as a Tool: Processing of Key-Specific Stimuli in Discrete Keying Sequences Is Compulsory. WILLEM B. VERWEY, *University of Twente* – We assessed the Simon effect in the DSP sequential key pressing task in order to explore whether key-specific stimuli are being used even when 7-element keying sequences have extensively been practiced. To that end, participants practiced by repeatedly reacting to two series of fixed and discrete series of letter stimuli. The Simon effect was induced by presenting these letter stimuli at locations that did, or did not, correspond to the location of the response. The results of Experiment 1 confirm the occurrence of the Simon effect for each sequence element, even after extensive practice. Experiment 2 confirmed these effects and showed that it is the onset of a stimulus that causes the Simon effect, rather than the display of a key-specific letter. Together, these experiments indicate that even though skilled participants are able to produce sequences without key-specific stimuli, the spatial attention drawn by stimulus onset continues to influence the execution of even highly practiced sequences.
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10:20-10:35 AM (308)

Attentional Capture Without Attentional Engagement: A Camera Metaphor of Attention. DOMINIQUE LAMY and ALON ZIVONY, *Tel Aviv University* – Most models of spatial attention assume that attention operates like a spotlight and that stimuli appearing in the focus of attention are mandatorily processed. Here, we show that when an irrelevant object captures attention, the shift of attention can be shallow and not followed by attentional engagement. In two studies, we used separate measures to index spatial shifts of attention and attentional engagement. Using a spatial cueing paradigm, we found that attentional shifts to onset distractors were followed by attentional engagement at the onset's location only with onsets matching the attentional set (contingent attentional engagement). Using an RSVP paradigm, we found that attentional shifts to a distractor were unaffected by the attentional blink, whereas attentional engagement at the distractor's location was reduced and the distractor-locked N2pc component of the ERP suppressed. We discuss the implications of these findings for the distinction between stimulus-driven and goal-dependent attentional capture and for the mechanisms indexed by the N2pc. We suggest that attention operates like a camera, which requires both aligning the zoom lens and pushing the shutter button, rather than like a spotlight.
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10:40-10:55 AM (309)

Attention Allocation for Natural and Urban Scene: Effects on Visual Working Memory. MELISSA R. BECK and KATHERINE C. MOEN, *Louisiana State University* – Viewing natural scenes results in fewer and longer fixations than viewing urban scenes (Valtchanov & Ellard, 2015). Fewer and longer fixations may indicate a broader spread of attention favoring the processing of lower spatial frequency (LSF) information. In the current study, we examined if viewing an urban or natural scene would determine the type of information stored in visual working memory. Participants viewed an urban or natural scene for 5000 ms. Three high spatial frequency (HSF) and three LSF gratings appeared on top of the scenes. Next, one of the gratings changed orientation, and participants reported which grating that had changed. Participants completed two blocks of 80 trials each. Overall, changes to LSF gratings were detected more often than HSF gratings. During block 1, HSF grating changes were detected more often with natural scenes than with urban scenes. Furthermore, less time was spent looking at HSF gratings in urban scenes.
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11:00-11:15 AM (310)

Spatial Language and Visual Attention: A New Interaction Between Language and Cognition. FLORIAN GOLLER, SOONJA CHOI, and ULRICH ANSORGE, *University of Vienna* – It is debated how far-reaching the effects of language

on cognition are - if they exist at all. Using multiple visual search paradigms, we tested whether native Korean and native German speakers are differentially sensitive to visual 3D-object composites that only the Korean, but not the German (nor the English) language semantically distinguishes as tight-fit versus loose-fit. We instructed our participants to search for a color-defined target composite among distractors. However, targets were also implicitly signalled by their tight-fit or loose-fit composites. Only Korean speakers picked up on this implicit target-defining characteristic, reflected in attention capture by target-similar composites. As these concepts are not grammticalised in the German language, our results demonstrate that language can determine which visual features capture attention. Our research introduces a novel approach because processing of the linguistically discriminated visual characteristics was neither instructed nor necessary for the task, demonstrating a case of linguistic relativity of cognition.
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11:20-11:35 AM (311)

The Role of Talker Familiarity in Auditory Distraction. BRITTAN A. BARKER, *Utah State University*, EMILY M. ELLIOTT, *Louisiana State University* – The current research employed a classic irrelevant sound effect paradigm and investigated the talker-specific content of the irrelevant speech. Specifically, we aimed to determine if the participants' familiarity with the irrelevant speech's talker affected the magnitude of the irrelevant sound effect. Experiment 1 was an exploration of talker familiarity established in a natural listening environment (i.e. a university classroom) in which we manipulated the participants' relationships with the talker—informed familiar, uninformed familiar, and unfamiliar. In Experiment 2 we manipulated the participants' familiarity with the talker via 4 days of controlled exposure to audio narratives recorded by the target talker. For both Experiments 1 and 2, a robust effect of irrelevant speech was found; however, regardless of the talker manipulation, talker familiarity did not influence the size of the effect. We interpreted the results within the processing view of the auditory distraction effect and highlighted the notion that talker familiarity may be more vulnerable than once thought.
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11:40-11:55 AM (312)

Hearing Parents Adjust Auditory, Visual, and Tactile Cues in Communication as a Function Child Hearing Status. ALLISON GABOUER,and HEATHER BORTFELD, *University of California, Merced* (Presented by Heather Bortfeld) – The aim of this project is to characterize how early parent-child interaction is supported through the use of multimodal communication cues (e.g., auditory, visual, tactile). The ability to establish joint attention is a critical component of the language learning process, and caregivers scaffold their children's language learning by communicating in a way that supports a child's attentional allocation. This can be through verbal communication in hearing-hearing dyads, or through manual communication in deaf-deaf dyads. But how does this process unfold when a deaf child interacts with a hearing caregiver who does not use sign language? This is a common occurrence for hearing parents whose deaf children are candidates for cochlear implantation but who have not yet been implanted. The current study investigates how hearing parents of deaf children accommodate their deaf children's hearing status during the pre-implant period by using multiple sensory modalities to establish joint attention. We compare this to communication between hearing parents and their hearing children, focusing on the amount of uni- vs. multimodal communication used in the two dyad types when joint attention is established successfully, and when it is not.
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Language Comprehension and Production
Strand 13 A, Sunday Morning, 9:40 AM-12:00 PM
Chaired by Navin Viswanathan, Pennsylvania State University

9:40-9:55 AM (313)

Studying Speech Perception and Production Simultaneously Using a Collaborative Task. NAVIN VISWANATHAN, and ANNIE J. OLMSTEAD, *Pennsylvania State University* – Spoken language processing accounts are derived from results of carefully controlled, non-interactive experimental tasks. However, there is evidence that speech perception and production are affected by characteristics and needs of conversational partners. In the current study we investigated how interlocutors navigate native phonemic contrasts covarying across multiple acoustic dimensions. English native speakers, for instance, can use vowel length as information for vowel identity as well as surrounding consonant voicing. Using a collaborative word matching paradigm, we determined how native English pairs distinguish word sets that simultaneously differ in vowel tensity and the voicing of following consonants (e.g., hit/hid/heat/heed). Specifically, we evaluated whether vowel length serves as information for the vowel, following consonant voicing, or both. Our results demonstrated that vowel length is used exclusively to signal following consonant voicing. We discuss implications of these findings and evaluate the promise of this paradigm for understanding how interlocutors negotiate critical phonemic distinctions.
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10:00-10:15 AM (314)

Lend Me Your EAR: An Experience Sampling Method to Investigate Natural Speech. CHRISTINE CHIARELLO, ALESSANDRA MACBETH, MICHELLE BRUNI, NATSUKI ATAGI, EMILY MECH, JUSTIN SARKIS, JESSICA MONTAG, ALEX KARAN, and MEGAN ROBBINS, *University of California, Riverside* – The EAR (electronically activated recorder) is a cell phone app that can be programmed to record auditory samples at predetermined intervals, enabling unobtrusive experience sampling of daily language use. Participants wear the device during their normal waking hours over several days and are unaware of when recordings occur. We are currently using this tool to examine language usage in multilingual southern California, as compared to standard language history and social network self-report measures. The advantages and limitations of the method, IRB concerns, and "lessons learned" from our initial study will be described. The ability to capture random samples of speech from large numbers

of participants holds promise for the investigation of bilingual and monolingual language use in the community, permitting examination of the relationship between laboratory measures of language processing and individuals' actual language use. Initial findings from the project will be presented in several conference posters.
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10:20-10:35 AM (315)

Dynamic Updating of Native Language Constructions. BARBARA C. MALT and IIONA D. SCULLY, *Lehigh University*, AMY LEBKUECHER, *Pennsylvania State University*, JESSICA JOSEPH, *Lehigh University* – Native language knowledge is deeply ingrained and, for the most part, resistant to change. However, some flexibility is needed to accommodate new environments. We exposed people to instances of two constructions that do not normally occur with the particular English verbs used (e.g., "enjoy to do" and "return them the book"). Exposure was within a simulated interview context. Even after limited exposure embedded within naturalistic discourse, significant shifts in post-exposure judgments of acceptability occurred. In a second study, exposure was the same but judgments were of grammaticality. Increased judgments of grammaticality occurred only for two of the six target sentences. The contrast between the two types of judgments suggests that in an initial phase of adaptation, acceptability, perhaps reflecting processing ease, may increase without a change in underlying grammatical representations. However, the item variation suggests that some verb representations may more readily adapt with exposure to the novel construction.
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10:40-10:55 AM (316)

DeepListener: A New Neural Network Model of Spoken Word Recognition That Operates On Real Speech. HEEJO YOU, *University of Connecticut*, HOSUNG NAM, *Korea University*, PAUL D. ALLOPENNA, KEVIN BROWN, and JAMES S. MAGNUSON, *University of Connecticut* (Presented by James S. Magnuson) – Few current computational models of spoken word recognition take speech as input. They use idealized acoustic-phonetic features, diphone confusion probabilities, or phonemic symbols. The few models that work on real speech borrow elements from automatic speech recognition, but do not achieve high accuracy and are arguably too complex to provide theoretical insight. We will present DeepListener, a neural network model trained on 1000 words produced by 10 talkers. DeepListener is less complex than many models, making it potentially useful as a psychological model. It maps 256 spectrographic channel inputs to sparse "semantic" vectors (10 units 'on' in a 300-element vector) via 224 hidden ("long short-term memory") units in 10 ms steps. DeepListener achieves high accuracy (97% for trained-on items) and generalization (90% for words left out for a trained-on talker, and 89% for talkers not included in training at all), and exhibits human-like over-time phonological competition. Analyses of hidden units reveal that the model learns a distributed phonological code to map speech to semantics. A model that works on real speech opens the door to previously out-of-reach modeling questions (e.g., surface variation, talker variability).
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11:00-11:15 AM (317)

Role of the Motor System in Phonetic Categorization: Evidence From Mechanical Suppression. IRIS BERENT and MELANIE PLATT, *Northeastern University*, RACHEL THEODORE, *University of Connecticut*, ALVARO PASCUAL-LEONE, *Harvard Medical School*, EVAN BALABAN, *Universidad Carlos III de Madrid* – A large literature suggests that phonetic categorization engages the brain motor system. But whether these findings reflect the role of these substrates in motor simulation or non-motor computations is unknown. To address this question, here, we investigate the effect of mechanical suppression. Participants heard the midpoint of a voicing continuum––either a labial (ba-pa) or coronal (da-ta)–– while concurrently biting on either their lip or tongue. Results showed that, compared to congruent suppression (e.g., lip suppression of labials), incongruent suppression (e.g., tongue suppression of labials) impaired the speed of identification (in Experiment 1) and decreased sensitivity (d') in AX discrimination (in Experiment 2). These results demonstrate for the first time that adult participants functionally engage the speech motor system even when response selection is controlled. These findings suggest that unlike phonological computations (Berent et al., 2015, PNAS), phonetic categorization relies on motor simulation.
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11:20-11:35 AM (318)

Production of Morphologically Complex Words as Revealed by a Typing to Copy Task: Lexical Influences on Keystroke Dynamics. LAURIE BETH FELDMAN, *University of Albany, State University of New York*, JACOLIEN VAN RIJ, *University of Groningen*, RICK DALE, *University of California, Los Angeles* – In an online typing-to-copy task, measures based on latency to initial keystroke and length normalized interkeystroke interval (IKSIs) reveal the relation between motor processes to produce a word and that word's lexical and morphological structure. Our focus in Expt. 1 is on interactions between legal (word) and illegal (pseudoword) stem-affix(es) combination [e.g., UNACCEPTABILITY vs. UNACCEPTANCE] and the relative timing of keystrokes within the stem [ACCEPT]. Our focus in Expt 2 is on interactions between stem-affix(es) combinations that are full legal words and those that are partial words and thus pseudowords [e.g., UNACCEPTABILITY vs. UNACCEPT] and the relative timing of keystrokes within the stem [ACCEPT]. We use nonlinear mixed effect regressions to compare keystroke latencies at each position in the same stem aligned to stem initial and then stem final position in order to detect early and later lexical influences on IKSIs. Results provide new insights into the ways in which lexical and morphological structure can influence purportedly peripheral motor processing.
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11:40-11:55 AM (319)

Writing Systems Are Optimized to Maintain a Constant Decoding Effort: Evidence From Hebrew, English, Finnish, and Dutch. KELLY NISBET and VICTOR KUPERMAN, *McMaster University*, NOAM SIEGELMAN and RAM FROST, *Hebrew University of Jerusalem* (Presented by Victor Kuperman) – Recent evidence shows that readers of languages like English, Finnish, and Chinese require the same amount of time to read sentences that have an identical propositional content (Liversedge et al., 2016). Our eye-tracking data from English and Hebrew, and re-analyses of Dutch and Finnish data, develop this notion further. Based on average lengths of content-matched sentences in English and Hebrew (18 and 14 words, respectively), we demonstrated that—on average—any random 18-word fragment of an English text contained an equal amount of propositional content and was read in the same amount of time as a random 14-word fragment of a Hebrew text. The equality held for other language pairs too. This means that languages are optimized to encode an equal amount of propositional content in such a way that its decoding takes the same amount of reading effort, regardless of the actual content or the writing system.

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Reasoning and Judgment

Strand 11 A, Sunday Morning, 10:20 AM-12:00 PM

Chaired by Merim Bilalic, Northumbria University at Newcastle

10:20-10:35 AM (320)

The Mechanism of the Einstellung (set) Effect. MERIM BILALIC, *Northumbria University at Newcastle* – The Einstellung (set) effect occurs when the first idea that comes to mind, triggered by familiar features of a problem, prevents a better solution being found. The most famous example of the Einstellung effect is arguably Luchins' water-jar experiment. After learning to solve problems using the same method over introductory problems, most of people are not able to solve the final problem which requires a different but much simpler solution. Control participants, who are not set in their ways as their do not solve the introductory problems, had no problems finding the correct solution. Despite being extensively investigated, the mechanism behind the Einstellung is unclear. Here I use eye tracking to demonstrate that the activated memory is biasing participants' perception. The participants who fail to find the new solution, repeatedly try to make the previously used, now suboptimal method work. I also empirically show that removing the originally activated elements is a better strategy for reducing Einstellung than simply drawing attention to the newly important aspects of the problem. I propose that the same mechanism is the source of many cognitive biases, from phenomena in reasoning to perceptual errors and failures in memory.

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10:40-10:55 AM (321)

Fixation Effects: Automatic vs. Controlled Retrieval of Red Herrings. STEVEN M. SMITH, ALAN HERNANDEZ, and ZSOLT BEDA, *Texas A&M University* – Fixation refers to a block or impediment to cognition, preventing successful creative problem solving or memory retrieval, and overly-restricting creative production, idea generation, and design. Word fragment completion has been used as a simple laboratory task to examine fixation because the task can involve automatic and/or controlled influences of retrieval of misleading hints, known here as red herrings. Seeing, for example, the red herring word ANALOGY before trying to solve the word fragment A_L_ _GY makes the fragment more difficult to complete. Using this fixation task, we varied the number of red herrings, and tested fixation as a function of memory of those red herrings when deliberate recollection was discouraged (4 experiments) or encouraged (2 experiments). Exposure to any red herrings decreased completion rates, but the number of red herrings had an additional effect only when recollection was encouraged. The results indicate differences between implicit and explicit sources of fixation.

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11:20-11:35 AM (323)

Judging Truth Through "Rose-Tinted Glasses": Reliance on an Affect Heuristic. NADIA M. BRASHIER, *Harvard University*, ELIZABETH J. MARSH, *Duke University* – In a world filled with "fake news" and "alternative facts," it can be overwhelming to decide what is true. Instead of adopting time-consuming strategies (e.g., considering a source's credibility), people fall back on heuristics, or rules of thumb. Indirect evidence hints that one such "shortcut" for truth involves our own affect. In two experiments, we tested whether people judge truth through "rose-tinted glasses." Participants rated the truthfulness of claims paired with negative, neutral, or positive faces. Surprisingly, people did not conflate positivity with truth. Instead, they exhibited a negativity effect, where angry and fearful faces made statements seem less true than neutral faces. These data have important implications, given that marketers and politicians use emotional rhetoric in attempts to influence buying and voting behavior.

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11:40-11:55 AM (324)

Successes of the Intuitive Psychologist: Judgments in the Role-Conferred Advantage Paradigm Are Reasonable. DREW ELLEN WALKER, VANESSA RODRIGUEZ, NICHOLAS CHRISTENFELD, and EDWARD VUL*, *University of California, San Diego* – There is a long and influential tradition in psychology to view human social reasoning as biased and irrational (e.g., Ross & Nisbett, 2011). One of the most well-known phenomenon supporting this view is the role-conferred advantage: observers don't properly adjust for the advantages afforded by arbitrary social roles when making judgments about others (e.g. they ignore "role-conferred advantages"). In the classic paradigm, it is shown that observers think that a person randomly assigned to invent trivia questions has more general knowledge than a person randomly assigned to answer these questions (Ross, Amabile & Steinmetz, 1977). Although the implication in the literature is that judgments in this task are evidence of a biased reasoning process, here we argue that the judgment pattern elicited in these experiments is actually quite reasonable. In a series of 5 experiments we demonstrate that

(a) observers are not insensitive to the advantages conferred and disadvantages imposed by social roles, (b) they are better calibrated to the influence of social roles than previously argued, and (c) they make sensible use of nuanced situational variables relevant to these social judgments.
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Reading II
Strand 12 B, Sunday Morning, 10:20 AM-12:00 PM
Chaired by Zed Sevcikova Sehyr, San Diego State University

10:20-10:35 AM (325)
Assessing the Contribution of Lexical Quality Variables to Reading Comprehension in Deaf and Hearing Readers. ZED SEVCIKOVA SEHYR and KAREN EMMOREY, *San Diego State University* – We evaluated the relative contribution of lexical quality (LQ) variables – orthographic (spelling), phonological, and semantic (vocabulary) knowledge – to reading comprehension in deaf (n = 67) and hearing adults (n = 62) using a regression model to predict reading skill (PIAT and Woodcock Johnson - WJ comprehension subtests). For deaf readers, LQ variables predicted 28% of the variance in PIAT scores (after eliminating covariates) and 18% of the variance in WJ scores. Semantics and orthography, not phonology, predicted reading comprehension for deaf readers. For hearing readers, LQ variables predicted 14% of variance in PIAT scores and 56% in WJ scores. Phonology was the strongest predictor of reading comprehension (with semantics also predicting WJ scores). We conclude that 1) strong orthographic and semantic representations, rather than precise phonological representations, predict reading skill in deaf adults and 2) the predictive strength of LQ variables may depend upon how reading comprehension is measured.
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10:40-10:55 AM (326)
Discovering Lexicon's Statistical Structure Contributes to Word Learning. JAROSŁAW R. LELONKIEWICZ and DAVIDE CREPALDI, *Scuola Internazionale Superiore di Studi Avanzati* – Learners detect probabilistic regularities in linguistic materials (Saffran & Kirham, 2018). In two experiments, we tested if this ability is active in reading and may underlie word learning. Italian speakers were shown letter strings and instructed to distinguish between novel words and foil distractors. Participants successfully detected that novel words complied with the statistics of Italian lexicon, and used this information to perform the task. Interestingly, among the several possible variables, they relied particularly on single bigram frequency. These data contrast with studies suggesting that readers average the frequencies across all bigrams in a string (Grainger et al., 2012), but accord with overall evidence for the role of discovering statistical structure in reading and language.
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11:00-11:15 AM (327)
Learning Relationships Between Alphanumeric Symbols Through Statistical Properties. TERESA M. SCHUBERT, *Harvard University*, TREVOR COHEN, *University of Texas Health Science Center*, SIMON FISCHER-BAUM, *Rice University* – Learning to read is a statistical learning problem. Previous research has focused on learning spelling-to-sound correspondences or morphological regularities. Here, we focus on a previously ignored type of learning, the relationship between alphanumeric symbols. Borrowing methods from distributional semantics, we adapted the skipgram-with-negative-sampling to calculate similarity between all characters (upper and lowercase letters, digits and punctuation symbols) from the TASA corpus. This model generated a purely input-driven similarity space that includes divisions previously argued to depend on top-down processing – letter/digit status, case, consonant/vowel status. This type of statistical learning can help explain early divisions between consonant and vowel processing during the course of word-recognition. Furthermore, the learned similarity structure correlates with adult letter recognition behavior. From these results, we argue that adult readers rely on a rich and continuous measure of similarity between alphanumeric symbols based on distributed statistical properties.
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11:20-11:35 AM (328)
The Development of Eye-Movements When Learning to Read in a New Orthography. SASCHA SCHROEDER, *University of Göttingen*, KATHARINA PITTRICH, *Max Planck Institute for Human Development* – In this study, we investigated the development of adults' eye-movements when they learn to read in a new orthography. Nine participants learned to read simple German sentences which were, however, written using Greek letters. Subjects participated in nine sessions which were separated by one week. In each session, their eye-movements were recorded on three different experiments investigating various aspects of their foveal and parafoveal processing. Moreover, we are able to compare their performance to children's eye-movements in grades 2-4 that completed the same experiments in normal, unchanged script. Results showed that adults initially had great difficulty to read in the new script. However, they constantly increased their performance and their learning curve followed a power law distribution and their final performance was similar to that of 2nd graders. We can thus compare the effects of the different experimental manipulations between the beginning and the end of the training and children and adults. We will discuss our results with regard to current models of eye-movement development
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11:40-11:55 AM (329)

Does CaSe-MiXinG Disrupt the Access to Lexico-Semantic Information? MANUEL PEREA, MARÍA FERNÁNDEZ-LÓPEZ, and ANA MARCET, *Universitat de València* – Mixed-case WoRdS disrupt performance in word recognition tasks. There is, however, a controversial issue around this finding as the hindered performance could be related to impoverished lexico-semantic access or to visual familiarity. We examined whether there is a genuine mixed-case effect during lexico-semantic access or whether the effect is driven by a visual familiarity bias (i.e., lack of familiarity may induce a bias toward "no" responses in word/nonword decisions). Participants were presented with same-case vs. mixed-case items in a word/nonword discrimination task (lexical decision) and in a task that requires access to semantic information (semantic categorization). In lexical decision, responses were faster to same-case words than to mixed-case words, whereas the nonwords showed the opposite pattern. In two semantic categorization experiments, we failed to find any signs of a case-mixing effect for words. Therefore, the case-mixing effect in word recognition is not due to an impoverished access to lexico-semantic information.
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POSTER SESSION I

Thursday Evening
Elite A
Viewing 4:00-7:30, Author Present 6:00-7:30 PM

ATTENTION I

6:00-7:30 PM (1001)

Mind Blanking Does Not Require Inhibition While Mind Wandering Actually Does. CHARLOTTE VAN DEN DRIESSCHE AND JÉRÔME SACKUR, *Ecole Normale Supérieure* – The relationship between mind wandering and executive control appears to be controversial. Some authors define mind wandering as a failure of cognitive control and lack of inhibition (Kane & McVay, 2012) whereas others say that mind wandering is a sustained train of thought and therefore requires executive resources (Smallwood, 2013, Christoff et al., 2015). The refinement of the definition of mind wandering helps to solve this paradox. Indeed, differentiating spontaneous from deliberate mind wandering (Seli et al. 2015) or aware from unaware mind wandering (Franklin et al. 2014) appears to be key. Here tested the hypothesis that mind wandering require executive resources and we used the classification based on the content of the train of thoughts (Van den Driessche, Bastian et al. 2017), including mind blanking (Ward & Wegener, 2013) a mental state were no content can be reported.
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6:00-7:30 PM (1002)

Supporting Evidence That Response and Attentional Inhibition Are Not Sharing the Same Capacity in an Ecuadorian Sample. JOSE A. RODAS (J. Frank Yates Student Travel Award Recipient), *University College Dublin/University of Guayaquil*, CIARA GREENE, *University College Dublin* (Sponsored by Ciara Greene) – Inhibition models tend to identify response and attentional inhibition as functionally different, although it is not clear if these two forms of inhibition share the same capacity. The assumption of a common capacity was tested by comparing performance of an Ecuadorian sample (184 university students) on response inhibition tasks (stop-signal task and Stroop) with performance on a task designed to require attentional inhibition only. The latter task consisted of 30 mathematical sums presented in two conditions: with and without a distractor (the distractor consisted of a video). Performance on response and attentional inhibition did not showed any correlation, although a task evaluating updating in working memory showed a relationship with performance on attentional inhibition when the distractor was presented. Data would suggest that the two forms of inhibition do not share common resources, and that updating might be related to attentional inhibition.
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6:00-7:30 PM (1003)

Evidence for Stimulus-Driven Control Under Concurrent Memory Load. THOMAS G. HUTCHEON, OLIVIA GIBSON, ABIGAIL SULLIVAN, and ELIZABETH FITZGERALD, *Bard College* – Recent evidence has implicated a relatively fast and flexible form of cognitive control that emerges as a function of experience within a task. This so-called stimulus-driven control represents an important modification to existing models of cognitive control. However, context-level manipulations in which this form of control has been observed are frequently confounded with stimulus-response contingencies. Therefore, it is difficult to differentiate between control and contingency learning accounts for the results of these manipulations. In two experiments, we test whether there is evidence for stimulus-driven control while participants are under a concurrent memory load, a situation previously shown to interfere with contingency learning. Consistent with stimulus-driven control accounts and in contrast to contingency learning accounts, we find evidence for stimulus-driven control in a context-specific proportion congruency (CSPC) manipulation (Experiment 1) and an item-specific proportion congruency (ISPC) manipulation (Experiment 2) under both high and low memory load conditions. Together, these results highlight the operation of stimulus-driven control processes in tasks of selective attention.
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6:00-7:30 PM (1004)

Free-Choice Eye Movement Control: Choosing Among Targets of Equal (Bottom-Up and Top-Down) Priority. LYNN HUESTEGGE, OLIVER HERBORT, NORA GOSCH, WILFRIED KUNDE, and ALEKS PIECZYKOLAN, *Würzburg University* – Eye movement control is known to occur on several levels, ranging from bottom-up (stimulus-driven) to top-down (instruction-driven) control. However, one type of top-down control has not received much attention in the oculomotor domain yet, namely voluntary free-choice selection among targets of equal priority (as defined by stimulus characteristics and instructions). Here, we ask which target features (identity-related or location-related) are used to determine where we look in such situations. In two experiments, participants executed a saccade to one of four peripheral targets in three different choice conditions: free choice (unconstrained), constrained choice based on target identity (color), and constrained choice based on target location. A Bayesian analysis of choice frequencies revealed that free-choice selection closely resembled location-constrained choice. This suggests that free-choice oculomotor control is mainly guided by spatial target characteristics, probably because participants avoid less parsimonious re-coding of target-identity representations into spatial codes.
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6:00-7:30 PM (1005)

To Stand or Not to Stand; This Is the Question: Influence of Postural Control Demand on Cognitive Control in Task Switching. DENISE NADINE STEPHAN and IRING KOCH, *RWTH Aachen University* – In the current study we investigated

the effects of postural control on cognitive control processes in task switching. A series of experiments was conducted using cued auditory-manual task switching under different postural control demands (sitting vs. standing). This design allowed us to explore the effect of postural control on switch costs, mixing costs and the between-task congruency effect. In addition, we tested a group of older participants to examine whether these are more sensitive to additional postural control demands. We replicated the standard effects in task switching (i.e., switch costs, mixing costs, congruency effects) in all experiments. Importantly, we demonstrated a selective effect of postural control demands in task switching in terms of an increased congruency effect when standing as compared to sitting. This finding suggests that particularly in situations that require keeping two tasks active in parallel, the postural control demands have an influence on the degree to which cognitive control enforces a more serial (shielded) mode. Our results are also discussed considering the specific influence of age.
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6:00-7:30 PM (1006)

Pupil Size as an Indicator of Arousal and Task Focus. JASON S. TSUKAHARA and RANDALL W. ENGLE, *Georgia Institute of Technology* (Sponsored by Chris Hertzog) – Pupil dilation is a response of activation in the sympathetic nervous system and increased arousal levels. Researchers have suggested that changes in pupil size also corresponds to states of on-task focus vs. off-task focus, such as mind wandering. Mind wandering is a phenomena that occurs on a small time-scale, at one moment you may be focused on a task at hand and the next moment you are distracted by an unrelated thought. However, there is considerable difficulty measuring mind wandering at this micro-level using only the traditional thought-probe methods. The use of pupillometry and eye-tracking may allow researchers to investigate mind wandering on a smaller time-scale. In the current study, we explore this possibility by measuring pupil size, arousal, and mind wandering across different tasks and how they relate to task performance and higher-order cognitive abilities.
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6:00-7:30 PM (1007)

Mindfulness as a Form of Attentional Regulation Training. RUTH KIM, MELISSA J. PTOK, JUDITH SHEDDEN, and SCOTT WATTER, *McMaster University* – Mindfulness is a cognitive strategy involving self-regulation of attention and a nonjudgmental orientation to one's current internal and external states. While attention regulation is central to mindfulness training, the mechanisms by which mindfulness influences attention are unclear. The purpose of this study was to examine whether a brief 15-minute mindfulness induction would improve attention regulation, assessed using an encoded-speeded response (ESR) task. Phases 1 and 2 were used to establish individual baseline performances, and then participants were randomly assigned to either a mindfulness meditation condition or a thought-wandering condition. Phase 3 responses were assessed relative to earlier performance, with accurate and faster responses indicating better regulation and disengagement of attention from the stimulus. Participants in the mindfulness condition had a significantly greater proportion of these fast/disengagement trials in Phase 3 compared to the control condition. These findings suggest that mindfulness training may improve attention by enhancing attentional regulation and disengagement.
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6:00-7:30 PM (1008)

Individual Differences in Cognitive Control and Working Memory: Tracing the Cognitive Correlates of Grit. NURIA V. AGUERRE, *University of Granada*, CARLOS GOMEZ-ARIZA, *University of Jaen*, TERESA BAJO, *University of Granada* (Sponsored by Carlos Gomez-Ariza) – Grit is a personality trait that refers to the tenacious pursuit of a dominant superordinate goal despite setbacks. Individual differences in grit have drawn the attention of cognitive neuroscientist with the idea of understanding the neurocognitive mechanisms that underpin this trait. In previous work we have shown its relation with the processing of cues when using cognitive control in the AX-CPT. As the relationship between grit and cognitive control seems to be nonlinear, in the present work we aim at exploring the role of working memory and inhibitory control in this relationship. In our study, 100 participants differing in grit were assessed with five experimental tasks (O-Span, Stroop task, AX-CPT, Switching Task and Stop Signal Task) to establish their efficiency in cognitive control and working memory.
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6:00-7:30 PM (1009)

Evidence for Stage-Specific Desirable Difficulty. MELISSA J. PTOK, KARIN R. HUMPHREYS, JUDITH SHEDDEN, and SCOTT WATTER, *McMaster University* (Sponsored by Judith Shedden) – The desirable difficulty effect is described by instances where increasing difficulty during initial task performance leads to better encoding of the targeted information. We take a stage-specific approach to investigate what particular task elements should produce this congruency priming/ desirable difficulty benefit. Across several experiments, we have found that enhancing cognitive control demands at a semantic categorization stage of processing elicits this effect. The objective of this study was to provide further evidence of this stage-specific account – providing us with a better understanding of the mechanisms involved. Participants completed a congruency-priming task where they categorized names/words (e.g. male or female names) while ignoring distractor primes (e.g. the words "male" or "female"). This was followed by a subsequent memory test. The results discuss a simple model of limited-capacity cognitive control allocation that accounts for and predicts where and when desirable difficulty effects occur.
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6:00-7:30 PM (1010)

Stay on Target: Does Mind Wandering Affect Prospective Memory? KRISTINA KRASICH and SAMUEL F. MURRAY, *University of Notre Dame*, MYRTHE FABER, *Radboud University*, JAMES R. BROCKMOLE, *University of Notre*

Dame (Sponsored by James Brockmole) – People often forget to complete future actions, known as prospective memory (PM) errors. We tested whether mind wandering (MW)—an attentional shift from task-related to unrelated thoughts—affects PM and whether the severity of the consequence following an error affects this relationship. Participants served lunches to virtual students, adjusting for students with dietary restrictions. Failures to serve the correct lunch had moderate or severe consequences: we manipulated whether participants received monetary reward, monetary punishment or no monetary incentive for their performance on this task. Periodically, participants self-reported whether they were paying attention to the task or mind wandering. We show that MW was associated with greater PM errors. This relationship was unaffected by the severity of the consequence following PM errors unless participants were monetarily incentivized: participants who received a monetary reward in the severe consequences condition self-reported MW more often and committed more frequent PM errors. Collectively, results suggest that the relationship between MW and PM is sensitive to reward and the potential consequence following a PM error.
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6:00-7:30 PM (1011)

The Influence of Thought Probes on Performance: Does the Mind Wander More if You Ask it? ELIZABETH A. WIEMERS and THOMAS S. REDICK, *Purdue University* (Sponsored by Thomas Redick) – Numerous studies have demonstrated the potential costs and benefits of mind-wandering in relation to ongoing task performance. Commonly, mind-wandering is measured via self-report thought probes within an ongoing task. However, a critical issue to determine is whether or not the presence of the thought probes fundamentally alters an individual's typical performance on the task. In the current study, 149 participants completed a sustained attention to response task (SART) with and without thought probes. Working memory capacity (WMC) was also measured, to evaluate the relationship between individual differences in WMC, mind-wandering, and thought probes. The results indicate that SART performance does not differ based on thought probe presence. Individual differences in WMC were associated with better SART performance in probe-present and probe-absent conditions. Additionally, individual differences in WMC negatively correlated with mind-wandering frequency. The results indicate that thought probes are a non-reactive manner to measure mind-wandering in attention and inhibition tasks.
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6:00-7:30 PM (1012)

Working Memory and External Stroop Tasks: Comparison of Conflict Adaption Effects in Response Times and ERPs (N450). MARK E. FAUST, ERICA GOWAN, MONICA NELSON, CHRIS ANDERSON, and MATT GRANSON, *University of North Carolina at Charlotte*, KRISTI S. MULTHAUP, *Davidson College* – Previously, we compared RT-based and ERP-based distractor interference effects for matching external and internal Stroop color identification tasks (i.e., color patch identification with external distractor words over the color patch vs. internal distractor words held in WM, based on Kiyonaga & Egner, 2014), and found similar distractor interference for RT- but not ERP-based distractor interference effects. This divergence challenges the idea that similar distractor interference in RTs across tasks is indicative of similarities between external attention and internal attention associated with WM. Our present results compare matching versions of the internal and external tasks in terms of conflict adaptation (CA, changes in distractor interference contingent on the prior trial thought to reflect cognitive control). We will report on CA, for RTs and ERPs, across the internal and external distractor tasks. Similarity of CA for RTs, but not for ERPs, would further suggest important processing differences between internally- and externally-directed attention.
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6:00-7:30 PM (1013)

Re-examining the "Brain Drain" Effect: Replicating Ward et al. (2017). ANA CECILIA RUIZ PARDO, and JOHN PAUL MINDA, *The University of Western Ontario* (Sponsored by John Paul Minda) – Smartphones are nearly ubiquitous and as a result, researchers have begun to study whether or not there are negative consequences that result from this ubiquity. Previous research has found attentional costs of smartphone usage during driver performance and in other contexts. The rising prevalence of smartphones has prompted research about how they can impact cognitive abilities. In the present study, we replicated Ward et al.'s (2017) second experiment. Participants were randomly assigned to place their smartphones according to one of six conditions: on their desk, in their pocket/bag, or outside of the testing room (with their phones powered either on or off in each location. As in Ward et al., each participant then completed an automated Operation Span and a Cue-Dependent Go/No-Go task, followed by a smartphone dependency questionnaire. Results did not replicate Ward et al.'s original findings: neither smartphone location and/or power impacted task performance. Therefore, future research should investigate whether smartphones can impact cognition as a whole or what the underlying mechanisms behind these interference are.
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6:00-7:30 PM (1014)

The Role of Rehearsal in the Irrelevant Sound Effect. JAMIELYN R. SAMPER, ALEXANDRA B. MORRISON, and JASON CHEIN, *Temple University* (Sponsored by Jason Chein) – The processes involved in maintaining information in working memory (WM) are highly debated within the scientific literature. Among the most turbulent of topics is how these processes are disrupted when irrelevant noise is present in the environment, a phenomenon known as the irrelevant sound effect (ISE). While some theorists posit that cognition suffers in the presence of background noise due to the split obligation of attention to the irrelevant sound and the to-be-remembered information, others believe that background noise corrupts order information within WM. Due to the general reliance on serial recall tasks, the serial order component becomes infused with a rehearsal strategy as a necessary factor in finding an ISE, thus confounding the basis of the ISE. The present study

aims to isolate serial order from rehearsal by using a running memory span task that discourages rehearsal to investigate if a rehearsal strategy is necessary to observe an ISE. Through four experiments, we demonstrate that rehearsal is not an essential causal factor of the ISE, suggesting that irrelevant sounds interfere with WM processes beyond those involved in ordered maintenance.
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6:00-7:30 PM (1015)

Task Sets Determine the Boundaries of Cognitive Control. SAVANNAH L. COOKSON, *University of California, Berkeley*, LAUREN D. GRANT and DANIEL H. WEISSMAN, *University of Michigan* – Prior findings suggest that task sets serve as boundaries for control processes underlying the congruency sequence effect (CSE). These findings are difficult to interpret, however, because researchers confounded control processes with contingency learning processes. We therefore revisited the task set boundary hypothesis in four new experiments (all N=32) that employed different variations of a "confound-free" cross-modal (auditory/visual) temporal flanker task. Consistent with prior work, we found that the CSE transfers between modalities only when the task structure encourages participants to adopt a single, modality-general task set. However, our findings suggest an additional requirement for such cross-modal transfer: the sensory modality in which the distractor appears must not enable participants to reduce a many-to-one stimulus-response mapping to a one-to-one mapping. Finally, contrary to prior data, we found that the CSE transfers between two stimulus categories even when those categories are mapped to separate hands. These results confirm some prior findings regarding the boundaries of control processes underlying the CSE, but also reveal new effects that require additional explanation.
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6:00-7:30 PM (1016)

Automatic Effects of Motor Imagery. ARIANE JIM, BAPTIST LIEFOOGHE, and JAN DE HOUWER, *Ghent University* (Sponsored by Baptist Liefooghe) – Motor imagery refers to a dynamic state during which the representation of a given motor act is internally rehearsed within working memory, without any overt movement. Although motor imagery is widely used for optimizing a variety of complex skills, nothing is known about the power of motor imagery in inducing automaticity. The current study presents a series of experiments in which we investigate this issue by elaborating on previous research, which demonstrated that new instructions can already trigger automatic effects, even when these instructions were never applied overtly before. More precisely, we investigated whether motor imagery has the power to modulate and even extend such automatic effects. Results of a series of behavioral experiments suggest that motor imagery increases the strength of automatic effects of new and unapplied instructions. We propose that whereas instruction implementation leads to action representations in working memory, motor imagery can result in the formation episodic traces in long-term memory.
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6:00-7:30 PM (1017)

Transcutaneous Vagus Nerve Stimulation (tVNS) Enhances Conflict-Triggered Adjustment of Cognitive Control. RICO FISCHER, *University of Greifswald*, CARLOS VENTURA-BROT, *University of Potsdam*, ALFONS HAMM, *University of Greifswald*, MATHIAS WEYMAR, *University of Potsdam* – Response conflicts play a prominent role in the flexible adaptation of behavior. Previous studies have highlighted the functional roles of the affectively aversive and arousing quality of the conflict signal in triggering the adaptation process. We tested for the causal impact of arousal on behavioral and electrophysiological markers for adaptation to conflict. Participants performed a response conflict task with either transcutaneous vagus nerve stimulation (tVNS) to directly modulate the arousal system or neutral sham stimulation. In both sessions the N2 and P3 event-related potentials (ERP) were assessed. In line with previous findings, conflict interference, the N2 and P3 amplitude were reduced after conflict. Most importantly, this adaptation to conflict was enhanced under tVNS compared to sham stimulation for conflict interference and the N2 amplitude. No effect of tVNS on the P3 component was found. These findings suggest an involvement of arousal in the adaptation to conflict, which may be linked to promoting activity of the locus coeruleus-norepinephrine system. The present findings add important pieces to the understanding of the neurophysiological mechanisms of conflict-triggered adjustment of cognitive control.
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6:00-7:30 PM (1018)

Using Pupillometry to Study Within-Task Performance Variation in Single-Item and Multi-Item Stroop Tasks. LAOURA ZIAKA and ATHANASSIOS PROTOPAPAS, *University of Oslo* (Sponsored by Athanassios Protopapas) – We have recently found that performance remains stable during the course of the single-item version of the Stroop task, whereas it decreases during an equivalent multi-item version. The decrease is attributed to the emergence of an ego-depletion state. To further investigate within-task performance changes, we examined variation in pupil size, a physiological index of cognitive effort, known to dilate in the incongruent condition of the single-item Stroop task, indicating effort. We found an increase of dwell time during the multi-item version but decrease in the corresponding single-item version. In contrast, pupil size decreased in the course of both versions, consistent with gradually decreasing effort, for different reasons, namely effective cognitive control in the single-item version but reduced vigilance due to ego depletion in the multi-item version. As both tasks are very brief, the results highlight the role of task complexity, rather than duration, as the critical factor for depletion.
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6:00-7:30 PM (1019)

The Role of Rehearsal in the Irrelevant Sound Effect. JAMIELYN R. SAMPER, ALEXANDRA B. MORRISON, and JASON CHEIN, *Temple University* (Sponsored by Jason Chein) – The processes involved in maintaining information in

working memory (WM) are highly debated within the scientific literature. Among the most turbulent of topics is how these processes are disrupted when irrelevant noise is present in the environment, a phenomenon known as the irrelevant sound effect (ISE). While some theorists posit that cognition suffers in the presence of background noise due to the split obligation of attention to the irrelevant sound and the to-be-remembered information, others believe that background noise corrupts order information within WM. Due to the general reliance on serial recall tasks, the serial order component becomes infused with a rehearsal strategy as a necessary factor in finding an ISE, thus confounding the basis of the ISE. The present study aims to isolate serial order from rehearsal by using a running memory span task that discourages rehearsal to investigate if a rehearsal strategy is necessary to observe an ISE. Through four experiments, we demonstrate that rehearsal is not an essential causal factor of the ISE, suggesting that irrelevant sounds interfere with WM processes beyond those involved in ordered maintenance.
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6:00-7:30 PM (1020)

Unexpected Conflict Signals Loom Larger in a Positive Context: Evidence From Context Specific Control Adjustments. GESINE DREISBACH, KERSTIN FRÖBER, and ANJA BERGER, *Regensburg University*, RICO FISCHER, *Universität Greifswald* – One prominent feature of adaptive cognition in humans is the ability to flexibly adjust to changing task demands. In this respect, context-specific proportion congruency (CSPC) effects describe the phenomenon that participants learn to adapt to contexts of frequently occurring conflicts even when the upcoming context cannot be anticipated. Here, we aim to provide evidence that such CSPC effects strongly depend on the affective valence of the context. In three experiments, positive or negative stimuli were associated with a high proportion of incongruent trials and a low proportion of congruent trials, respectively. Overall, results show that a CSPC effect can only be observed when the high proportion of incongruent trials was associated with positive stimuli but reduced or even absent when the high proportion of incongruent trials was associated with negative stimuli. The findings further speak to the idea that it is the aversive nature of conflict stimuli that functions as a trigger for control adaptation. And such an unexpected aversive conflict signal looms larger when presented in a positive context than in a negative context.
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READING

6:00-7:30 PM (1021)

A Network Model of Reading Comprehension. SARA ANNE GORING and CHRISTOPHER J. SCHMANK, *Claremont Graduate University*, MICHAEL J. KANE, *University of North Carolina at Greensboro*, ANDREW R.A. CONWAY, *Claremont Graduate University* (Sponsored by Andrew Conway) – Individual differences in reading comprehension among healthy young adults are well established, but the extent to which these differences are due to variation in domain-general versus domain-specific processes is still a matter of debate. Recently, Freed, Hamilton, and Long (2017) argued that individual differences in reading comprehension can be largely explained by language experience and reasoning and concluded that working memory capacity is not an important factor regarding variation in comprehension. We re-analyzed the Freed et al. data, using latent-variable and network-modeling approaches, to assess the role of working memory capacity versus other factors in reading comprehension. The results demonstrate that working memory capacity is more important in reading comprehension than previously concluded. Overall, we argue that both domain-general and domain-specific processes are associated with individual differences in reading comprehension.
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6:00-7:30 PM (1022)

How Stuff Doesn't Work: Dealing With Inaccuracies in Scientific Explanations. BRENT STEFFENS, *Grand Valley State University*, M. ANNE BRITT and KEITH K. MILLIS, *Northern Illinois University* – The Content-Source Integration Model (Stadtler & Bromme, 2014) contends that a reader's goals impact how inaccurate text information is detected and represented in memory. The current studies tested the model using scientific explanations, which have been shown to be challenging for students (Steffens et al., 2015). Each explanation contained two events which were consistent or inconsistent. Additionally, participants either received a detailed description of an explanation and a goal to ensure the causal chain made sense, or were simply told to read and understand each text. Across two experiments, participants showed detection of the inconsistencies during reading. This result did not depend on the assigned reading goal. However, readers could not correctly identify the inconsistency after reading, and did not show systematic regulation behaviors after encountering the inconsistencies. Together, readers appear to lack appropriate strategies for constructing coherent representations of scientific explanations. Stronger scaffolds are necessary to improve conflict regulation.
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6:00-7:30 PM (1023)

Eye-Tracking Exposure to Misinformation on Social Media: When Do We Notice "Fake News"? ALYSSA N. BLAIR and SUSAN R. GOLDMAN, *University of Illinois at Chicago* – The quality and accuracy of information that individuals encounter online varies extensively, prompting widespread concern from researchers, educators, and the general public (Alcott & Gentzkow, 2017; Balmas, 2014; Goldman & Scardamalia, 2013). To speak to this issue, we examined the online processing of accurate and inaccurate information presented in a social media format through a combination of eye-tracking, think-aloud protocols, and an adaption of Marsh, Meade, and Roediger's (2003) narrative misinformation paradigm. The first study presents baseline eye-tracking and think-aloud data for reading on a social media platform, describing what participants attend to and why. In study two, participants read experimenter-constructed social media pages that included accurate, neutral,

and inaccurate before completing an open-ended recall and source-monitoring test. Results of this recall test are discussed in relation to fixation times for accurate versus inaccurate target statements, highlighting the role of attention in the acquisition of misinformation online.
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6:00-7:30 PM (1024)

Predicting Reading Comprehension From Eye Movements. JULIE GREGG and SIDNEY K. D'MELLO, *University of Colorado, Boulder* – We know that reading involves a coordination between textual characteristics and visual attention, but what do eye movements during reading tell us about comprehension? We addressed this question by training random forest models (a machine learning technique) to predict reading comprehension from global, page-level eye movement features in a person-generalizable manner. We used data from two prior studies in which readers (Ns = 104, 130) answered multiple-choice comprehension questions during and/or shortly after (~30 mins) reading a 6500-word text. The models were highly accurate at predicting reading comprehension assessed during reading at both the page- (AUROC = .882) and participant- level (r = .671; computed by aggregating page-level predictions). Accuracy for the post-reading models was lower (AUROCs between .538 and .552; rs between .343 and .373), but significantly above chance baselines. Collectively, these findings confirm how eye movement features can capture underlying reading strategies and cognitive states associated with reading comprehension.
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6:00-7:30 PM (1025)

Does Learning the Meaning of a Word Make Spelling Easier? Evidence From Incidental Word Learning During Reading. SHAUNA P.A. DE LONG (Graduate Travel Award Recipient) and JOCELYN R. FOLK, *Kent State University* (Sponsored by Jocelyn R. Folk) – Research on incidental vocabulary learning during reading has found links between the development of orthographic and semantic knowledge, but the nature of this relationship remains unclear. The current study primarily investigates whether semantic knowledge benefits orthographic knowledge. Participants were exposed to 14 novel non-words embedded in sentences with either informative or uninformative context; the spelling frequency of the novel words was also manipulated (high x low). Participants were exposed to each novel word 3 times in different sentences within the same context condition. Response accuracy was assessed using orthographic and semantic posttests. Results indicated that the relationship between context and orthographic accuracy was moderated by spelling frequency such that when a word had a less common—more difficult—spelling, participants were more likely to learn spellings to words with a known meaning. These findings indicate that teaching words' spellings and meanings independently of one another may not be the most beneficial means of learning new words.
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6:00-7:30 PM (1026)

Word Learning Influences Word Skipping, But Word Skipping Does Not Influence Word Learning. MICHAEL A. ESKENAZI, CASSIDY G. CAMPBELL, and BAILEY NIX, *Stetson University*, ASHLEY N. ABRAHAM, JOCELYN R. FOLK, *Kent State University* – Readers regularly encounter novel words during reading and, without intention, create a new lexical representation for that word. Recent research has investigated online processing of lexical acquisition using eye-tracking (Lowell & Morris, 2017; Joseph et al., 2014). Evidence suggests that readers' fixation durations and regression rates decrease with more exposures, which is indicative of the lexical acquisition process. However, research has not yet investigated the role of word skipping in lexical acquisition. The current study investigated whether participants' novel word skipping patterns influenced learning the meaning of a novel word in context. Eighteen novel words were embedded into three distinct, informative sentences and 120 participants' eye movements were monitored during reading, which was followed by a surprise vocabulary test. Participants skipped novel words on 18% of trials (excluding trials in which an immediate regression was made to the novel word). Results indicated that word skipping did not influence word learning; however, participants' skipping rates increased across the three trials (15%, 18%, 21%). The results provide evidence that word skipping is mostly based on lexical processing.
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6:00-7:30 PM (1027)

Semantic Parafoveal Processing: Evidence From Lexical Ambiguity Resolution. ASHLEY N. ABRAHAM, *Kent State University*, MICHAEL A. ESKENAZI, *Stetson University*, JOCELYN R. FOLK, *Kent State University* (Sponsored by David Riccio) – Parafoveal-on-foveal (POF) effects – when parafoveal processing influences reading of a fixated word –have been debated (Brothers, et al., 2017). Recent research suggests highly-skilled readers are able to process semantic information in the parafovea (Veldre & Andrews, 2016). Therefore, they may be more likely to demonstrate semantic POF effects. We investigated differences in parafoveal processing and POF effects by exploring skill differences in lexical ambiguity resolution. Participants read sentences containing an ambiguous word (e.g. boxer) that was immediately followed by either a disambiguating word (e.g. talk) or neutral word (e.g. fall). Results suggest that ambiguity effects do not emerge until readers encounter the disambiguating word, consistent with serial models of eye movement control. However, individual differences in skill impacted reading behavior and may be related to POF effects. The results have implications for models of eye movement control and for understanding individual differences in the skilled reader population.
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6:00-7:30 PM (1028)

Modeling Word Length Effect in Lexical Decision: The Role of Visual Attention. EMILIE GINESTET and THIERRY PHÉNIX, *Université Grenoble Alpes - LPNC*, JULIEN DIARD and SYLVIANE VALDOIS, *CNRS - LPNC* (Sponsored by

Sylviane Valdois) – The word length effect in Lexical Decision (LD) has been studied in many behavioral experiments but no existing computational models can simulate this effect. We recently implemented a new Bayesian model of visual word recognition, the BRAID model, that simulates expert readers' performance. BRAID integrates an attentional component modeled by a Gaussian probability distribution but no phonological component. Through simulations, we explored the role of visual attention on the LD word length effect using 1,200 French words from 4 to 11 letters. The simulation results show that the BRAID model successfully simulates the LD word length effect reported in the French Lexicon Project and that the magnitude of the effect can be modulated by the distribution of attention. Simulations suggest that neither crowding nor the acuity gradient are critical to account for this effect but that visual attention is a key feature of single word recognition.
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6:00-7:30 PM (1029)

Adult Age Differences in Reading: Effects of Length and Predictability. KAYLEIGH L. WARRINGTON, SARAH J. WHITE, and KEVIN B. PATERSON, *University of Leicester* (Sponsored by Sarah White) – Despite being well documented, age-related reading difficulties and the associated age differences in eye movement behaviour are poorly understood. One suggestion is that young and older adults differ in their use of textual cues to word identity, such as context or word length. Previous research has examined age differences in the use of predictability (Rayner et al., 2006) or word length information (Paterson et al., 2013). However, these variables have only been examined separately for older adults. Given age-related declines in visual acuity, which are more pronounced in the parafovea, word length may modulate older adults' use of predictability information. Accordingly, we conducted an experiment in which the predictability of a critical word was varied. In addition, the target words were short (4–6 letters), medium (7–9), or long (10–12). The results build on previous research with young adults (Rayner et al., 2011) and demonstrate that both age-groups make use of predictability information for words of all lengths. These results have implications for understanding the nature of adult age differences in reading.
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6:00-7:30 PM (1030)

Interruptions During Reading Do Not Reduce the Effects of Inaccurate Information. AMALIA M. DONOVAN and DAVID N. RAPP, *Northwestern University* (Sponsored by David N. Rapp) – People routinely encounter false information, which can lead them to doubt their accurate knowledge, and/or to be influenced by the inaccuracies. Various tasks attempt to encourage more evaluation to reduce these effects, albeit with limited success. Readers unfortunately encode inaccurate information into memory, making it available for subsequent use. Thus, disrupting encoding during reading might decrease the effects of such exposure. In this project, participants read texts containing false assertions (e.g., "Seat belts do not save lives") with interruptions (intermittently completing math problems) or without interruption. After reading, participants judged the validity of statements potentially related to the assertions. Participants made more errors on the judgment task after reading inaccurate as compared to accurate assertions, replicating previous findings. This obtained whether or not participants were interrupted during reading. Explanations as to why encoding disruptions are insufficient to reduce the effects of exposure to inaccurate information will be discussed.
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6:00-7:30 PM (1031)

Modeling the Effects of Similarity and Variability in a Complex Task: Effects of Blocking Without Attention? TANJA C. ROEMBKE (J. Frank Yates Student Travel Award Recipient), ELIOT HAZELTINE, and BOB MCMURRAY, *University of Iowa* (Sponsored by Bob McMurray) – Interleaved training helps to identify contrasts between highly similar categories, but blocked training benefits learning low within-category similarity (Carvalho & Goldstone, 2014). Similarly, in reading, the learning of vowel sound/spelling correspondences may depend on the order of items during training as well as the similarity structure of irrelevant elements (consonants; McMurray et al., submitted; Roembke et al., submitted). To investigate this in the laboratory, we trained adults to map abstract four-symbol strings onto three-finger manual responses, a task modeled after reading. Participants (N=15/condition) were trained on variable or similar consonant sets, and with vowels either blocked or interleaved. We found a similarity benefit for interleaved but not blocked training. However, for generalization, there was a variability benefit. Surprisingly, a simple backpropagation model showed both patterns—including blocking. This suggests that blocking effects—typically thought to invoke explicit strategies, such as attention—may derive from associative principles.
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6:00-7:30 PM (1032)

Elaborations Impair Memory for the Main Ideas in Expository Text. NOLA DALEY and KATHERINE A. RAWSON, *Kent State University* (Sponsored by Katherine Rawson) – Textbooks commonly include elaborations meant to support learning of the main ideas. Yet, research indicates elaborations impose a large time cost without providing any benefit to memory (Daley & Rawson, under review). The current study conceptually replicated and extended this research to investigate why elaborations do not enhance learning. In two experiments, students read either an elaborated or unelaborated passage on the process of hearing. On a final test two days later, memory for the main ideas was lower for the elaborated versus the unelaborated version. Was this due to time spent processing main ideas? Students spent less time reading main ideas in the elaborated versus unelaborated version, despite spending considerably more time reading overall. Additionally, Experiment 2 provided evidence that students have difficulty identifying the main ideas in the elaborated text. These results suggest elaborated texts are less effective than unelaborated texts for learning of main ideas.
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6:00-7:30 PM (1033)

When Mistakes Fail to Instruct: The Effect of Incorrect Examples on Science Text Comprehension. ALLISON J. JAEGER, *St. John's University*, SHAYNA BLACK and THOMAS F. SHIPLEY, *Temple University* – Learning in science is challenging because it depends largely on being able to comprehend complex systems and diagrams. In math, research has found that explaining incorrect worked examples (IWE) can support problem solving (Booth et al., 2013). IWEs have also been shown to support comprehension of 3D geologic diagrams (Jaeger et al., under review). The present study explored the effectiveness of explaining errors in conceptual diagrams for supporting expository science text comprehension. Participants read six short texts on plate tectonics and generated sketches, copied correct diagrams, or explained errors in incorrect diagrams. While no differences were found on a multiple-choice posttest, participants in the IWE condition included fewer correct concepts in their essays and reported greater task difficultly than students who sketched or copied. This suggests that IWEs may not support expository science text comprehension. Analyses on differences in spatial thinking, activity quality, and misconceptions will also be discussed.
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6:00-7:30 PM (1034)

The Limitations of Retrieval Practice for Comprehension. TRICIA A. GUERRERO, THOMAS D. GRIFFIN, and JENNIFER WILEY, *University of Illinois at Chicago* – Retrieval practice, the process of retrieving information from memory, has been well documented as a method to promote meaningful learning that can have lasting, persistent effects in some contexts (Roediger & Karpicke, 2006). However, prior work on learning from expository science texts suggests that testing opportunities that require more constructive activities (in contrast to purely reproductive activities) are needed to improve comprehension outcomes (Hinze, Wiley, & Pellegrino, 2013). The current work manipulated the extent to which students engaged in retrieval practice versus more constructive activities after studying complex expository texts. Learning outcomes were assessed with a final test on each topic. The benefits obtained from the various testing opportunities varied as a function of question types that included memory-based detail questions, bridging and causal inference questions, and application questions.
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6:00-7:30 PM (1035)

Drawing Improves Metacomprehension Accuracy. KEITH THIEDE, KATHERINE WRIGHT, JULIANNE WENNER, and SARA HAGENAH, *Boise State University* – We evaluated the effects of two drawing interventions on metacomprehension accuracy: The Elements-Focused Group was instructed to include key elements in their drawings; whereas, the Connections-Focused Group was instructed to include key elements but also attend to the connections between the elements. After receiving drawing instructions and working through one practice texts, fifth graders read a science text and generated a drawing while they read. They then predicted their performance and completed a test for the text, which included 5-inference questions. Participants repeated this procedure for five texts. The groups did not differ in terms of quality of drawings. They did not differ on predicted performance, however, inference test performance was greater for the Connections-Focused Group than for the Elements-Focused Group. More important, absolute and relative accuracy were greater for the Connections-Focused Group than for the Elements-Focused Group.
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6:00-7:30 PM (1036)

Examining the Role of Font Styles in Estimates of Learning, Liking, and Memory of STEM Materials. LINDA J. MYERS, RAESHAUN JONES, PAYNE WINSTON-LINDEBOOM, OLIVIA DE LA PAZ, SARAH BONNELL and JODI PRICE, *University of Alabama in Huntsville* – We investigated how presenting science passages in fluent (16 pt. black Arial font) and disfluent (12 pt. 60% grayscale Comic Sans) font styles influenced participants' judgments of learning (JOLs), and judgments of liking (JOLIs). Judgment order (JOLs first, JOLIs second; JOLIs first, JOLs second) and Passage order (Waves first, Atmospheric Circulation second; Atmospheric Circulation first, Waves second) were also manipulated to yield eight conditions. Collecting both types of judgments allowed us to examine whether students exposed to STEM-based textbook materials in a fluent font size and style give higher JOLs and JOLIs than those presented in a disfluent font style, and whether these metamemory judgments align to predict memory performance. The results revealed participants gave similar values for JOLs and JOLIs, with the only differences driven by passage type and order. Neither judgment was an accurate predictor of memory performance and performance did not differ by font type or passage condition.
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6:00-7:30 PM (1037)

Pupil Diameter and Metacomprehension Judgments. AARON WONG and JARROD MOSS, *Mississippi State University* (Sponsored by Jarrod Moss) – Studies have shown that readers may rely on different heuristics when making metacomprehension judgments with some heuristics relying on cues from a situation model and other relying on cues such as topic familiarity. The use of these heuristics requires varying amounts of cognitive control. Pupil diameter has been shown to be related to task engagement and cognitive control. Therefore, pupil diameter could potentially be used to implicitly measure heuristic use during metacomprehension judgments. The current study is an exploratory study looking at the relationship between pupil diameter and metacomprehension judgments. Across two studies, pupil diameter was measured while participants made judgments of learning (JOL) for texts. Pupil diameter was found to be a significant predictor of JOL magnitude. In addition, JOL magnitude was a significant predictor of test performance. The findings suggest that pupil diameter could be used as a measure to examine heuristic use for metacomprehension judgments.
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6:00-7:30 PM (1038)

Memory for Actions That Are Done, Imagined, or Promised in Text. SARAH-ELIZABETH DESHAIES and KIEL CHRISTIANSON, *University of Illinois at Urbana-Champaign* – Thinking about an action is sometimes misremembered as doing the action (Garry et al., 1996). We wondered if this sort of effect holds when people read texts depicting characters thinking about or promising to undertake an action, compared to doing the action. In two experiments, participants read vignettes that depicted characters as doing, thinking about, or promising to do things. After participants read each vignette, they were asked, e.g., "Did Monica walk the dog?" Participants responded yes or no. Accuracy and response latencies were measured. Experiment 1 compared just the three verbs. LME analysis showed that participants responded faster and more accurately ('yes') to the did condition than the thought/promised conditions ('no'); however, there were ~40% 'yes' responses in the latter conditions. Experiment 2 added the factor of character trustworthiness (normed), e.g., nurse/senator. Again, there was a robust effect of verb, but no main or interactive effects of trustworthiness.
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6:00-7:30 PM (1039)

The Plausibility of Alternative Causes and the Continued Influence Effect. PATRICK R. RICH, *University of Mary Washington*, AMALIA M. DONOVAN and DAVID N. RAPP, *Northwestern University* – Research indicates that people continue to rely on previously mentioned, but discredited, causal information when reasoning about an event (the continued influence effect). However, this continued influence can be reduced by providing a reasonable alternative explanation. If alternative explanations reduce continued influence by counteracting the explanatory role of the discredited information, then this reduction should depend on the plausibility of the alternative. In the current study, we investigated whether high plausibility alternatives reduce continued influence more than low plausibility alternatives. Participants read a report about a warehouse fire resulting from pressurized gas cylinders. After learning this causal information was incorrect, some participants encountered a high plausibility alternative (faulty wiring) while others encountered a low plausibility alternative (detonated cannon). Contrary to our prediction, both alternatives reduced continued influence to the same extent. These findings suggest that high plausibility and low plausibility alternatives have similar effects on the updating of discredited information.
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6:00-7:30 PM (1040)

Eye Movement Behaviour During Reading: Effects of Preceding Text Difficulty. SARAH J. WHITE and FAYE O. BALCOMBE, *University of Leicester*, TIMOTHY J. SLATTERY, *Bournemouth University* – Two experiments are presented that examine how the difficulty of preceding sentences modulates eye movement behaviour during reading of subsequent sentences. In each experiment there were two blocks of trials, and the difficulty of the filler items was manipulated. The difficult block included filler sentences with an object relative clause, nested relative clause, or a syntactic ambiguity. The easy block included control versions of these filler items. All participants completed both blocks, and the order of the blocks was counter-balanced across participants. Each block also included experimental items. For these items the characteristics of a critical word were manipulated: word frequency in Experiment 1 and word predictability in Experiment 2. For the first block of trials, preceding text difficulty modulated first-pass eye movement behaviour, with longer gaze durations on words within experimental items when preceded by difficult filler sentences. The results indicate that the difficulty of preceding text can modulate eye movement behaviour for subsequent sentences. Implications for models of eye movement behaviour during reading will be discussed.
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6:00-7:30 PM (1041)

Return-Sweep Saccades and Undersweep Fixations During Reading in Adults and Children. ADAM J. PARKER, TIMOTHY J. SLATTERY, JULIE A. KIRKBY, *Bournemouth University* (Sponsored by Timothy Slattery) – Return-sweeps are a specific eye movement that direct a reader's gaze from the end of one line to the start of the next. As yet, insufficient eye-movement research has been conducted with children to allow an understanding of return-sweeps across the developmental trajectory. We present two eye movement studies in which return-sweeps are compared between developing and skilled adult readers. In the first study, we report that children's return-sweeps are launched closer to the end of a line while they land closer to the start of the next. Children made more corrective saccades following a return-sweep than adults. However, children did not take any longer to make these corrections than adults. In the second study, we examined the effect that the brief pause prior to a corrective saccade (undersweep fixation) had on subsequent reading. We found that following an undersweep fixation, reading time measures were shorter on target words in both adults and children and there was an increased rate of skipping. Together these results show that while children's eye movement are more prone to return-sweep error, they are just as efficient as adults at correcting these errors and utilising information encoded during undersweep fixations.
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6:00-7:30 PM (1042)

Binocular Coordination and Return-Sweep Saccades Amongst Skilled Adult Readers. ADAM J. PARKER, *Bournemouth University*, MIRELA NIKOLOVA, *University of Southampton*, TIMOTHY J. SLATTERY, *Bournemouth University*, SIMON P. LIVERSEDGE, *University of Central Lancashire*, JULIE A. KIRKBY, *Bournemouth University* (Presented by Julie A. Kirkby) – An increasing body of research concerning binocular coordination and reading indicates that disparities, of approximately 1-character space, are reported on a significant proportion of fixations. Return-sweeps are saccadic eye movements that act to direct the readers gaze from the end of one line to the start of the next. Inflated initial fixation durations on a line are attributed to increased

binocular disparity. Previous research has found that the magnitude of binocular disparity is related to the length of the preceding saccade. The aim of the current study was to measure the magnitude and direction of binocular disparity following return-sweeps in skilled adult reading. Analyses indicated that the magnitude of disparity and the prevalence of uncrossed fixations (where the left eye fixates further to the left than the right eye) were increased following a return-sweep. Yet, this increase was resolved and was comparable to within-line binocular disparity by the end of fixation. Similar to previous findings, binocular disparities were most often uncrossed. This adds support to the notion that binocular disparity appears to occur as a consequence of low-level oculomotor characteristics of the saccade orienting system.
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6:00-7:30 PM (1043)

What Should I Remember? Clefts and Connectives Affect Later Text Memory. KOLE NORBERG and SCOTT H. FRAUNDORF, *University of Pittsburgh* (Sponsored by Kathleen Hourihan) – As we read, we must integrate information from previous sentences with the sentence we are currently reading. We often use connectives and clefts to make the relationships among sentences clear. But do these overt relationship indicators actually affect processing and memory for what we read? We investigated the effect of adversative connectives and it-clefts on the ability to read and remember a text. Reading times were collected as participants read stories, such as "The British and the French searched for the monkey in Indonesia and Malaysia. However, the British found the monkey in Indonesia." After reading the stories, they took a memory test in which they had to distinguish between the contrasting items (e.g., British vs French and Indonesia vs Malaysia). It-clefts improved memory for the first contrast set whereas differential effects among different connectives suggested that they may vary in their ability to facilitate subsequent memory. Finally, the pattern of online reading times across conditions did not match the pattern of memory performance, indicating these effects were not driven by processing time.
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6:00-7:30 PM (1044)

"All's Well That Ends Well"—Comparing Children and Adults' Reading Comprehension of Comics Through a Coherence Paradigm: An Eye-Tracking Study. LORENA ALICIA MARTIN-ARNAL, JOSÉ ANTONIO LEÓN, and RICARDO OLMOS, *Universidad Autónoma de Madrid* (Sponsored by Juan Botella) – Nowadays, eye-tracking have proven to be a good measure of comic reading (Rayner, 2009). Understanding theories put an emphasis on meaning changes across sequences (Cohn & Bender, 2017). A good example is Cohn's Visual Narrative Grammar (2013), which stablishes a structure of four main parts for a comic story. Our aim was to analyse how the two final parts, peak and release ("bullet point"), affect online comprehension of stories —eye-movement patterns—, through a coherent/incoherent paradigm ("coherence"), for children and adults ("group"). We used an eye-tracker Tobii—x120 and a mixed model with two random effects to analyse data. Significant effects were found for "group" in total fixation time (F(1,61)=8,324, p=.005) and for the interactions of "bullet point" and "coherence", in total fixation time (F(2,1149)=118,518; p<.001) and number of regressions in (F(2,1229)=7.335; p=.001). Therefore, incoherence of both pictures disturbs reading patterns, thus, both are important for deep comprehension. However, only the incoherence of peak affected release to decrease eye movement patterns on it even below "usual".
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HUMAN LEARNING AND INSTRUCTION I

6:00-7:30 PM (1045)

Is One Example Enough? Increasing Dosage of Provided Examples Does Not Improve Concept Comprehension. AMANDA ZAMARY and KATHERINE A. RAWSON, *Kent State University* – Comprehension of abstract concepts is enhanced by studying concrete examples versus restudying concept definitions and other example-based learning techniques (Hamilton, 1990; Rawson et al., 2015; Zamary & Rawson, 2018). However, all previous research has involved study of multiple different examples per concept. This dosage may be greater than what students would receive in educational settings. The current research answered two questions: Does the effect of provided examples on comprehension depend on the number of exposures to examples? Do exposures need to involve different provided examples, or is re-exposure to the same example sufficient? Across two experiments, performance on a delayed comprehension test was similar following study of one example per concept, one example with five exposures per concept, and five different examples per concept (ds = .04 - .10), and all groups outperformed a control group (ds = .50 - .56). These findings suggest that one example may be enough.
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6:00-7:30 PM (1046)

Not all Active Learning is Created Equal. PAULO F. CARVALHO, KODY J. MANKE, and KENNETH R. KOEDINGER, *Carnegie Mellon University* – It is indisputable that active learning— when students are actively engaged in the instructional event—improves learning. However, it is not fully understood whether different active learning approaches potentiate different types of learning. In a within-subjects randomized study, students enrolled in a Psychology course completed a series of homeworks to consolidate their understanding of scientific principles taught in class. For half of the assignments, students were presented with the setup for a study that tested an aspect of the principle being studied. Students were then asked to generate and explain predictions for the study, observe the actual results, and then explain the results (Predict-Observe-Explain approach). For the other half of the assignments, students read about the same study, were told the results, and given the explanations before answering questions about what they read (Testing approach). Students performed better on exams requiring generalization to novel situations when they practiced using the Predict-Observe-

Explain approach. These results suggest that prediction and explanation cycles might be a better active learning approach to promote generalization and transfer than practice questions.
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6:00-7:30 PM (1047)

The Suppression of Naïve Theories About the World: A Bayesian Hierarchical Diffusion Model. PETER A. EDELSBRUNNER, *ETH Zurich*, HENRIK SINGMANN, *University of Zürich* – Shtulman and Valcarcel (2012) showed that judging the truth of scientific statements (e.g., "the earth evolves around the sun") takes longer for adults when the statements are in conflict with naïve theories typically hold in childhood. Does this indicate that naïve theories are not replaced through acquiring scientific theories in schooling, but rather have to be suppressed each time we face a relevant situation? To investigate this question from cognitive educational science we employed a Bayesian hierarchical diffusion model. Specifically, we applied the four-parameter Wiener model to the data of Shtulman and Valcarcel (2012) with crossed random-effects for participants and items. The model provides an adequate account of the data for most individuals and conditions. Parameter estimates reveal that the congruency of a statement with naïve theories impacts the drift rate parameter. The hierarchical nature of the model allows the investigation of how specific characteristics of the statements (e.g., scientific domain, word length, number of syllables & scientific terms) and participants (e.g., age, educational background) influence reaction times and choice probabilities.
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6:00-7:30 PM (1048)

Improving Classroom Learning Through Interleaved Pretests. FARIA SANA, *Athabasca University*, VERONICA YAN, *University of Texas at Austin* – If two strategies can independently facilitate learning, their combination could contribute to even greater learning. For example, pretests—asking students questions on to-be-taught content—enhance memory retention compared to no pretests or re-exposure to the content. Interleaved practice—answering questions on different concepts intermixed—enhances memory retention compared to blocked practice—answering questions grouped by concept. We examined the effect of interleaved pretests on student learning in an undergraduate abnormal psychology course. Students wrote a pretest, where they classified scenarios based on appropriate psychological disorders, at the start of eight lectures. Four pretests were blocked (all scenarios on the same disorders were presented consecutively) and four pretests were interleaved (scenarios on different disorders were presented in a random order). On the final exam, students classified novel scenarios based on the disorders. Students scored higher when exam questions were on pretested than non-pretested concepts, and on pretested concepts that were interleaved rather than blocked. These findings have practical implications on how to effectively combine and implement strategies to optimize learning.
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6:00-7:30 PM (1049)

Retrieval Practice Promotes Transfer for Analogical Problem Solving. KATHRYN T. WISSMAN, *North Dakota State University*, DANIEL J. PETERSON, *Skidmore College* – Research has shown that retrieval practice has robust effects on learning and memory. However, a majority of prior research uses the same material during practice and on the final test, which is not necessarily representative of real-world learning contexts. The current study examines the extent to which engaging in retrieval practice promotes transfer for tasks requiring analogical problem solving. Learners were presented with a source text, which contained both a problem and a solution and then engaged in either retrieval practice or restudy. Following a short (Experiment 1) or long (Experiment 2) delay, learners were given a novel text that also contained a problem and asked to generate a solution. Critically, the solution provided in the source text could be applied to solve the problem in the novel text. Outcomes showed that learners who previously engaged in retrieval practice (versus restudy) were more successful at solving the problem.
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6:00-7:30 PM (1050)

Feedback Hinders Performance on Women's Mathematics Problem Solving. NICHOLAS A. VEST and EMILY R. FYFE, *Indiana University* – The effects of feedback on learning and problem solving are quite variable. We hypothesize that some of this variability depends on whether the learner interprets the feedback message as an evaluation of their abilities. We experimentally tested the effects of feedback for men and women (N = 87) on a probability task using a 2 x 2 factorial design with context (evaluative or non-evaluative) and feedback during problem solving (yes or no) as the factors. Feedback influenced problem-solving performance. However, it depended on both context and gender. In the non-evaluative context, feedback had minimal effects for both men and women. However, in the evaluative context, there was a significant feedback by gender interaction, $F(1, 37) = 19.57$, $p < .001$, $\eta p2 = .35$. Feedback had positive effects for men and negative effects for women. Results suggest feedback may have consequences for women in situations that are evaluative of their abilities.
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6:00-7:30 PM (1051)

Graph Comprehension by Insight: Testing the Impasse Hypothesis. AMY RAE FOX, CAREN M. WALKER, and JAMES D. HOLLAN, *University of California, San Diego* – How do you make sense of a graph that you have never seen before? Building on recent work demonstrating that prior knowledge of conventional types of data visualizations is extraordinarily difficult to overcome, we explore the use of implicit scaffolding to reconstruct graph reading as an insight problem. We hypothesize that constructing a mental impasse will improve learner performance by increasing the probability learners will reconsider their default strategy and recognize alternative interpretations of novel graphical forms. We find support for this hypothesis in a between-subjects laboratory experiment testing comprehension of statistical

graph with an unconventional coordinate system. Subsequent analyses of mouse-tracking data suggest promising directions for understanding graphical intuitions. We conclude with suggestions for future work that address the timing of mental model formation for unconventional graphic forms.
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6:00-7:30 PM (1052)

The Interaction of Learning Tasks and Learning Styles: Can Exemplar-Based Learners Learn Rules? MINKYUNG CLAIR HONG and LISA K. FAZIO, *Vanderbilt University* (Sponsored by Sean Polyn) – Research in the function learning domain suggests that there are two qualitatively different types of learners: those who learn through remembering specific example-response associations (i.e. exemplar learners) and those who abstract an underlying rule that governs each example-response association (i.e. rule learners or abstractors). The present study examines how these different types of learners perform on novel tasks that encourage rule-based (i.e. parametric task) or exemplar (i.e. nominal task) learning. Do exemplar learners act like rule-based learners when the learning task promotes rule learning? And what happens to rule-learners when the learning task encourages exemplar processing? Our current findings suggest that the learning task is more important than an individual's preferred learning style. Both types of learners were able to learn the rule after completing the parametric (rule-based) task and neither group learned the rule with nominal (exemplar-based) task. Our results suggest that participants' learning styles are flexible and adapt to the current task demands.
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6:00-7:30 PM (1053)

Do Contingency Estimates Inform our Causal Judgments? A Survey of Controversial Health-Related Beliefs. JULIE YEW LI CHOW, BEN COLAGIURI, and MICAH GOLDWATER, *University of Sydney*, BEN ROTTMAN, *University of Pittsburgh*, EVAN LIVESEY, *University of Sydney* (Sponsored by Micah Goldwater) – Estimating the contingency between events seems to be the logical basis for making informed judgments about causal relationships (e.g., whether a treatment effectively improves health). However, there are some asymmetries in terms of how sensitive contingency estimates and causal judgments are to illusory causation manipulations. Illusory causation refers to the overestimation of causal relationships when there is no objective contingency between events (the patient is just as likely to recover with or without the treatment). We conducted a survey of Australian adults to investigate relationships between causal judgments and contingency estimates in several 'real life' controversial health-related beliefs. We found that individuals' contingency estimates reflected their beliefs about treatment efficacy, but dissociations between causal judgments and these contingency estimates persisted. Similar to causal judgment in laboratory experiments, endorsements of health-related causal relationships appear to be influenced by more than simple contingency estimates, which has important implications for attempting to correct erroneous beliefs.
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6:00-7:30 PM (1054)

Using Cognitive Strategies to Enhance the Retention of Statistical Concepts. VANESSA LAUREN FOOT, *York University*, FARIA SANA, *University of Athabasca*, MELODY WISEHEART, *York University* (Sponsored by Melody Wiseheart) – In the education system, students are often required to master course material in a limited amount of time. As a result, the efficiency of learning is crucial so that students are able to learn as quickly as possible. Laboratory studies show that retention can be powerfully enhanced through the use of three cognitive strategies: spacing, testing, and exposure to the structural features of test questions. The current study assessed adults' retention of statistical concepts rooted in illustrative word-problems. Concepts were reviewed either immediately or after a time delay. Some concepts were reviewed by testing ("guess the answer"), and others were re-studied. Participants were given word-illustrated problems focusing on either structure- or surface- emphasizing features. After a time delay, all groups wrote a final test and were asked to give confidence ratings for each test question.
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6:00-7:30 PM (1055)

Theories of the Generation Effect and the Impact of Generation Constraint: A Meta-Analytic Review. MATTHEW P. MCCURDY (Graduate Travel Award Recipient), *University of Illinois at Chicago*, WOLFGANG VIECHTBAUER, *Maastricht University*, ANDREA N. FRANKENSTEIN, ALLISON M. SKLENAR, and ERIC D. LESHIKAR, *University of Illinois at Chicago* (Sponsored by Eric Leshikar) – The generation effect is the memory benefit for self-generated compared to read (or given) information. Decades of research on this mnemonic has led to several proposed theories that attempt to explain the memory mechanism(s) underlying this effect. In this meta-analysis, we coded 126 articles (315 experiments) to assess eight theories that have been postulated to account for the generation effect. Importantly, we also assessed the influence of generation constraint, which our prior work has shown impacts the magnitude of the generation effect. We found strong support for two theories: the two-factor theory, and processing account, while others were only partially or not supported. We also found that generation constraint was a significant moderator of the magnitude of the generation effect, suggesting that this factor should be considered in future work. Overall, this meta-analysis provides a review and examination of the ability of the proposed theories to explain the aggregate data on the generation effect. Further, these data provide insight into the experimental moderators (such as generation constraint) that have the biggest influence on the magnitude of the generation effect that can be used to guide future research.
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6:00-7:30 PM (1056)

The Effect of Exercise on Encoding and Recall of Information. WILFORD MIRANDA, MCKINLEY ALDEN, MICHAEL D. LONG, ANASTASIA ZWENGER, LEANNE BOUCHER, and W. MATTHEW COLLINS, *Nova Southeastern University* (Presented by Michael D. Long) – Research has demonstrated the benefits of moderate aerobic exercise on cognitive function (Coles & Tomporowski, 2008; Skriver et al., 2014). Here, we examine the relationship between aerobic exercise, encoding rate, and forgetting. Participants either watched a movie or performed an acute bout of aerobic exercise for 30 minutes (moderate pace of walking in Study 1; running in Study 2). Participants then completed a paired-associate-learning task, which involved learning word pairs and then recalling one word of the pair when presented with the other to measure the rate of learning. Two days later, participants returned and were given a surprise recall task to measure forgetting. Results of Study 1 indicated that participants in the exercise group did not learn the words faster or recall more at follow-up. Preliminary results of Study 2 also indicate that participants in the exercise group did not learn the words faster or recall more at follow-up. These results contradict a number of published studies that show even short bouts of exercise can benefit cognitive functions.
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6:00-7:30 PM (1057)

Forget-Me-Not: The Effects of Note Taking and Proactive Interference on Learning. IRINA GHILIC, AMY A. PACHAI, and DAVID I. SHORE, *McMaster University* (Sponsored by David Shore) – Humans are information hoarders. Saving information can benefit us in the long run (Storm & Stone, 2015). One benefit may derive from reduced proactive interference, which occurs when the ability to remember recently learned information is impaired by previously learned information (Eskritt & Ma, 2014). Using external memory aids such as saved files, photographs, or notes provides cognitive offloading (Risko & Gilbert, 2016), which may reduce proactive interference. As per Storm and Stone (2015), participants in the present experiment studied List A, but before being tested on this list, they studied and were tested on List B. The current research aims to replicate the finding that participants recalled a significantly higher number of words from File B when they saved File A than if they did not. To determine whether the modality of note-taking would further reduce proactive interference, participants either typed or read the word lists.
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6:00-7:30 PM (1058)

Multiple Talkers and Intertrial Variability Impacting Memory. STEVEN J. DESSENBERGER, *Washington University in St Louis* (Sponsored by Joel Myerson) – Memory for words spoken by multiple talkers is typically better than when those same words are all spoken by the same talkers. However, little research has been directed to identifying factors that either promote or inhibit this multi-speaker advantage. The present study measured memory retention for four different training conditions comparing different formats for presenting words spoken by either single or multiple talkers. In all conditions, participants received four presentations of words and were asked to recall as many as possible immediately following the last presentation. We orthogonally crossed number of speakers (1 versus 4) and frequency of talker change (same speaker for each word in a group versus a different speaker for each word). Results indicated that both variability in number of talkers and frequency of change between talkers must be increased to promote the greatest benefits to memory retention.
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6:00-7:30 PM (1059)

Uncovering What Is Hidden in Averages: An Exploration of Individual and Item Differences in Learning and Forgetting Curves. STEFANY MENA and ROBERT A. BJORK, *University of California, Los Angeles* – An individual point on a traditional learning or forgetting curve represents the average performance across all participants and all to-be-learned items. By means of an experiment in which 80 participants each learned 50 low-association word-word paired associates via four anticipation-method trials—and were then tested 48 hours later—we examined the degree to which averaging can hide meaningful learning and forgetting differences between participants, between items, and possible interactions of those differences. The details of the two families of learning/forgetting curves we obtained, one for each of the 50 to-be-learned pairs and one for each of the 80 participants, suggest that traditional learning/forgetting can indeed hide meaningful individual-differences and item-differences dynamics.
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6:00-7:30 PM (1060)

The Rainbow Mnemonic Improves Recall in Preschool Children. ELENA RAMLOW, *Hillsdale College*, JERI L. LITTLE, *California State University, East Bay* (Sponsored by Jeri Little) – Mnemonic devices aid recall. However, little research has explored their use with preschool-aged children. The present studies examined whether a new peg-type mnemonic technique (rainbow mnemonic) could be used to improve memory in preschool children. Item cards, which displayed a word and its corresponding picture were studied alongside colored cards, and this condition was compared to a control condition in which children were left to their own devices to study the item cards and, in Experiment 2, a condition in which children had to mentally picture the colors. The experiments revealed that the rainbow technique could improve recall for preschool children. This is the first study to demonstrate the effectiveness of a peg-type technique with young children.
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6:00-7:30 PM (1061)

Using Successive Relearning to Promote Student Achievement in a Difficult Science Course. JESSICA L. JANES, JOHN DUNLOSKY, AARON JASNOW, and KATHERINE A. RAWSON, *Kent State University* (Sponsored by John Dunlosky) – Successive relearning involves retrieving content until a particular level of mastery has been reached and then relearning that content to the same level of mastery in multiple sessions. Successive relearning thus combines

two potent learning techniques (practice testing and spaced practice) and results in impressive levels of long-term retention. The current study aimed to evaluate its effectiveness in helping college students prepare for a high-stakes exam in a difficult Biopsychology course. Prior to the first exam, students used a flashcard program to learn course content across multiple sessions as part of their course grade. Exam performance was higher on questions involving concepts learned with the program than questions that were not, and this was true for both memory-based and applied questions. These findings suggest that implementing successive relearning into science courses is a promising means for promoting student achievement.
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6:00-7:30 PM (1062)

The Prequestion Effect: How Question-Type and Structure Building Ability Impact Learning. KYLE J. ST. HILAIRE and SHANA K. CARPENTER, *Iowa State University*, JANINE M. JENNINGS, *Wake Forest University* (Sponsored by Shana Carpenter) – Research on the prequestion effect shows that answering questions before studying (prequestions) enhances learning; however, these benefits usually occur for information asked at both pretest and posttest (prequestioned material), and are less consistent for novel posttest questions (non-prequestioned material). The current study explores whether transfer to non-prequestioned material depends on question-type and whether structure building ability influences these effects. Participants either answered fill-in-the-blank or open-ended prequestions before studying a prose passage, or just studied the passage. A later test assessed knowledge of both prequestioned and non-prequestioned material. Although answering fill-in-the-blank prequestions corroborated previous research showing benefits for prequestioned material, open-ended prequestions showed no benefits for prequestioned or non-prequestioned material relative to the study-only group. The same effects held when controlling for structure-building ability.
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6:00-7:30 PM (1063)

Examining the Effects of Student-Generated Quiz Questions to Promote Retention in a College Class. KENNETH BARIDEAUX JR., *University of South Carolina Upstate* – There is some evidence indicating that generating questions rather than re-reading promotes learning, especially long-term retention (e.g., Weinstein, McDermott & Roediger, 2010). While implications from this previous research highlight ways to promote more efficient learning, it is sometimes unclear if these findings extend to real-life classrooms beyond laboratory settings. The main goal of the current research was to test the effectiveness of generating quiz questions for weekly pop quizzes in a college class. Using a quasi-random design, undergraduate students enrolled in a semester-long Learning and Memory course completed a weekly "before and after assignment" (i.e., the control group) or a weekly quiz question submission assignment (i.e., the experimental group). The results did not indicate significant differences between the control and experimental group on weekly pop quizzes. However, the results did show that exam performance was significantly better for those in the experimental group compared to the control group. These findings suggest that having students generate questions may facilitate classroom learning by enhancing long-term retention.
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6:00-7:30 PM (1064)

Can Retrieval Practice Benefit Updating Causal Information? LUKE GLENN EGLINGTON and SEAN H.K. KANG, *Dartmouth College* (Sponsored by Sean Kang) – Retrieval practice typically enhances memory (Rowland, 2014), but only recently have researchers shown that retrieval practice can benefit causal learning (Eglington & Kang, 2017). There are also many situations in which learners need to update causal representations. In Experiment 1, participants read a passage that described a school in which particular combinations of teachers caused effects for a given student. Participants performed retrieval practice or restudy. Afterward, all participants learned (via restudy) different relations between the same teachers for a different student. 48 hours later participants returned to make inference judgments and complete a free recall test for all relations (pertaining to both students). In Experiment 2, instead of augmenting a representation with complementary relations, participants had to learn new relations among the same features that contradicted the old. Overall, retrieval practice on the first set of relations benefitted causal inferences and memory for the second set, relative to restudy.
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6:00-7:30 PM (1065)

Instructor Communication and Teaching Practices in Large College Courses. NATHANIEL RALEY WOODWARD, *University of Texas at Austin*, ANDREW C. BUTLER, *Washington University in St. Louis*, STEPHANIE B. CORLISS and OLIVER A. DAVIDSON, *University of Texas at Austin* (Sponsored by Paula Hertel) – We present a large-scale characterization of normative educational practices (e.g., course structure, teaching methods) across over 1,000 high-enrollment undergraduate courses at a large public institution over the last 5 years. We assess the extent to which course features reflect research-based best-practices and recommendations from the cognitive science literature by systematically reviewing all course syllabi. We document the type, quantity, and grade-weight of all work assigned in each course, as well as the prevalence and variability of course features such as spacing, retrieval practice, and collaborative learning. Beyond course features, we analyze the language used in the syllabus to see how instructors communicate information to students and how linguistic variables are related to teaching best-practices. Results indicate heterogeneity across colleges. In general, while certain areas show a trend toward educational best-practices, other areas are found to be lacking. Additional results linking course variables to student outcomes are forthcoming and will be discussed.
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6:00-7:30 PM (1066)

Autobiographical Retrieval Can Potentiate the Learning of New Information. ACACIA L. OVEROYE and BENJAMIN C. STORM, *University of California, Santa Cruz* (Presented by Benjamin C. Storm) – Retrieval has been shown to play an important role in the updating and modification of memory. Typically such effects are studied in the context of testing effects and retrieval-induced forgetting or facilitation, where it is the retrieved information itself or other related information that is affected by retrieval. In the present study, however, we examine whether retrieving an autobiographical memory can potentiate the learning of unrelated information. In the first experiment, participants studied four prose passages. Prior to studying two of the passages, participants were asked to spend 30 s retrieving the details of a specific event from their childhood. This autobiographical retrieval task was shown to potentiate the learning of the unrelated passage that followed, leading participants to recall significantly more idea units than they would have recalled otherwise, a finding that provides new insight into the mechanisms of retrieval and its ability to enhance learning.
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6:00-7:30 PM (1067)

Does Pretesting Affect the Learning of Non-pretested Information? KELSEY K. JAMES and BENJAMIN C. STORM, *University of California, Santa Cruz* (Sponsored by Jonathan Schooler) – Taking a test before learning can enhance the long-term retention of the information being learned, a phenomenon referred to as the pretesting effect. In the present research, we explored the consequences of pretesting on memory not only for the pretested information, but for the non-pretested information from the same passage. Across five experiments and various manipulations (e.g., the number of pretest questions, the relationship between pretested questions and non-pretested questions, whether participants expected non-pretested information to be tested, and the format of the to-be-learned material) a very clear pattern of results emerged. Specifically, in none of the experiments did we find any evidence of pretesting affecting participants' ability to recall information that was not itself pretested. This finding provides important implications for understanding the potential mechanisms of the pretesting effect as well as practical implications for implementing pretests in the classroom.
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6:00-7:30 PM (1068)

The Use of Adjunct Questions in Video Learning. JANELLE EBERHARD and EMMA H. GELLER, *University of California, San Diego* (Presented by Emma H. Geller) – The benefits of adjunct questions have been studied extensively in the context of text comprehension (e.g. Rothkopf, 1966; Hamilton, 1985; Hamaker, 1986) but little research has evaluated their effectiveness for multimedia learning. There are good reasons to suspect that learning from videos may differ in important ways from learning from text, especially due to the temporal nature of video lessons and the difficulty of scanning backwards through a lesson. In this study, we investigated whether inserting adjunct questions into a video lesson on the muscle stretch reflex can improve retention and transfer of key ideas relative to a video with no adjunct questions. Additionally, we manipulated the question format (multiple choice vs. open response) and placement (immediately before or after the answer is presented in the lesson), to determine whether certain types of adjunct questions are more effective than others. Results suggest that asking questions immediately after the relevant material has been presented leads to higher retention than pre-answer questions, and that the effectiveness of question type may depend on participants' prior familiarity with the material.
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BILINGUALISM I

6:00-7:30 PM (1069)

Catching the Cognitive Consequences of Bilingual Sentence Processing on the Fly. CHRISTIAN A. NAVARRO-TORRES, DALIA GARCIA, and VRINDA CHIDAMBARAM, *University of California, Riverside*, ANTONELLA SORACE, *University of Edinburgh*, JUDITH F. KROLL, *University of California, Riverside* (Sponsored by Paola Dussias) – Bilinguals learn to resolve the competition between their two languages and that skill has consequences for cognitive functioning more generally. However, most research on bilingualism has not examined how bilinguals engage cognitive control during language processing. The present study compares monolinguals and bilinguals using a novel cross-task adaptation paradigm (Hsu & Novick, 2016) that interleaves a Stroop task with a sentence comprehension task. Participants first performed an incongruent or congruent Stroop sequence, followed by a visual-world paradigm sequence in which participants heard either an ambiguous or unambiguous sentence. Following Hsu and Novick, engaging cognitive control on incongruent Stroop sequences should facilitate the processing of ambiguous sentences. Preliminary results confirm this hypothesis, suggesting that both groups engage the same mechanisms to solve linguistic conflict. However, bilinguals also showed momentary facilitation of ambiguous sentences even when cognitive control was not engaged (i.e., when preceded by congruent Stroop trials), possibly indicating that bilinguals were better able to detect initial conflict (Teubner-Rhodes, Bolger, & Novick, 2017).
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6:00-7:30 PM (1070)

Reading Comprehension and Strategy Use in Fourth- and Fifth-Grade French Immersion Students. BAILEY FRID and DEANNA FRIESEN, *University of Western Ontario* – The Simple View of Reading (Hoover & Gough, 1990) assumes that reading comprehension success is determined by decoding skill and language comprehension (e.g., vocabulary). However, the strategies readers recruit during text comprehension should also uniquely contribute to reading comprehension success in both their first and second language. Seventy fourth- and fifth-grade French immersion students were assessed on language proficiency measures and on strategy use during a reading comprehension task by using a think-aloud procedure. Results indicate that students used more

complex strategies (i.e. background knowledge, predicting and visualizing) in their dominant language, and more textbase strategies (i.e. summarizing) in their less proficient language. For both languages, using textbase and complex strategies each accounted for unique variance in reading comprehension performance beyond language proficiency. Relying on these strategies allow readers to both construct an understanding of a text and consolidate it into memory. Implications for theories of reading comprehension and for second language pedagogy will be discussed.
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6:00-7:30 PM (1071)

What's Left for Balanced Bilinguals? Language Proficiency and Item Familiarity Affect Left-Hemisphere Specialization in Metaphor Processing. DORIT SEGAL and TAMAR H. GOLLAN, *University of San Diego, California* – Objective: To characterize the hemispheric processing of metaphors in bilinguals compared with monolinguals and to determine the role of language proficiency in hemispheric lateralization. Method: Fifty-seven Spanish-English bilinguals and 57 monolinguals participated in a divided visual field study. The two groups performed a semantic judgment task with metaphorical, literal, and unrelated word pairs presented either to the right visual field/left hemisphere or to the left visual field/right hemisphere. Results: Bilinguals processed metaphors more slowly and less accurately than monolinguals in both visual field presentations but there was no difference between the groups in the symmetry of processing. In bilinguals, the efficiency of processing within the left hemisphere was predicted by language dominance scores and in all participants, the left hemisphere was more sensitive than the right hemisphere to metaphor familiarity. Conclusion: These results suggest that bilinguals rely on the same underlying cognitive mechanisms as monolinguals in metaphor processing and that the left hemisphere is more sensitive than the right hemisphere to small variations in linguistic experience.
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6:00-7:30 PM (1072)

Joke Processing in English Dominant and English Non-Dominant Bilinguals. EMILIA V. EZRIN, *City University of New York* (Sponsored by Virginia Valian) – Verbal humor is largely based on detection and resolution of semantic incongruity [1], which may be difficult for bilinguals in their non-dominant language. English-dominant and non-English-dominant bilinguals and two monolingual groups rated jokes and non-jokes in English as funny or not. RSVP was used to show stimuli one word at a time. Sensitivity (d') and response time (RT) were measured. Undergraduates were equally fast and sensitive in detecting jokes, whether they were English-dominant bilinguals or monolinguals. Non-English-dominant bilinguals were significantly slower than English-dominant bilinguals, but equally sensitive to the jokes. The data suggest that semantic and conceptual representations are similar in content but activated at different speeds in native and non-native speakers. Monolingual Mturkers had shorter RTs than the other three groups and larger d's than undergraduate monolinguals and bilinguals. The data suggest that motivation and practice are more important than language status for processing speed. References: Attardo, S. (2010). Linguistic theories of humor (Vol. 1). Walter de Gruyter.
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6:00-7:30 PM (1073)

Linguistic and Experiential Factors Reveal Fundamental Variation in Grammatical Gender Processing. ANNE L. BEATTY-MARTÍNEZ, *Pennsylvania State University*, MICHELLE R. BRUNI and CHRISTIAN A. NAVARRO-TORRES, *University of California, Riverside*, GIULIA TOGATO and PAOLA E. DUSSIAS, *Pennsylvania State University* (Sponsored by Paola Dussias) – Traditionally, mastery of grammatical gender has served as the benchmark of achievement of native-like language acquisition and processing, with some studies reporting differential sensitivity to gender agreement in L2 processing and others arguing against such differences. However, sensitivity may vary depending on linguistic and experiential factors, including individual differences. This work examines the electrophysiological correlates of gender violations in native monolingual Spanish speakers and Spanish-English bilinguals. ERPs were recorded while participants read sentences that were either well-formed or contained gender violations. Half of the target nouns were feminine and half were masculine in gender. For monolinguals (n = 40), although grand mean analyses showed a biphasic LAN-P600 pattern, responses to masculine violations had a far greater variability and showed reduced sensitivity in the later half of the experiment. Feminine violations elicited a more robust P600 response. Although bilingual data collection is ongoing, these preliminary results suggest that variability in processing gender agreement exists even among groups that have traditionally been assumed to be homogenous.
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6:00-7:30 PM (1074)

The (Re)activation of Idiomatic Expressions. ANNA B. CIESLICKA, ARIANA GARCÍA, ROBERTO R. HEREDIA, and ELVA A. GARCÍA, *Texas A&M International University* – In two experiments, we examine meaning (re)activation of idiomatic expressions by bilinguals who are dominant in Spanish, English, or balanced. Participants listened to English idiomatic expressions of the type, I'm not one to make a scene, but after he yelled at me, that was impossible to avoid. Participants made lexical decisions to critical targets that were literally ("play"), figuratively ("disturbance"), and unrelated to the critical idiomatic expressions. For Experiment 1, targets were presented immediately at idiom offset, and immediately after a pronoun anaphor. In Experiment 2, critical targets were presented at idiom onset and 300ms after anaphor offset. Results revealed that idiom meaning (re)activation was modulated by language dominance, where English-dominant bilinguals had significantly faster responses than both Spanish-dominant and balanced bilinguals. There was a general tendency of the literal meaning of idioms to be more active. Results are discussed in terms of bilingual idiom processing models.
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6:00-7:30 PM (1075)

How Changes in Brain Activity Are Modulated by Semantic Priming, Crosslinguistic Phonological Overlap, and Their Interaction, During Second Language (L2) Word Recognition in Noisy Listening Conditions. SARA GUEDICHE and ANGELA DE BRUIN, *Basque Center on Cognition, Brain, and Language*, MARTIJN BAART, *Tilburg University and Basque Center on Cognition, Brain, and Language*, ARTHUR G. SAMUEL, *Basque Center on Cognition, Brain, and Language; and Stony Brook University* – Little is known about how the bilingual brain coordinates its multiple interacting sound-to meaning maps, especially under challenging listening conditions that introduce a high degree of mapping uncertainty. The aim of the current fMRI study is to probe the neuro-functional organization of L2 spoken word recognition. We investigate how changes in brain activity are affected by 1) L2 phonological overlap with L1 translations, 2) semantic priming, and 3) their interaction. Listeners perform a lexical decision task on noisy L2 targets (in speech babble) that are preceded by either a semantically related or unrelated clear L2 prime. We use noisy targets to promote increased interactions between semantic and perceptual processes. Prior behavioral work shows semantic facilitation effects, inhibitory competition effects of L2-L1 phonological lexical overlap, and an interaction between semantic priming and crosslinguistic overlap that suggests semantically-mediated inhibition of L1 competition. Preliminary fMRI analyses based on an initial dataset (data collection is ongoing) show semantic priming effects in ATG and MTG, crosslinguistic overlap in MTG and posterior STG, and interactions in middle ATG and left middle frontal gyrus.
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6:00-7:30 PM (1076)

Studying Texts in a Non-Native Language: The L2 Recall Cost Is Not Just a Production Effect. HELEEN VANDER BEKEN and MARC BRYSBAERT, *Ghent University* (Presented by Marc Brysbaert) – At the latest PS meeting we reported that studying an expository test in a non-native language (L2) did not cause inferior performance in a yes/no recognition test (even not after one month), but resulted in a large L2 cost in a free recall test (d = .8). In that study, L1-L1 (study in the native language, test in the native language) was compared to L2-L2. The origin of the L2 recall cost could be due to (a) a less organized mental model of the text, and/or (b) less proficient memory recall in L2 written production. To test the latter hypothesis, we ran a new study in which we compared L1-L1 to L2-L2 and L2-L1 (i.e., studying in L2, but being tested in L1). Results showed no difference between L2-L2 and L2-L1, which were both considerably worse than L1-L1 (d = .6). Implications of these findings for models of text memory and for educational practice with nonnative speakers are discussed.
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6:00-7:30 PM (1077)

L2 Proficiency and Acoustic Deviation Modulates the Matched Interlanguage Speech Intelligibility Benefit. YU-HEI SHUM, *The Chinese University of Hong Kong*, KIT-YING CHAN, *City University of Hong Kong*, MICHAEL D. HALL and THOMAS ROHALY, *James Madison University*, YANG WANG, KUN-YANG ZHAO, and CHUN-YU TSE, *The Chinese University of Hong Kong* (Presented by Kit-Ying Chan) – This study investigated how acoustic deviations and second language (L2) proficiency affect L2 learners' recognition and accentedness ratings of native speech, as well as L2 speech produced by speakers sharing their first language. English words containing Cantonese-accented vowels with small, medium, and large deviations from native F1-F2 frequency norms or native vowels were re-synthesized for transcription and accentedness ratings by native Cantonese speakers. Participants with lower L2 proficiency showed higher accuracy in recognition (matched interlanguage speech intelligibility benefit) and lower accentedness ratings for words with vowels reflecting large F1-F2 deviation compared to native words, while no such difference was observed in participants with higher L2 proficiency. Only the accented vowel with the largest acoustic overlap with adjacent vowels was rated as more accented than native vowels by highly proficient L2 participants. These findings further understanding of accent perception and acquisition of L2 phonological categories in L2 learners.
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6:00-7:30 PM (1079)

Examining Effects of Language Brokering on Decision Making Using the Iowa Gambling Task. BELEM G. LÓPEZ and CHANTAL RAMIREZ, *University of Texas at Austin* – Language brokering is a language contact phenomenon whereby bilingual children must translate and interpret for their parents. Research on the long-term cognitive effects of brokering suggests that it may impact conceptual representation and semantic access across language boundaries (López & Vaid, 2018a; 2018b). However, this work has not explored how brokering may affect cognitive domains such as decision making. Language brokers are often tasked with helping their parents make important decisions. The current study explored decision making in Spanish-English bilinguals with varying brokering experience using the Iowa Gambling Task. This task simulates real life decision making and risk assessment. Participants were presented with advantageous and disadvantageous decks of cards and were instructed to choose one of the decks, resulting in either a gain or loss of money. Deck choice, change, and reaction time were measured. Findings are discussed in how variability in language brokering experience may affect decision making strategies
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6:00-7:30 PM (1080)

Neural Correlates of Naming Failures in Native Language and Second Language Proficiency. KATY BORODKIN, *Tel Aviv University*, ABIGAIL LIVNY-EZER and GALIA TSARFATY, *Sheba Medical Center*, MIRIAM FAUST, *Bar-Ilan University* – Some individuals achieve native-like proficiency in second language (L2), while others are able to obtain only a minimal level of linguistic competence. Native language (L1) indices, particularly tip-of-the-tongue (TOT) naming failures, can predict L2 proficiency. Our research aimed to explore the neural correlates of this association. Native Hebrew speakers (n

= 24), who learned English as L2 in a school setting, participated in an fMRI experiment. They covertly named pictures of objects or famous people in Hebrew. Their responses were categorized as "know", "don't know", or "TOT". Low-proficiency L2 learners reported more TOT states than high-proficiency learners. They also showed reduced neural activity in the left inferior frontal gyrus (specifically, pars triangularis) in both TOT > know and TOT > don't know contrasts. Our findings indicate that reduced activity in this region can lead to more frequent TOT states in L1 and may also negatively affect L2 learning outcomes.
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6:00-7:30 PM (1081)

Introducing SECSE: A Survey of Experience in Code-Switching Environments. ANGELIQUE M. BLACKBURN, ALEX ALEMAN, and BRENDA L. GUERRERO, *Texas A&M International University* – Bilinguals navigate different situational contexts in which they might use one language for an extended period (single-language), switch languages frequently with changes in the conversation or interlocutor (dual-language), or switch between languages within a conversation (dense code-switching) [Green & Wei (2014). Lang Cogn Neurosci, 29(4), 499-511]. Researchers are investigating the short- and long-term impact of context on cognition; however, the means of quantifying time spent in different bilingual contexts is limited to surveys that do not adequately differentiate between environments or methods that may not fully capture a bilingual's contextual language history. We have designed and tested a Survey of Experience in Code-Switching Environments—a rapid, free, and interactive tool that can be used with bilinguals from varied language backgrounds. Researchers can use the survey not only to categorize bilinguals according to the primary context in which they interact, but also to obtain a unique profile of a bilingual's engagement in different contexts over the course of life.
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6:00-7:30 PM (1082)

The Impact of Shifting Language Dominance and L2 Immersion on the Processing of Emotionally-Laden Words. EMILY N. MECH, SAMREEN KAZI, MARIAMME IBRAHIM, BRIANDA RODRIGUEZ VERDIN, EUFROCINA PALAGANAS, DINH BUI, MONICA MIKHAIL, VALERIYA RAGOZINA, LEILA YOUSEFI-RIZI, NISHA BAJAJ, and JUDITH F. KROLL, *University of California, Riverside* (Sponsored by Judith Kroll) – Emotionally-laden words in the bilingual lexicon may be conceptually distinct not only from neutral words but also across languages (Pavlenko, 2008). Research suggests that the first language (L1) is the more emotional language, but it is unclear if the second language (L2) can shift into this role. The impact of shifts in proficiency and language context on processing of emotionally-laden words was investigated in heritage speakers who had switched dominance from the L1 (Spanish) to the L2 (English) and native English speakers immersed in the L2 (Spanish). Lexical decision tasks in English and Spanish assessed processing of valenced words relative to neutral words. Preliminary trends suggested that accuracy to English words did not differ by valence, but accuracy in Spanish was lowest for negative words and highest for positive words. RT trends in English and Spanish suggested that negative words elicited the slowest response while positive words elicited the fastest. These patterns were similar across groups, suggesting that while switching dominance may not substantially impact emotion word processing, immersion in an L2 environment may.
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6:00-7:30 PM (1083)

Determinants of Successful Reading Development in L2 English Learners: A Within Participant Eye-Movement Study. DANIEL SCHMIDTKE, AMY BETH WARRINER, and ANNA MORO, *McMaster University* – The objective of the present study was to identify predictors of successful L2 reading development in an eight-month (26 week) intensive ESL program. We report a within-participant eye-movement study of reading (n = 70) in which university-level learners of English were tested at the beginning (t1) and end (t2) of an instructional program of English. We sought to identify (a) what components of reading behavior would be most affected by L2 instruction; (b) what individual skills at t1 contribute to outcomes in reading proficiency at t2; and (c) what skills developed between t1 and t2 are most strongly associated with individual gains in reading proficiency. The greatest developmental changes occurred for late eye-movement measures to words (total reading time and regression rate). We interpret this as indicative of gains made in later cognitive processing stages of word recognition, such as semantic integration. Moreover, the greatest developmental gains in reading skill (gauged via eye-movements) were found in individuals with the greatest growth in vocabulary from t1 to t2. We discuss the behavioral trajectory of reading development and the implications of individual learner differences in second language literacy acquisition.
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6:00-7:30 PM (1084)

Two Languages or One: Language as a Cue for Talker Identification in 3- to 5-Year Old Children. REINA MIZRAHI (J. Frank Yates Student Travel Award Recipient), and SARAH C. CREEL, *University of California, San Diego* (Sponsored by Sarah Creel) – A central question in language development is how bilingual children form separate representations of the languages they speak. One relatively-untested idea, is that children associate individuals with particular languages. In a series of experiments, we investigated how children of varying language backgrounds associate languages with particular talkers and the specific language features that allow them to do so. In previously-reported work, we assessed bilingual and monolingual 3- to 5-year olds' ability to associate individuals with languages, in an eye-tracked talker-voice association paradigm. In the learning phase, children saw two characters speaking a different language. The following test phase contained 16 two-alternative trials which tasked children with selecting the character that spoke. Accuracy and fixations in all groups exceeded chance (84%, $p<.001$), suggesting that regardless of language background children can use language

features to identify talkers. Using this paradigm, data from two experiments showed that for children that comprehend only one of the two languages, language - rather than voice - is a more salient cue in children's talker identification, as long as they comprehend one of the two languages.
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6:00-7:30 PM (1085)

Multivariate Analysis on the Construct Validity of Procedural Memory Assessments Used in Second Language Learning. JOSHUA BUFFINGTON and KARA MORGAN-SHORT, *University of Illinois at Chicago* (Sponsored by Kara Morgan-Short) – Emerging evidence indicates that procedural memory (PM), a long-term memory system, contributes to second language acquisition (e.g., Hamrick, Lum, & Ullman, 2018). However, strong conclusions are hindered by the lack of knowledge regarding the construct validity of PM assessments. In this study, participants completed three assessments of PM—the Weather Prediction Task, Alternating Serial Reaction Task, and Tower of London—along with assessments of declarative memory, a separate long-term memory system. Correlational analyses indicated that the Alternating Serial Reaction Task and Tower of London, but not the Weather Prediction Task, showed discriminant validity from declarative memory. Unexpectedly, none of the PM tasks showed convergent validity. A preliminary exploratory factor analysis with two latent variables revealed one procedural and one declarative memory assessment as most representative of each factor. Additional analyses will be reported and implications for future research on the role of PM in second language acquisition will be discussed.
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6:00-7:30 PM (1086)

Language Diversity Predicts Second Language Abilities. JASON W. GULLIFER, and DEBRA TITONE, *McGill University* – Bilinguals vary in how they use language across social contexts, which has consequences for communicative ability and executive control (Gullifer et al., 2018). Theoretical and empirical studies in the neurocognition of bilingualism attempt to capture this variability, but there remains a focus on static language experience (e.g., age of acquisition) and one-dimensional measures of current experience (e.g., language exposure), which underestimates the full range of experiences. To address this shortfall, we propose an innovative measure: language diversity mathematically formalized as entropy. Entropy continuously characterizes individuals' language diversity from compartmentalized, monolingual usage (low entropy/diversity) to integrated dual language usage (high entropy/diversity). Here, we report a novel exploratory analysis of 507 bilingual speakers of French and English, where entropy predicts self-rated L2 abilities (positive association) beyond traditional measures (AoA, exposure). These results, along with our past work, suggest that language diversity is an important construct, consistent with neurocognitive theories of bilingualism (Green & Abutalebi, 2013).
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6:00-7:30 PM (1087)

More Evidence for Inhibition of the Native Language After Speaking a Second Language. ANDREA TAKAHESU TABORI, DENNIS WU, JUDITH F. KROLL, *University of California, Riverside* (Presented by Judith F. Kroll) – When bilingual speakers are immersed in a second language (L2), there is suppression of the first language (L1) (e.g., Baus et al., 2013; Linck et al., 2009). Cross-language dynamics under immersion can also be observed in the laboratory, when L1 is spoken after L2 or in mixed language conditions (e.g., Misra et al., 2012; Van Assche et al., 2013). In the present study we asked how the engagement of inhibitory control for L2 speech is modulated by the conditions and context in which naming occurs. English-dominant speakers of Spanish named pictures under blocked or mixed naming conditions in the US or in Spain. In each case, there was evidence for inhibition of L1 following L2 production and when naming under mixed language conditions. Language immersion affected the speed of naming but not the pattern of L1 inhibition. We consider the implications for models of inhibitory control in bilingual speech planning.
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6:00-7:30 PM (1088)

The Effects of Literacy Experiences on Bilinguals' Everyday Speech. NATSUKI ATAGI, EMILY MECH, ALESSANDRA MACBETH, MICHELLE BRUNI, JUSTIN SARKIS, JESSICA MONTAG, ALEXANDER KARAN, MEGAN ROBBINS, CHRISTINE CHIARELLO, *University of California, Riverside* – Literacy experiences predict individuals' vocabulary size (Stanovich et al., 1995), but it is unknown how reading habits affect every day oral language. We used an Electronically Activated Recorder (Mehl et al., 2001) to examine how self-reported reading habits and an explicit measure of text exposure (Author Recognition Test [ART]; Acheson et al., 2008) relate to bilinguals' everyday speech. The speech of English-dominant bilinguals was periodically recorded over four days. Preliminary analyses revealed English tokens (total words spoken) were related to self-reported time spent reading in English (r=.47), reading complexity (r=.45), and reading enjoyment (r=.43), but not ART scores (r=-.06). English tokens were negatively correlated with self-reported reading proficiency in speakers' non-English language (r=-.42). To assess vocabulary diversity in a manner not conflated with sample size, we calculated type residuals of the function predicting word types from tokens and examined its relationship with English and non-English reading proficiency. Bilingual reading habits may relate to everyday English speech, such that individuals with more text exposure produce more words and exhibit greater vocabulary diversity in their speech.
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6:00-7:30 PM (1089)

How Bilingual Language Use Relates to Social Network Size and Diversity. ALESSANDRA MACBETH, NATSUKI ATAGI, MICHELLE BRUNI, EMILY MECH, JUSTIN SARKIS, ALEXANDER KARAN, MEGAN ROBBINS, and CHRISTINE CHIARELLO, *University of California, Riverside* (Sponsored by Christine Chiarello) – Knowing two languages might

affect one's social network, since bilinguals can hypothetically communicate with a larger audience than monolinguals. In our study, bilingual participants wore an Electronically Activated Recorder (EAR; Mehl et al., 2001) for four days, then completed a language history questionnaire and Social Network Index (Cohen et al., 1997). We hypothesized more diverse and larger social networks were related to increased self-reported and real-world non-English (heritage) language use. Self-reported non-English use and social network diversity were positively correlated (r=.39), as were self-reported language switching frequency and social network size (r=.37). Real-world non-English language use was not associated with either social network measure. However, social network size and diversity correlated with participants' overall amount of speech (r=.33 and r=.37), and the proportion of time spent speaking to two or more people correlated strongly with social network diversity (r=.60) and size (r=.71). These findings suggest social network characteristics relate well to real-world measures of general language use, but not of heritage language use.
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6:00-7:30 PM (1090)

Does the Emotional Salience of Seductive Details Increase Attention Distraction? MATTHEW SWAFFER and JAMES KOLE, *University of Northern Colorado* (Sponsored by James Kole) – Participants read a STEM-based passage in one of three randomly assigned conditions: emotional seductive details, non-emotional seductive details, and no seductive details. The materials were presented on a Tobii 120 eye-tracking device with seductive detail images defined as Areas of Interest (AOI). A one-way ANOVA indicated a statistically significant difference in total fixation duration between the three groups. A Tukey post-hoc analysis indicated no statistically significant difference of total fixation duration between the control condition and non-emotional seductive details. Statistically significant differences of total fixation duration were found between emotional seductive details and non-emotional seductive details as well as the control condition, with total fixation duration longer for emotional seductive details. This evidence suggests emotionally salient seductive details distract attention more than non-emotionally salient seductive details.
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DECISION MAKING

6:00-7:30 PM (1091)

Choice Blindness in Different Experimental Settings. EMRAH AKTUNC, EMRE BAYTIMUR, BESTE UYSAL, CEREN HAZAR, and TURKU ERENGIN, *Ozyegin University* – Choice blindness has been introduced by Johansson et al. (2005). Despite the availability of different versions, some boundary conditions have not been investigated, two of which are experimenter's presence and testing medium. These two factors were investigated in three different conditions; in cond. 1, an experimenter administered the task, in the other two conditions, the task was administered on a computer interface with (cond. 2) or without (cond. 3) the experimenter in the room. Participants were asked to choose which of two female pictures they found more attractive and their selections were manipulated in certain trials. Generally low detection rates were obtained. Although detection rates were higher in the computer-administered conditions, the only significantly higher rate was in cond. 3 compared to cond. 1 (U=710, p=.005). We suggest further experiments will reveal boundary conditions under which choice blindness may or may not occur.
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6:00-7:30 PM (1092)

The Weight put on Extreme Outcomes Is Dependent on Task Demands: Findings From a Novel Decisions-From-Experience Paradigm. YONATAN VANUNU, JARED HOTALING, and BENJAMIN R. NEWELL, *University of New South Wales* (Sponsored by Benjamin Newell) – When making decisions in complex environments, we must selectively sample and process information with respect to task demands. Previous studies have shown that this can manifest in the amount of weight placed on extreme items (i.e., values at the edges of a distribution). We adapt a visual-search task in which participants have to evaluate an array of numbers presented briefly on-screen. When the participants' goal was to choose between a safe, known outcome, and an unknown outcome drawn from the presented array, extreme outcomes had a greater influence on choice. However, this trend was absent when participants' goal was to evaluate the objective magnitude of a feature in the array (e.g. the average). Nonetheless, under very short choice time-limits the effect of overweighting the extremes was enhanced in both tasks. A novel cognitive process model captures the effects of task goal, weighting of extremes, and time constraints via a three-step sampling, integration and choice mechanism. Together our empirical and modelling results shed light on how task goals modulate the way in which information is sampled from complex environments, and how that sampling process determines choice.
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6:00-7:30 PM (1093)

Decisional and Post-Decisional Processes in Confidence Judgments. KOBE DESENDER, NIKLAS WILMING, and TOBIAS H. DONNER, *University Medical Center - Hamburg Eppendorf*, TOM VERGUTS, *Ghent University* – Human observers can provide very precise confidence judgments of their own performance. Within the drift diffusion model, confidence has been modelled as a function of evidence and decision time (decision model of confidence) or as a function of post-decisional evidence (post-decision model of confidence). We created a unified framework and derived predictions by manipulating the input variability. The model predicted that highly variable input has a positive influence on confidence when confidence is interrogated at the time of response (decisional locus), and a negative influence when confidence is interrogated after the response (post-decisional locus). These predictions were tested in a random dot discrimination task. Consistent with the predictions, when observers provided their decision and confidence judgments at the same time (in a single response), observers were more confident when the sensory input was highly variable. Contrary to the predictions, however,

when confidence judgments were queried later in time, we still observed a positive effect of variability on confidence. Our results are consistent with a decisional locus of confidence, and they show that post-decisional evidence is ignored in confidence judgments.
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6:00-7:30 PM (1094)

The Role of Passing Time in Decision Making. NATHAN J. EVANS, *University of Amsterdam*, GUY E. HAWKINS and SCOTT D. BROWN, *University of Newcastle* – Theories of decision-making have been dominated by the idea that evidence accumulates in favour of different alternatives until some fixed threshold amount is reached, which triggers a decision. Recent theories -- supported by non-human primate data -- have suggested that these thresholds may instead collapse as time passes, but reviews of data from typical human decision-making paradigms have failed to support collapsing thresholds. We designed three experiments to test collapsing threshold assumptions in decision environments specifically tailored to make them optimal. An emphasis on decision speed encouraged the adoption of collapsing thresholds, but setting an explicit goal of reward rate optimality through both instructions and task design did not. We also assessed why humans and non-human primates appear to differ in decision strategy, focusing on whether the differences in methodological procedures from the two research traditions induce different decision strategies. Our findings indicate that humans—like non-human primates—adopt collapsing thresholds when exposed to experimental methods matched to those experienced by non-human primates: extensive task practice, or time-based penalties.
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6:00-7:30 PM (1095)

The Influence of Moral Belief and Self-Control on Information Security Decision Making. ROBERT WEST, EMILY BUDDE, BRIDGET KIRBY, and KAITLYN MALLEY, *DePauw University* – Cybercrime resulting in information security being compromised represents a significant challenge for corporations. Research reveals that roughly 50% of violations of information security result from insider threat, and that deterrence programs may not reduce the intention to commit cybercrime. Studies of individual differences indicate that higher levels of moral belief decrease the intention to violate information security, while lower levels of self-control increase the intention to violate information security. In the two studies, we examined the neural basis of the association between individual differences in moral beliefs, subcomponents of self-control, and the ERP correlates of information security decision making. BehavioralPLS analysis revealed that moral belief and self-control had opposite effects on ERPs related to decision making; and that two distinct components of self-control representing impulsivity, risk-taking, and tempe, or self-centeredness, a preference for simple tasks, and a preference for physical over cognitive activity were related to the ERPs.
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6:00-7:30 PM (1096)

Choice Rules: Mapping the Probabilistic Nature of Cognition. ELIZAVETA KONOVALOVA and THORSTEN PACHUR, *Max Planck Institute for Human Development* – Most cognitive activity includes some kind of choice between options—whether in memory retrieval, categorization, multi-attribute, risky, and intertemporal choice, or strategic games. A fundamental aspect of choice is its probabilistic nature. We highlight that formalizations of probabilistic choice are highly heterogeneous across different domains and models of cognition. To structure the different approaches, we propose a taxonomy and reveal assumptions underlying different classes of approaches. We further examine the differences between the employed choice rules—a structural feature in most models—and analyze their differences in model complexity. Our analysis also explores the possible historical reasons for the heterogeneity. It suggests that the formalization of probabilistic choice in computational models is often more a function of domain-specific and ad hoc conventions. We discuss how different approaches and traditions are connected and what implications the different approaches have for debates on human rationality.
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6:00-7:30 PM (1097)

Exploring Differences in Expert and Novice Drivers Using the Critical Decision Method In Order to Design Effective Training Measures. JESSICA CRUIT, WILLIAM VOLANTE, and PETER HANCOCK, *University of Central Florida* – As driving continues to evolve to include many aspects of the vehicle (driver-centered, autonomous, semi-autonomous), understanding drivers' decision-making is critical for measuring drivers' expertise to ensure continuous safety. The purpose of this study was twofold; 1) to gain an understanding of the differences in expert/novice decision-making during driving events and 2) to use the information gathered from the Critical Decision Method (CDM) to design training scenarios in order to measure driving performance. We interviewed six participants (three novice and three expert drivers) and used the CDM to elicit drivers' decision-making strategies during non-routine driving events. The results indicate differences in the ways expert and novice drivers recognize critical situations during driving. The results of the study will aid in building driving training scenarios in order to measure driving performance. In addition, the results may help industry officials and researchers design safer vehicles for the evolving automobile industry.
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6:00-7:30 PM (1098)

Intertemporal Decision Making: Domain Specificity in the Consideration of Future Consequences. LISA MURPHY, EIMER CADOGAN, and SAMANTHA DOCKRAY, *University College Cork* (Sponsored by Aidan Feeney) – The decision to engage in any given behaviour may pose an intertemporal dilemma, i.e. a dilemma between immediate and future behavioural outcomes. The Consideration of Future Consequences is a cognitive-motivational construct that describes the extent to which individuals consider immediate versus future outcomes during decision-making. CFC scores

are predominantly considered to represent an overall present- or future-oriented cognitive mindset. However, it is possible that individual's temporal orientation varies according to life domain. Across three surveys, participants (N = 498) reported behaviour in five domains (health, environment, occupation, finances and academia), and completed global and domain-specific CFC scales. A repeated measures ANOVA revealed a significant effect of domain on participants' preference for immediate vs. future outcomes, suggesting that individuals vary in the extent which they are present or future oriented depending on domain. Further, only domain-specific CFC scales predicted behaviour in a given domain. Our findings have theoretical implications for understanding domain-specificity in decision-making, and applied implications for designing interventions to target intertemporal decision-making.
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6:00-7:30 PM (1099)

Self-Reported Affect Does Not Reliably Predict Risky Decision Making. EMMA K. BRIDGER, EIRINI MAVRITSAKI, and SILVIO ALDROVANDI, *Birmingham City University* – In the present study we address the relationship between affect and preferences in risky decision-making. In particular, we explore whether there is an association between (a) state affect and risk parameters estimated from choices, and (b) state affect and self-reported risk preferences across different domains. In an incentive-compatible paradigm, 80 participants made 150 choices between two monetary gambles of equal expected value and framed as losses and gains. Self-reported risk-taking and risk perception were measured through DOSPERT (Weber et al., 2002). Before and after the experiment, participants' state anxiety and affect were measured through PaNAS (Watson et al., 1988) and STAI (Spielberger et al., 1983). No associations were observed between estimated risk preferences, self-reported risky decision making, and affect measures. The results indicate that risky decisions are influenced by the procedures to elicit preferences (e.g., Tversky et al., 1990) and that risk preference measures do not reliably covary with self-reported affect.
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6:00-7:30 PM (1100)

Expected Value Insight Learning: A Computational Model of Confidence in Experiential Choice. EMMANOUIL KONSTANTINIDIS, *University of Leeds*, MAARTEN SPEEKENBRINK and DAVID R. SHANKS, *University College London* – The relationship between decision accuracy and confidence has been extensively investigated since the early days of psychological research. However, little is known about decision accuracy and confidence in consequential economic decisions as in the case of experience-based decision making. Here we examine the progression of choice and confidence judgments in a typical experience-based task and provide a formal description of confidence judgments and their relationship to choice mechanisms. Participants select cards from four different options with different payoffs. They are then asked to provide a confidence judgment on having selected an advantageous option. The results show that learning to choose the most profitable options is accompanied by accurate confidence reports. We develop a model to unfold the cognitive processes of choice and confidence based on Reinforcement-Learning and Signal Detection Theory. Our model accounts for both choice and confidence and provides a framework of metacognitive judgments in the context of experience-based decision making.
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6:00-7:30 PM (1101)

Safety First: Timing of Descriptive Warnings Shapes Experience-Based Risky Choice. LEONARDO WEISS-COHEN, *City University London*, EMMANOUIL KONSTANTINIDIS, *Leeds University Business School*, NIGEL HARVEY, *University College London* – Descriptive warnings can be used in an attempt to reduce risk-taking behavior, often having to overcome contradictory personal experience. Here we examine how different levels of accumulated prior experience might have an effect on the impact of the efficiency of warnings. In four experiments we manipulated the timing of warnings, with later presentations allowing for higher amounts of prior experience. We show that prior experience shapes the influence of descriptions on behavior: Participants who had more prior experience reacted less strongly to the warnings, while participants who had little experience were more compliant. This finding was moderated by an endowment effect, which led to the perverse effect of warnings increasing risk taking in some situations: Individuals who had not accumulated many points took more risk when warnings were shown. A number of psychological mechanisms are considered for explaining the effect, such as behavioral inertia, cognitive dissonance, and learning interference. The current results have strong implications for decision making under risk when combining contradictory sources of information as is often the case in the real world, and for the creation of efficiently timed warning labels.
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6:00-7:30 PM (1102)

The Effect of Stimulus Presentation Time on Bias: A Diffusion-Model Based Analysis. JEREMY NGO and CHRIS DONKIN, *University of New South Wales* (Sponsored by Chris Donkin) – There are two main types of bias in simple decision tasks, response bias and stimulus bias. Response bias is a reduction in the evidence required for one response, and stimulus bias is the evaluation of stimuli in favor of a biased response. Differences in the relative frequency of presented stimuli are typically thought to induce response bias, though previous research has sometimes reported an effect on stimulus bias. We use a two-alternative forced-choice brightness discrimination task in which we manipulate the presentation length of the stimuli. We analyse the resultant data with a hierarchical diffusion model. The results show an overall response bias, but we also find that stimulus bias increases as stimulus presentation time decreases. We argue that the results challenge the typical stationarity

assumption of the diffusion model, and suggest that participants may be accumulating evidence based on factors other than the stimulus early in a trial.
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6:00-7:30 PM (1103)

A Quantitative Synthesis of Preferential Choice Models. LISHENG HE, WENJIA ZHAO, and SUDEEP BHATIA, *University of Pennsylvania* – There is a profusion of decision models due to the growing popularity of behavioral decision research. Inevitably, the models are likely to overlap with each other. We present a computational study designed to address this issue. Our study considers over 60 risky choice models and over 20 intertemporal choice models, and uncovers a measure of similarity between each pair of models in each choice domain. Our analysis involves three key steps: (1) A list of choice questions is randomly generated from a reasonable stimulus space; (2) A model, x, (with a random sample of parameters) is applied to the set of choice questions to obtain a list of predicted choice probabilities; (3) Another model, y, is fitted to these predicted probabilities to minimize the Kullback–Leibler (KL) divergence between the fitted predictions and the generated predictions. We repeat steps 1-3, 100 times, for each pair of models x and y, to generate average KL(x,y) for the pair. By applying multivariate techniques and network analysis to average KL(x,y), we are able to map out the underlying structure of the space of decision models, and subsequently identify model clusters and hierarchies. Our results have novel implications for choice modeling.
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6:00-7:30 PM (1104)

Comparing Delta and Decay Rules in Reinforcement Learning. HILARY J. DON and ASTIN C. CORNWALL, *Texas A&M University*, A. ROSS OTTO, *McGill University*, TYLER DAVIS, *University of Texas at Austin*, DARRELL A. WORTHY, *Texas A&M University* – Delta and Decay learning rules update expected values (EVs) in reinforcement learning. The primary distinction is that the Delta rule learns average rewards (EV = reward probability), while the Decay rule learns cumulative rewards (EV = reward frequency). This distinction is important as different models assume either averaged or summed forms of learning. To test model predictions, participants made binary choices on intermixed AB and CD trials, where optimal choices were A and C. Critically, although reward probability was higher for C (.75) than A (.65), reward frequency was higher for A than C as AB trials occurred twice as often as CD trials. The Delta rule predicts a preference for C, despite the base-rates. The Decay rule predicts a preference for frequently rewarded A. Choice was compared in conditions where participants experienced either rewards or losses. On novel CA trials, choices were more consistent with Decay model predictions.
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6:00-7:30 PM (1105)

Distraction and Delay: Memory and Evaluation of Temporal Sequences of Events. ALICE MASON and MARK HURLSTONE, *University of Western Australia*, GEOFF WARD, *University of Essex*, GORDON BROWN, *University of Warwick*, SIMON FARRELL, *University of Western Australia* – Previous studies have found a direct relationship between accessibility of items in memory and retrospective evaluations of sequences of events. For example, people typically show a preference for improvingover declining temporal sequences and this preference can be reversed if a delay is inserted between encoding and evaluation. This has been linked to the reduced recency in recall of events during delayed recall. We tested the conditions under which a memory-based framework provides a comprehensive explanation for retrospective evaluations. We compared memory and evaluation of improving and declining temporal sequences under delayed recall and with a continuous distractor during encoding. We predicted that the continuous distractor during encoding would reinstate recency in both memory and evaluation. We further predicted that improving sequences would be more positively evaluated compared to declining sequences under continuous distraction (as measured by willingness to pay). We found mixed evidence in favor of a direct relationship between memory for individual items within the sequence and overall evaluation of the sequence.
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6:00-7:30 PM (1106)

Motor Indicators of Cognitive Load: A Mouse-Tracking Approach. HANSOL RHEEM, VIPIN VERMA, and DAVID VAUGHN BECKER, *Arizona State University* (Sponsored by David Becker) – Previous studies suggest that mouse-trajectory data can reveal decision dynamics and other aspects of cognitive performance. The current study investigated whether the mouse-trajectory data can be used to make inferences about cognitive load under conditions in which motor task difficulty (e.g. moving a mouse cursor to a target that is small and hard to locate) is systematically manipulated. Participants performed simple tasks which required them to move a cursor to different-sized targets, and at the same time performed secondary, arithmetic tasks designed to impose different levels of cognitive load. Slower mean response time and less trajectory deviation were observed when participants were given secondary tasks imposing a greater cognitive load, whereas slower mean response time, greater trajectory deviation and earlier velocity peak were observed when participants moved a cursor toward a smaller-sized target. The implications of the results in relation to other types of input devices (i.e. touchscreens) are discussed.
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6:00-7:30 PM (1107)

Evidence Accumulation in a Complex Visual Domain: Applying the Linear Ballistic Accumulator to Fingerprint Discrimination. HECTOR PALADA, *University of Queensland*, RACHEL A. SEARSTON, *University of Adelaide*, ANNABEL PERSSON, *University of Queensland*, MATTHEW B. THOMPSON, *Murdoch University*, TIMOTHY BALLARD, *University of Queensland* (Sponsored by Guy Hawkins) – Evidence accumulation models have been used to understand the cognitive processes underlying performance across a number of domains. Previous experiments typically involve making decisions about basic stimuli (e.g., random dots).

Fingerprint discrimination requires the processing of complex visual information. However, previous modeling efforts fail to account for temporal information, which is closely related to accuracy. We apply the linear ballistic accumulator (LBA) to fingerprint discrimination to capture the processes underlying accuracy and response time performance. We show that the LBA can provide a psychologically coherent account of performance across three fingerprint discrimination experiments. The model was able to account for manipulations in visual noise, speed-accuracy emphasis, and training. The LBA is a promising candidate for further understanding real-world perceptual discrimination decisions.
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6:00-7:30 PM (1108)

Empirical Priors for Evidence Accumulation Models. NGOC-HAN TRAN (Graduate Travel Award Recipient), LEENDERT VAN MAANEN, and DORA MATZKE, *University of Amsterdam*, ANDREW HEATHCOTE, *University of Tasmania* (Sponsored by Andrew Heathcote) – The Diffusion Decision Model (DDM) and the Linear Ballistic Accumulator (LBA) are the most prominent evidence accumulation models for speeded-decision-making tasks. Recently, the Bayesian approach has become increasingly popular for parameter estimation in both models. The key element of the Bayesian approach is the formalization of knowledge and assumptions about likely values of the model parameters in the prior distribution. We therefore strive for informed priors. In an extensive literature review, we extracted parameter estimates for the DDM and LBA from published studies to generate informed prior distributions. We then illustrated the benefits of using informed priors in individual as well as hierarchical Bayesian parameter estimation. Our study establishes a comprehensive reference resource for the DDM and LBA parameter values in various experimental paradigms for empirical researchers. Based on the challenges we faced during the literature review, we give guidelines for best practices in cognitive modelling to increase computational reproducibility.
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6:00-7:30 PM (1109)

Prominence in Multi-Attribute Choice: A Drift Diffusion Analysis. WENJIA JOYCE ZHAO and SUDEEP BHATIA, *University of Pennsylvania* (Sponsored by Sudeep Bhatia) – We use hierarchical drift diffusion models to investigate the effect of prominence in two-alternative multi-attribute preferential choice. Experiment 1 examined option-based prominence effect, experiment 2 examined attribute-based prominence effect, and experiment 3 examined both types of prominence simultaneously. We find that option-based and attribute-based prominence effects both increase choice probabilities for options favored by prominence. However, drift diffusional model fits suggest that the two effects work through different mechanisms. Altering choice option prominence leads to a starting point shift for the prominent option, whereas altering attribute prominence leads to a drift rate shift for the option that is dominant on the prominent attribute. Our results illustrate how seemingly identical contextual factors can be distinguished with the use of drift-diffusion modelling.
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6:00-7:30 PM (1110)

Rapid Assessment of Cognitive States With an Experiment and Modeling Ecosystem. RYAN P. KIRKPATRICK, ADAM W. FENTON, EMILY R. WEICHART, KEVIN P. DARBY, and BRANDON G. JACQUES, *University of Virginia*, BRANDON M. TURNER, *The Ohio State University*, PER B. SEDERBERG, *University of Virginia* (Sponsored by Brandon Turner) – Most current approaches to assess the cognitive state of an individual suffer from long assessment times, a lack of insight into the latent processes that give rise to the assessment results, and failure to sufficiently estimate the uncertainty in those assessments. We introduce a suite of behavioral tasks: a perceptual decision-making task, a cognitive control task, a risk-taking task, and an episodic memory task, each with a corresponding process model (two variants of the Leaky Competing Accumulator model, a novel model of susceptibility to risky behavior, and a variant of the Temporal Context Model respectively), designed to quickly measure as many cognitive constructs as possible. When these models are fit to the data within a Bayesian framework, we can assess an individual's performance, decomposed into parameters that both explain task performance and provide insight into the current cognitive state and abilities of a participant. We can then track the fluctuations in the parameter values across experiment sessions and, by assessing variability in the parameter estimates, identify significant differences in behavior both within and between individuals of both clinical and healthy populations.
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6:00-7:30 PM (1111)

Co-registration of Pupillary and Electrophysiological Responses in a Visual Oddball Task. SARA LOTEMPLIO, *University of Utah*, KARA FEDERMEIER, *University of Illinois*, BRENNAN PAYNE, *University of Utah* (Sponsored by Brennan Payne) – The P300 is one of the most widely studied event-related potential (ERP) indices of information processing and decision making, yet its neurophysiological origins remain elusive. Task-related decision processes have been shown to modulate both the P300 and activity within the locus coeruleus norepinehrine (LC-NE) system, suggesting that they may be coupled. Drawing on prior work showing a strong relationship between pupil diameter and LC activity, we simultaneously examined pupillary and ERP indices of task-related decision making in a two-stimulus visual oddball task. Infrequent stimuli elicited a robust and posteriorly distributed P3b component, as well as a substantial phasic increase in pupil dilation. We also observed modest correlations between individual differences in the P3b and pupil dilation. Findings are discussed with respect to the adaptive gain control theory of decision making.
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6:00-7:30 PM (1112)

Would You Like a Snack? Priming for Food-related Behaviors. JENNIFER M. MARTIN and ALLISON M. WILCK, *University at Albany, State University of New York*, STEPHANIE A. KAZANAS, *Tennessee Technological University*, JEANETTE ALTARRIBA, *University at Albany, State University of New York* – Individuals' behavior can be influenced by cues in their surroundings (Bargh, Chen, & Burrows, 1996). In the current study, behavioral priming was applied to examine if exposing individuals to subliminally presented food items would later influence their behavior when selecting a snack and completing cloze sentences. Phase I of this experiment collected a descriptive norm of university student food preferences. In Phase II, high preference food items and highly familiar office items were photographed and incorporated into cloze sentences of varying constraint that were validated on a comparable population. During the critical Phase III, participants viewed the target photos at subliminal durations while completing a distractor task before completing cloze sentences and making a two-choice snack decision. Preliminary results indicated that there were no differences in completing sentences with the target item (previously presented as a photo) as compared to any other appropriate response. Additionally, priming was not revealed in the behavioral (i.e., snack decision) data. Planned follow-up experiments will replicate Phase III with a stronger priming manipulation.
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DISCOURSE PROCESSES

6:00-7:30 PM (1113)

Lexical Alignment in the two Languages of Bilinguals. DACIA CAROLINA HERNANDEZ, AZIZ A. ATIYA, ALINA ANCHONDO, and IVA IVANOVA, *University of Texas at El Paso* (Presented by Iva Ivanova) – Speakers in dialogue tend to mimic aspects of their interlocutor's speech, and theories of this phenomenon (alignment; Pickering & Garrod, 2004) postulate that it brings processing facilitation. If so, we would expect more alignment in the non-dominant than in the dominant language of bilinguals, but there is no work on bilingual alignment. Here, English-dominant and Spanish-dominant bilinguals played a picture-matching game with a confederate in Spanish. On critical trials, participants named objects which were either previously named by the confederate with a dispreferred but acceptable name (e.g. mano[hand] for puño[fist];alignment condition) or were not previously named by the confederate (control condition). Bilinguals produced more dispreferred responses in the alignment than in the control condition (an overall alignment effect), which was larger for the group speaking in their non-dominant language. These results suggest that alignment aids lexical choice when speaking a non-dominant language, and have implications for bilingual communication and second-language learning.
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6:00-7:30 PM (1114)

A Multi-Dimensional Analysis of Students' Writing Flexibility. LAURA K. ALLEN, *Mississippi State University*, AARON D. LIKENS and DANIELLE S. MCNAMARA, *Arizona State University* – Researchers have hypothesized that writers' abilities to flexibly adapt to writing contexts may play an important role in their ability to produce high-quality texts. The current study builds on this work by examining how participants revise texts for different audiences, and whether these revisions interact with reading skills. Participants (n=95) were asked to revise texts for two audiences: a group of professors or a class of fourth-grade students. The revised drafts were then analyzed along five text Easability components. Results suggest that participants generally adapted the texts appropriately for the audiences. Across four dimensions, participants made texts easier to read for the students. Importantly, the nature of these revisions depended on the audience and participants' reading abilities. On two dimensions, high-skilled readers were better able to adapt texts for the audiences than the less-skilled students. Our results provide insights into the role of flexibility and comprehension ability in writing skill.
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6:00-7:30 PM (1115)

Analyzing Discourse Markers in Five- to Seven-Year-Old Typical Children and Children With Autism. MANYA JYOTISHI and LETITIA NAIGLES, *University of Connecticut* (Sponsored by Letitia Naigles) – Discourse makers are small words (e.g., 'um', 'uh', 'well', 'like', etc.) that are used to maintain discourse coherence. They serve a pragmatic function in a conversation. Previous studies have yielded mixed findings in discourse marker usage. While some have found that ASD participants use fewer 'ums' and 'uhs' compared to typically-developing (TD) children, others have found discourse markers usage to be comparable across the TD and ASD groups. The goal of the current study is to examine the use of a wide range of discourse markers in a narrative task with five-to-seven-year old TD children and children with ASD as participants. Twenty-eight TD children and fourteen children with ASD participated. They were administered the ADOS, TACL-4, and narratives were elicited using either Tuesday or Frog, Where are You? The results showed that TD children used more discourse markers in their narratives than children with ASD; however, 'um' and 'uh' were comparable across the two groups. Moreover, TD children used more varied types of discourse markers (e.g., 'so', 'like', 'but', 'and then') in their narratives. It was found that children's vocabulary and grammatical abilities did not drive these differences in discourse markers usage.
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6:00-7:30 PM (1116)

If You Like Me, You Will Tell Me When You Are "Foaming at the Mouth": Idiom Use Increases Perceived Intimacy. KRISTA A. MILLER, CHARMAINE BERNARDO, and GARY E. RANEY, *University of Illinois at Chicago* (Sponsored by Gary Raney) – Horton (2007) demonstrated that when people use a metaphor in conversation, they are perceived as having a closer relationship than if they do not use a metaphor. The purpose of

this study was to determine if using idioms produces the same effect. We had participants read narrative passages containing conversations between two people whose relationship was not described. The passages ended with a sentence containing an idiom or a literal phrase (e.g., The referee had mefoaming at the mouth / feeling extremely angry). Half of the idioms were low familiarity and half were high familiarity. Participants rated how well the two characters know each other on a 7-point scale (intimacy ratings). Passages containing idioms led to significantly higher intimacy ratings. There was no difference in ratings between low- and high-familiarity idioms, suggesting that using an idiom reflects higher intimacy in general. Our study shows that the metaphor intimacy effect found by Horton generalizes to idioms.
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6:00-7:30 PM (1117)

The Effect of Thematic and Process Spoilers on the Experience of Short Stories. SAVANNAH K. RAINES and WILLIAM H. LEVINE, *University of Arkansas* (Presented by William H. Levine) – Spoilers have been shown in different studies to both increase and decrease enjoyment of short stories. In an effort to understand these discrepant findings, which may be due to variability in the types of spoilers used, participants in this study (n = 300) each read three short stories (selected from a pool of six). One story was unspoiled. A second was preceded by a process spoiler, detailing major plot points and the ending. The third was preceded by a thematic spoiler, providing information about the overarching theme of the story. Additionally, spoilers were presented either immediately before reading or with a short delay between spoiler and reading. After each story, enjoyment and other aspects of the experience of the story (e.g., suspense) were measured. In general, enjoyment was affected minimally by both types of spoilers, but suspense was reduced by both spoiler-types at no delay, but increased by thematic spoilers with a short delay between spoiler and story. These results and others will be discussed with respect to theories of poetics and the role of processing fluency in aesthetic pleasure.
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6:00-7:30 PM (1118)

Eye See What You're Saying: Beat Gesture and Contrastive Pitch Accent Facilitate Online Reference Resolution in Discourse Processing. LAURA M. MORETT, *University of Alabama*, SCOTT H. FRAUNDORF, *University of Pittsburgh*, JAMES C. MCPARTLAND, *Yale University* – Although beat gesture and contrastive pitch accent both convey importance and are closely related, little is known about how these cues are integrated and how this affects online reference resolution in discourse processing. To address this question, we conducted a visual world eye-tracking experiment in which we independently manipulated beat gesture and contrastive pitch accenting. Participants (n = 40) were presented with context sentences (e.g., Click on the blue star) followed by critical sentences, half of which contrasted in color (e.g., Now, click on the red star) and half of which differed in color and shape (e.g., Now, click on the red heart). When the target contrasted in color with the context referent, contrastive pitch accenting on the color adjective decreased fixations to competitors ($t = -4.73$, $p < .001$). Furthermore, beat gesture on the color adjective increased the rate of target fixations relative to competitor fixations more for color contrast trials than it did for color + shape difference trials ($B = -0.08$, $t = -4.12$, $p < .001$). No significant three-way interaction was observed, indicating that beat gesture and contrastive pitch accenting exert independent, additive effects on reference resolution.
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6:00-7:30 PM (1119)

Seeing Double: Beat Gesture and Pitch Accent Increase Listeners' Cognitive Load During Discursive Reference Resolution. LAURA M. MORETT, *University of Alabama*, JENNIFER ROCHE, *Kent State University*, SCOTT H. FRAUNDORF, *University of Pittsburgh*, JAMES C. MCPARTLAND, *Yale University* – Although beat gesture and contrastive pitch accent both convey importance and are closely related, little is known about how these cues are integrated and how this affects cognitive load during reference resolution in discourse processing. To address this question, we conducted a visual world eye-tracking experiment in which we independently manipulated beat gesture and contrastive pitch accent. Participants (n = 40) were presented with context sentences (e.g., Click on the blue star) followed by critical sentences, half of which contrasted in color (e.g., Now, click on the red star) and half of which differed in color and shape (e.g., Now, click on the red heart). Participants spent marginally more time looking at videos and target objects when both beat gesture and contrastive pitch accenting were present than when both of these cues were absent ($B = -.06$, $t = -1.68$, $p = 0.09$). Moreover, pupil size was larger in trials with beat gesture and contrastive pitch accent relative to trials with neither cue ($B = 0.02$, $t = -2.40$, $p = .02$). These results indicate that viewing beat gesture in conjunction with contrastive pitch accent may increase listeners' cognitive load during reference resolution in discourse processing.
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6:00-7:30 PM (1120)

When You Kick the Bucket Do You Pick Up the Pail? EMILY SANFORD, *Johns Hopkins University*, EVA HARMON, NATALIE SPANOS, OLIVIA SHAFFER, and BROOKE LEA, *Macalester College* (Presented by Brooke Lea) – How are phrases such as "Joe kicked the bucket" comprehended? Some theories of idiom comprehension claim that idiomatic meanings are processed prior to, and independently from, literal meanings (e.g., Swinney & Cutler, 1979; Gibbs, 1980), while others posit that literal processing precedes idiomatic processing (e.g., Cacciari & Tabossi, 1998; Cutting & Bock, 1997). We presented idioms at a fixed rate, and asked subjects to quickly indicate whether or not a target word had appeared in the phrase. Target words were either related to the literal meaning of the phrase (e.g., "pail") or to the figurative meaning (e.g., "die"). With an interval of 100 ms between the phrase-ending word and the target, both literal and figurative meanings were activated.

When the ISI was increased to 800 ms, however, only the literal meanings remained significantly activated. The results are discussed in the context of models of meaning activation.
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6:00-7:30 PM (1121)

"Still Feeling Lucky?" Features of Sarcasm in the Context of Failed Predictions. ALEXANDER A. JOHNSON and ROGER J. KREUZ, *The University of Memphis* – What makes a statement sarcastic? We explored this via a crowdsourcing paradigm in which participants provided completions to brief interactions between two characters. In some stories, an event predicted by one character occurred, whereas in others it did not. Participants spontaneously provided many sarcastic completions but did so overwhelmingly for stories with failed predictions (such as bowling poorly). Using features previously described in this literature, we identified specific attributes in 187 sarcastic completions and compared them to literal completions serving as controls. Logistic regression indicated that a small number of features accounted for about 40% of the variance. These included contextual factors (explicit echoes of predictions), lexical choices (such as exaggeration) and cultural factors (the gender of the potential ironist). The results suggest that no single feature is paramount for communicating sarcastic intent. This echoes the work of computational linguists attempting to identify sarcasm in social media via sentiment analysis.
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6:00-7:30 PM (1122)

Misunderstanding Authors' Humor and Sarcasm in an Online Fashion Forum. COURTNEY KELLNER and MICHAEL F. SCHOBER, *The New School* – How accurately do people interpret each other's ironic and humorous intent? Using actual posts about celebrity fashions from an online forum, this study asked authors of posts, forum members, members of other forums, and people who weren't members of any forum to rate authors' intended humor and sarcasm. Ratings suggested that readers' interpretations could be surprisingly misaligned with authors'. Members of the forum were at best moderately aligned in their perception of authors' intents, and participants who weren't members of the forum were even less likely to align with authors. The findings are consistent with a perspectival view of irony: irony may not be an essential property of an utterance, but rather something that a speaker or author can propose, and that an addressee may or may not perceive based on a constellation of factors about the participants and the utterances themselves.
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6:00-7:30 PM (1123)

Influence of Contextual Events on the Terms Before and After. JENNIFER KOLESARI and LAURA CARLSON, *University of Notre Dame* (Sponsored by Laura Carlson) – Various aspects of linguistic context affect how we interpret words within discourse. In 4 experiments, we systematically assessed the influence of contextual events on the interpretation of the prepositions before and after. Specifically, we presented participants with temporal descriptions such as She watched a movie after she ran a 5k, and asked participants to estimate the duration of events and the duration that passed between events. Across experiments, we varied the durations of events, the sentence structure, and the semantic relation between events. Manipulating sentence structure enabled us to separately examine the impact of temporal sequence and role in the sentence. Manipulating semantic relation enabled us to examine events with both variant and invariant orders. We found a strong relationship between the durations of events and the estimates of time that passed between them. The event duration with the strongest influence on these estimates was often based on their temporal sequence, and only based on their role in a few specific cases with less common structures and variant orders. This demonstrates a strong role of time in these interpretations, which is different from other influences of context on terms.
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6:00-7:30 PM (1124)

The Meaning of "Because" in Mechanistic and Teleological Explanatory Schemas. LILLIAN ASIALA, KATJA WIEMER, and M. ANNE BRITT, *Northern Illinois University* (Sponsored by Katja Wiemer) – Mechanistic and teleological explanations differ in the reasons they mention for why phenomena occur. A mechanistic explanation provides a causal account, while a teleological explanation provides a functional account. This study investigated the interpretation of the causal connective "because" in both explanatory schemas. We hypothesized that "because" in a mechanistic schema would specify a cause-effect relationship, while "because" in a teleological schema would signify an enabling relationship. Therefore, we predicted that readers would accept "because" as a sensible connective for both schemas, but would prefer an enabling connective "so that" in teleological explanations. These predictions were confirmed by two experiments. Different interpretations of "because" for separate explanatory schemas has implications for the inferences needed to understand the causal relation. We predicted that the mediating inferences readers identify as necessary for establishing coherence would differ systematically based on explanatory schema. This prediction was consistent with the results of our third study. This suggests that the explanatory schema guides the interpretation of "because," which affects how readers integrate the text.
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6:00-7:30 PM (1125)

Pragmatic Processing: An Experimental Investigation of Presuppositions Using Mouse-Tracking. COSIMA SCHNEIDER, *University of Tübingen*, MICHAEL FRANKE, *University of Osnabrück*, CAROLIN SCHONARD, *TU Chemnitz*, GERHARD JÄGER and MARKUS JANCZYK, *University of Tübingen* (Sponsored by Markus Janczyk) – A presupposition (PSP) is a condition that has to be met in order for a linguistic expression to be appropriate. Certain linguistic expressions trigger PSPs. The definite article is one PSP trigger and it creates the (uniqueness) PSP: If in a given context there are two bananas and one pear, it is felicitous to utter "Give me

the pear," but it is inappropriate to say "Give me the banana." In this study we investigate the processing of PSPs using mouse-tracking in a verification task. This setup allows to compare the processing of sentences with definite and indefinite articles in pragmatically felicitous and infelicitous contexts, and to gain insight into the temporal dynamics of this processing. The data show that PSP processing is context dependent: Sentences with infelicitously used articles require more processing costs than felicitously used ones. Our study is the first attempt to provide mouse-tracking data for PSP processing.
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EMOTION AND COGNITION I

6:00-7:30 PM (1126)

Timing Is Everything: The Effects of Valence and Arousal Across the Adult Lifespan in an Emotional Stroop Task. SAMANTHA E. TUFT and CONOR T. MCLENNAN, *Cleveland State University* – As age increases, there is evidence that people tend to pay less attention to negative information, pay more attention to positive information, or both. In the current study, we examined positivity effects across the adult lifespan by evaluating competing predictions of two theories: Socioemotional Selectivity Theory (SST), which is based in motivation, and Dynamic Integration Theory (DIT), which is based in capacity. Computer mouse tracking was used to examine effects across levels of Valence (negative, neutral, positive) and Arousal (low, medium, high) in an emotional Stroop task. Emotional complexity (EC) was used as a proxy for cognitive resources. With increased age and EC, participants' responses were slower and more deviated for low arousing positive words relative to neutral words, consistent with SST. Furthermore, as age and EC increased, participants had faster initiation times (ITs) for low arousing negative words relative to neutral words, consistent with SST. The results contribute to a better understanding of emotional cognitive biases across the adult lifespan.
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6:00-7:30 PM (1127)

Social Exclusion: Ego Depletion and Self-Awareness. SELINA SALDIVAR and GINA A. GLANC, *Texas A&M University, Corpus Christi* (Presented by Gina A. Glanc) – Previous research investigating ego depletion has found that self-control actions yield a state of ego depletion (Baumeister, R. F., Bratslavsky, E., Muraven, M., & Tice, D. M., 1998). This study sought to generalize the detrimental effects of ego depletion to cognitive performance and, in addition, determine whether self-awareness would alleviate ego depletion in participants, thereby reducing (or eliminating) it's effect on cognitive performance. The current study utilized three different tasks to elicit ego depletion (control group (no ego depletion), difficult math task, or social exclusion task), as well as a writing assignment (with self-awareness prompt or neutral prompt). Results indicated a main effect of ego depletion, indicating that participants within the social exclusion group demonstrated a smaller deficit in cognitive performance on the cognitive task than the control group. No interaction was found between the factors, which indicates that self-awareness did not demonstrate an effect on ego depletion in this study. Future research should investigate ways to alleviate ego depletion or even to strengthen self-control to deflect ego depletion after experiencing social exclusion.
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6:00-7:30 PM (1128)

Does Failure to Ignore Negative Material Lead to Depression? Evidence From a Modified NAP Task. REGARD MARTIJN BOOY and THOMAS SPALEK, *Simon Fraser University* (Sponsored by Thomas Spalek) – Previous research using the Negative Affective Priming (NAP) task reported reduced inhibition for negative material in depressed and high depressed trait individuals. This has lead to conclusions that reduced inhibition for negative material represents a cognitive vulnerability towards depression. However, in previous versions of the NAP task, subjects never responded to neutral words as targets. Thus, the positive-negative difference may have been artificially inflated. Additionally, negative priming effects for positive and negative words were not fully dissociated. To address these concerns, a modified NAP task was created. Subjects completed both the modified task as well as the original NAP task to directly compare the two versions. While NAP scores to negative targets was lower in high BDI compared to low BDI individuals on the original NAP task, these group differences were not observed in the modified version of the task. To confirm these effects, a follow-up study using only the modified task was conducted. Again, no group differences were observed. This suggests that failure to effectively ignore negative material might not constitute a cognitive vulnerability towards depression.
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6:00-7:30 PM (1129)

Assessing the Relationship Between Executive Function and Emotion Regulation Flexibility Using a Novel Measure. EVANGELIA G. CHRYSIKOU, *Drexel University*, ALEXANDRA E. FOWLER, *University of Kansas Medical Center*, HAYLEY O'DONNELL, *Drexel University* (Presented by Hayley O'Donnell) – One's ability to regulate emotional responses to different situations (emotion regulation, ER) has been at the center of much cognitive and affective neuroscience research on frontal lobe function. Recent findings show that executive function may also involve ER flexibility, namely, the ability to implement ER strategies that match contextual demands. Despite extensive research on cognitive flexibility (i.e., the regulation of cognitive strategies depending on context) much less work has examined ER flexibility. Here, we developed a novel measure of ER flexibility based on the widely accepted measure of cognitive flexibility, the Wisconsin Card Sorting Task (cWCST). We examined the strength of this new measure (eWCST) to capture ER flexibility in healthy adults (n = 30) and depressed individuals who are characterized by cognitive and ER flexibility impairments (n = 20). Behavioral and psychophysiological data showed that individuals with depression and healthy controls were less flexible on emotional sorting in the eWCST relative to their performance on the

cWCST. These findings contribute to the developing literature on ER flexibility, while allowing for direct comparisons between cognitive and emotion regulation domains.
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6:00-7:30 PM (1130)

Mine Versus Money: The Effect of Reward on the Ownership Memory Bias. GRACE TRUONG, TODD C. HANDY, and REBECCA M. TODD, *University of British Columbia* – Can the robustly-observed tendency to prioritize objects we own in attention and memory be attenuated by monetarily incentivizing memory for competing stimuli ? Here we investigated whether endowing stimuli owned by others with greater reward could abolish the memory bias for self-owned stimuli. In Experiments 1-3, participants first viewed a series of (images of) objects that were randomly assigned to be owned by the participant or the experimenter. Encoding of the object-owner pairings was incentivized via reward payout, which was either equal for each ownership category ($0.10 each for both categories) or unequally weighted towards other-owned objects (Experiment 1: $0.11 for other-owned objects, Experiment 2: $0.15 for other-owned objects). In Experiment 3, we switched to a loss framework in which forgetting objects was associated with differential costs. Subsequent memory tests revealed greater recognition for self-owned objects relative to other-owned objects regardless of reward condition or framework. These results suggest that self-relevance and money may differentially affect the reward system.
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6:00-7:30 PM (1131)

Affect Congruency With Full Color Angry and Happy Faces. DEAN G. PURCELL and LEENA TWAL, *Oakland University*, ALAN L. STEWART, *Stevens Institute of Technology* – In an Affect Congruency Task (ACT) observers judge the affect of two successive stimuli (S1 followed by S2). The observer's task is to determine if the affect of S1 and S2 represent the same emotion. An angry S1 produces interference, increasing decision time and reducing an observer's accuracy, independent of the affect of S2. In contrast to this, a happy S1 yields faster decision times and greater accuracy although performance was slightly reduced with an angry S2 face. Our previous research with this paradigm investigated grey-scale faces, schematic faces and words as S1 stimuli. All found essentially the same results: negative S1 stimuli interfere with performance. The current research determined that the interference effects of angry S1 stimuli generalized to full color Caucasian and African-American faces. There was no evidence for rapid processing of angry male African-American faces.
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6:00-7:30 PM (1132)

Arousal Enhances Suppression of Neutral Distraction in Young but not Older Adults. SARA N. GALLANT, KELLY A. DURBIN, and MARA MATHER, *University of Southern California* – In young adults, arousal selectively enhances memory for high-priority information while inhibiting memory for irrelevant details. Here, we investigated whether these selectivity effects extend to neutral stimuli preceding an emotionally arousing stimulus. We also examined age differences in arousal's influence, given that aging is associated with reduced selective attention and inhibitory processing. Young and older adults viewed a series of target images superimposed with either neutral or high arousal taboo distractor words. Memory was subsequently tested for all target and distractor items. Findings revealed differential effects of age on distractor regulation under arousal. When compared to young adults, older adults were more distracted by taboo relative to neutral words. Moreover, seeing a taboo word enhanced suppression of preceding neutral distractors in young adults only. These results thus suggest that arousal increases selective processing in young adults and susceptibility to distraction in older adults.
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6:00-7:30 PM (1133)

Transcutaneous Vagus Nerve Stimulation (tVNS) Enhances Recognition of Emotions in Moving but not Static Bodies. MARIA JESUS MARAVER and LAURA STEENBERGEN, *University of Leiden*, PAOLA RICCIARDELLI and ROSANNA ACTIS-GROSSO, *Università degli Studi di Milano-Bicocca*, LORENZA S. COLZATO, *Ruhr University Bochum & Leiden University* – The vagus nerve has been proposed as a key phylogenetic substrate that enables optimal social interactions and emotion recognition. Previous studies showed that the vagus nerve mediates people's ability to recognize emotions based on facial images but not static bodies. Here, we aimed to verify whether the previously reported causal link between vagal activity and emotion recognition can generalize to situations where emotions must be inferred from images of whole moving bodies. We employed transcutaneous vagus nerve stimulation (tVNS), a novel non-invasive brain stimulation technique that applies mild electrical stimulation to the auricular branch of the vagus nerve, in the anterior protuberance of the outer ear. In two sessions, participants received active or sham tVNS before and while performing two emotion recognition tasks. Active tVNS, compared to sham stimulation, enhanced the recognition of anger for moving but not static bodies. The ability to recognize a moving angry bodily expression fits with the evolutionary perspective suggesting that natural selection resulted in a propensity to react more strongly to negative stimuli, supporting the role of the vagus nerve in regulating social engagement via emotion recognition.
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6:00-7:30 PM (1134)

Arousal Rather Than Valence Affects Cognitive Control: The Effects of Emotional Stimulus on the Conflict Adaptation Effect. HYUNJEONG WOO, YOUNGJI HONG, and YOONHYOUNG LEE, *Yeungnam University*, REBECCA B. WELDON, *Juniata College*, MYEONG-HO SOHN, *George Washington University* (Presented by Myeong-Ho Sohn) – The current study investigated how emotion interacts with cognitive control. The specific question is how two dimensions of emotion, valence and arousal, are related to conflict adaptation. Here we present two experiments. On each trial, participants viewed an

emotional stimulus and then performed a color naming version of the Stroop task. The emotional stimuli were selected from the International Affective Pictures System (IAPS). In Experiment 1, arousal was varied (low, moderate, high) while valence was controlled to be neutral. In Experiment 2, valence was varied (positive, neutral, negative), while arousal was controlled to be moderate. The results of Experiment 1 showed that the conflict adaptation effect was significant only when the arousal level of the preceding emotional stimulus was low. In Experiment 2, the conflict adaptation effect was significant, but there was no effect of the preceding valence. The current results suggest that arousal rather than valence modulates conflict adaptation and further that higher levels of arousal can impede the flexible adjustment of cognitive control.
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6:00-7:30 PM (1135)

Aha! Moments When Learning About Relational Categories in Biology. CHRISTINE CHESEBROUGH, *Drexel University*, JENNIFER WILEY, *University of Illinois at Chicago* (Sponsored by John Kounios) – The Aha! experience has been studied mainly in the context of insightful problem solving, but less work has investigated Aha! experiences that might occur during learning. In this study, participants were asked to self-report Aha! moments when learning about relational categories in Biology. Participants were randomly assigned to engage in learning via a problem-oriented approach or direct instruction. In the problem-oriented condition, participants saw three exemplars of organisms that exemplified a Biology principle, such as symbiosis or mimicry, and were asked to generate their common principle. In the direct instruction condition, participants were told the principle directly. Frequency of self-reported Aha! moments was measured, as well as accuracy at identifying novel exemplars of the principles they had learned in a final test. Participants were significantly more likely to report Aha! moments in the problem-oriented condition. However, having an Aha! experience did not always lead to better category identification accuracy.
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6:00-7:30 PM (1136)

The Influence of Mood on Exploration in Experience-Based Decisions. YURY SHEVCHENKO and ARNDT BRÖDER, *University of Mannheim* (Sponsored by Arndt Bröder) – The differences between decisions from description and experience that have been discovered in recent research inspired the modeling of experience-based decisions. The exploration-exploitation tradeoff is of particular interest, as the paradigm resembles many features of everyday decisions – the choice of a stable, known option versus taking a risk – but also includes contextual information, such as waiting time, distance, or social factors. Our research concerns the emotional regulation of exploration decisions. There is no consensus in emotion theories on whether positive or negative moods promote exploration. In our three experimental studies (N = 453), we have demonstrated that negative mood increases the exploration in the foraging task. We assume that the "mood-as-information" mechanism can explain this result by the association of the current mood with the default strategy in the task. By crossing the manipulation of mood with the default mode (to explore or exploit), the current study tests the hypothesis that mood signals the success of the default strategy and thus influences the exploration decision.
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6:00-7:30 PM (1137)

Do Instructions and Response Modes Matter While Judging Smiles? ANNIE ROY-CHARLAND, ROXANE COUTURIER, and ADÈLE GALLANT, *Université de Moncton* – The purpose of the project was to examine the effect of methodological variations on the judgment of smiles and eye movements. More precisely, participants were instructed to judge, in the first experiment, whether the person in a picture was "really happy / genuine / sincere" or "not really happy / genuine / sincere" and, in the second experiment, judgments were made on Likert scales. The symmetrical Duchenne smiles were considered the most happy / genuine / sincere, followed by the asymmetrical Duchenne smiles and the non-Duchenne smiles were the least happy / genuine / sincere. Participants were sensitive to the absence of the Duchenne marker, which was also reflected in faster judgments. Participants made more saccades for the asymmetrical Duchenne smiles than for other types of smiles, which indicates that they processed them differently. There was no effect of instructions on the judgment or visual processing of smiles. However, while the response modes had no effect on the responses given, there was an impact on the processing time. Using a Likert type scale required more time than using dichotomous responses.
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6:00-7:30 PM (1138)

Hemifacial Asymmetries in Social Anxiety; Gender Differences and Facial Expression. KENTA ISHIKAWA, AKIHIRO KOBAYASHI, TAKATO OYAMA, HIKARU SUZUKI, and MATIA OKUBO, *Senshu University* – The present study investigated gender differences of hemifacial asymmetries for facial expressions in social anxiety. We used composite faces (left-left and right-right composites) of models with high and low social anxiety (n = 45). The composite faces featured three types of posed facial expressions (happy, angry and neutral expression). Seventy-seven raters evaluated which of the two facial composites looked emotionally more expressive (left-left vs. right-right). The left-hemiface advantage was larger for male models with high social anxiety than those with low social anxiety while the left-hemiface advantage was smaller for female models with the high social anxiety than those with low social anxiety. Experiment 2 partially replicated these results with increasing the number of models (n = 96).These findings suggest that socially anxious men and women differently used the left-hemiface, which linked to the emotional side of the brain, to avoid negative evaluations from others.
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6:00-7:30 PM (1139)

On the Immediacy of Evaluative Information About Aggressive and Non-Aggressive Breeds of Dogs From Lexical Decisions Tasks. SERENA MANGANO, PHILIP H. MARSHALL, and ELIZABETH M. BRIONES, *Texas Tech University* – Despite the large literature on animal cognition per se, especially that of dogs, there is scarce research on how humans process information about dogs. Four experiments were conducted. Participants were undergraduate students, and 10 high and 10 low perceived aggressive breeds of dogs were identified (Briones & Marshall, 2018). We used a lexical decision task to assess the immediacy of emotional/evaluative responses to pictures, and/or names, of perceived aggressive and non-aggressive breeds of dogs. If such information is immediately available upon presentation of the prime, we should find longer target decision times for high aggression primes (negative emotion/evaluation), and especially so for the aggressive prime/positive target incompatible combination. In these experiments actual aggressive dog pictures, or just the pictures and/or names of the perceived high and low aggressive breeds were used as primes. A variety of significant findings over these four studies show that dog breed aggressiveness information in the prime can be immediately available to humans. These results might be useful in explaining peoples' apparently immediate reactions and biases towards "aggressive" breeds.
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6:00-7:30 PM (1140)

The Influence of Mood on Implicit Learning. KATHLEEN G. LARSON and RIK WARREN, *Air Force Research Laboratory*, DAVID COPELAND, *University of Nevada, Las Vegas* – According to the affect-as-information hypothesis, a positive mood increases global processing of information and a negative mood leads to local processing (e.g., Clore & Storbeck, 2006). While most previous studies have focused on more explicit types of learning and decision making, we explored implicit learning about regularities in the environment through incidental exposure (e.g., Reber, 1967). In the current investigation, we conducted three experiments to explore how varying levels of mood and arousal affect artificial grammar learning. We also manipulated whether the mood induction phase was separate or embedded in the learning phase, and whether categories of pictures were presented. The patterns of results were generally not consistent with predictions made by the affect-as-information hypothesis. This suggests that implicit learning may not be as influenced by mood as explicit learning.
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6:00-7:30 PM (1141)

Moderately Negative Memories Can Erase Highly Negative Memories: Enhancing Retroactive Interference by Increasing Memory Strength. CODY J. HENSLEY, HAJIME OTANI, MONICA S. HAMAKER, and CHRYSTAL T. HARRISON, *Central Michigan University* (Sponsored by Hajime Otani) – Emotionally negative memories can be disruptive, and therefore, the question is how these memories can be reduced or even eliminated. Recently, we showed that these memories can be made inaccessible by creating retroactive interference (RI). We presented a list of highly negative pictures followed by a list of highly negative, moderately negative, or neutral pictures. The results showed that RI was greatest when List 2 was highly negative; however, RI was also present when List 2 was moderately negative or neutral, albeit to a lesser degree. In the present experiment, we attempted to increase RI in these latter conditions by presenting List 2 three times instead of once. The results showed that RI was increased, and when List 2 consisted of moderately negative pictures, RI surpassed the level that was created by presenting highly negative pictures as List 2 only once.
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6:00-7:30 PM (1142)

Positive Valence Versus Emotional Congruence in Memory Performance: Which Effects Matter When? REECE M. BROOKS, *Young Harris College*, CODY A. MASHBURN, *Georgia Institute of Technology*, AMY L. BOGGAN, *Young Harris College* – Although research on the intersection of emotion and memory has yielded several general principles, the interaction and relative impact of these effects on memory remains unclear. The present study sought to compare multiple influences on memory: the Polyanna principle, color associations, and congruency effects. Thirty undergraduates read lists of positive, neutral, and negative words aloud while simultaneously indicating by keypress the color in which each word was displayed (also positively, neutrally, and negatively valenced). A surprise recall task followed. The Polyanna principle suggests prioritized processing of positive material (Matlin & Stang, 1978). Color associations may facilitate or impede performance (Elliot et al., 2007), particularly when colors are emotionally congruent with word valence. We report evidence for the Polyanna principle in the encoding task, and positive word/color pairings elicited the fastest responses. Positive and negative words were recalled equally well, regardless of color, countering encoding task performance.
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6:00-7:30 PM (1143)

Infant Memory Processes for Emotion During a Social Referencing Encounter. DERRICK B. OCAMPO, *University of California, Merced*, JACQUELINE S. LEVENTON, *Towson University* (Sponsored by Dustin Calvillo) – To date, there is limited research that examines infants' retention for emotion information acquired in a social referencing encounter. We examined the relationships between looking behaviors at encoding and subsequent behaviors during retrieval, and predicted that infants would approach objects paired with a positive and avoid objects paired with a negative emotion. Ten- to fourteen- month-olds' encoding behaviors were recorded on an eye tracker while viewing a social referencing paradigm, and retrieval behaviors toward the objects were recorded after a 10-minute delay. Encoding and retrieval behaviors did not differ between emotion conditions, but there were significant correlations between encoding and retrieval behaviors between positive and negative conditions. Quicker latency towards the target at encoding resulted in a longer touch duration towards

the object at retrieval. Results from the study add to our understanding of infants' memory for emotion suggesting a relationship encoding and subsequent retrieval behaviors.
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6:00-7:30 PM (1144)

Attention, Awareness, Acceptance: How Mindfulness as an Emotion Regulation Strategy Could Reduce Anxiety. REBEKAH KNIGHT and LISA EMERY, *Appalachian State University* (Presented by Lisa Emery) – This study examines the impact of emotion regulation during stimulus encoding on feelings of anxiety at re-exposure. Prior research in our laboratory found that mindfulness improved stimulus memory in high anxiety participants. This may in turn decrease the anxiety felt upon stimulus re-exposure. To test this hypothesis, high (N =31) and low (N = 30) anxiety participants viewed emotional images while using different emotion regulation strategies (Suppression, Mindfulness, or Control), and rated their subjective feelings after each image. Participants returned one week later to view the images again and rate their responses, in the context of an old-new recognition test. Emotion regulation at encoding had little impact on feelings at re-exposure, suggesting that one-time use of these strategies had little long-term effect. High anxiety participants also showed higher arousal and negative affect than low anxiety participants in all conditions, with no significant habituation across time in the high anxiety group.
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6:00-7:30 PM (1145)

The Influence of Cultural Background and Input Familiarity on Multisensory Perception of Emotion. PEIYAO CHEN and VIORICA MARIAN, *Northwestern University* (Sponsored by Viorica Marian) – Previous cross-cultural studies suggest that people from Eastern cultures pay more attention to the auditory modality while people from Western cultures rely more heavily on the visual modality during multisensory emotional perception. The present study examined how input familiarity (i.e., the language of the voice and the race of the face) changes modality bias when perceiving multisensory emotions. Twenty-six native Chinese speakers from China and 28 native English speakers from the U.S. viewed Asian/Caucasian faces and heard Mandarin/English speech simultaneously. They were asked to judge the facial or vocal emotion while ignoring the other modality. Our results replicated the finding that Chinese participants pay more attention to the vocal emotion, while American participants pay more attention to the facial emotion. When both auditory and visual inputs became less familiar, the Chinese group showed a reduced dependence on the auditory modality and both groups increased their reliance on the visual modality. These findings suggest that the processing of emotion is shaped by culture-specific norms, and that people prioritize the visual modality in multisensory perception under a less familiar cultural context.
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6:00-7:30 PM (1146)

Does Being More Expressive Also Mean Being Better at Recognizing Emotions? GONCA ERCEGIL, AYCAN KAPUCU, and SONIA AMADO, *Ege University* – Expressing emotions and recognizing them on others' faces are two important factors for emotional intelligence and social interactions. This study explored the relationships between recognizing, expressing and feeling emotions, and compared these relationships across discrete emotions. Participants completed three emotion recognition tasks (identification, discrimination, matching). Facial expressions were recorded while watching videos of five emotions (anger, disgust, fear, happiness, sadness) and faces were analyzed by Noldus FaceReader for expression intensity. Participants reported their feelings after watching each video and completed the Emotional Expressiveness Questionnaire (King&Emmons,1994). Overall emotion recognition accuracy was not correlated with expression intensity but was significantly correlated with reports of how intense each emotion was felt. Only anger discrimination accuracy was correlated with both anger and fear expression intensity. Correlation between feeling and expressing was only significant for happiness. The relationships among expression intensity, emotion recognition and feeling of emotion will be further analyzed in a regression model.
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6:00-7:30 PM (1147)

Comparing Paranormal Believers and Self-Identified Geeks. WILLIAM LANGSTON and ISKA FROSH, *Middle Tennessee State University* – In an effort to understand paranormal beliefs we have been seeking double dissociations between paranormal believers and religious believers. Differences have been found between the two groups for experience and personality variables. The present project was designed to replicate the comparison between religious and paranormal believers and to extend that comparison to a third group: self-identified geeks. The geek identity is a separate belief system that will allow further exploration of the differences between religious and paranormal believers (e.g., geeks are more likely to identify as spiritual, but not religious, an important comparison group). People attending a ghost tour and people attending a geek media expo were surveyed on beliefs, experiences, religious intensity, and personality. Differences were found between the three groups for narcissism, creativity, and factors of schizotypy. The results will allow us to continue to explore the ways in which experience leads to belief and how to develop experience-based interventions to change consequential misbeliefs.
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LETTER/WORD PROCESSING I

6:00-7:30 PM (1148)

BRAID: A New Bayesian Word Recognition Model With Attention, Interference, and Dynamics. THIERRY PHÉNIX, SYLVIANE VALDOIS, JULIEN DIARD, *Université Grenoble Alpes, CNRS UMR 5105* – Numerous models of word recognition have been proposed during the last decades. Collectively, these models have successfully simulated a wide

range of experimental tasks, but it is puzzling to observe their disagreement about key questions of the field such as the overall architecture of the model, the manner letters are processed and their position encoded, or the involvement of visual aspects such as visual acuity, lateral interference and visual attention. A critical analysis of the current models leads us to define the foundation of a new model of visual word recognition, BRAID (for Bayesian word Recognition with Attention, Interference and Dynamics). This model, designed within the Bayesian algorithmic framework, incorporates an attention mechanism as a key feature. BRAID can account for classical behavioural effects like the word frequency effect or the word/pseudo-word superiority effect and for less often simulated ones (e.g. the Optimal viewing position effect).
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6:00-7:30 PM (1149)

Modeling Optimal Viewing Position With BRAID: The Role of Visual Attention. THIERRY PHÉNIX, SYLVIANE VALDOIS, and JULIEN DIARD, *Université Grenoble Alpes, CNRS UMR 5105* – Word processing performance differs depending on the position of fixation within the word. Fixating slightly left of the word center allows optimal word recognition but performance declines asymmetrically when deviating from this optimal viewing position (OVP), with an advantage for fixations on the initial letters. The visual acuity drop-off with eccentricity and the higher informativeness of the initial part of words have been identified as involved in the OVP effect. We used a new Bayesian algorithmic model of visual word recognition, the BRAID model (Phénix et al., submitted), to explore how visual attention deployment over the word letter-string would affect word recognition performance depending on gaze position. Results show that the model successfully simulates the inverted-J-shaped curves representative of word recognition performance in adult skilled readers and typical children. Moreover, simulations suggest that a reduced visual attention distribution yields inverted-V-shaped curves, as observed in poor and dyslexic readers.
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6:00-7:30 PM (1150)

Simulation of the Atypical Viewing Position Curves of Dyslexic Children. SYLVIANE VALDOIS and THIERRY PHÉNIX, *Université Grenoble Alpes*, MATHILDE FORT, *Université de Poitiers*, JULIEN DIARD, *Université Grenoble Alpes* – The probability of recognizing a word depends on the position of fixation during processing. The resulting word-recognition curves are characterized by a left-of-center optimal viewing position and a reversed J-shaped form in typical readers. We will here report behavioral results from 26 dyslexic participants showing atypical word-recognition curves characterized by the optimal viewing position being right of center and recognition probability being higher when fixating towards the end of the word. Second, we will use BRAID, a new Bayesian model of word recognition that implements gaze position, an acuity gradient, lateral interference and a visual attention device to simulate the atypical curves of dyslexic children. We show that the pathological curves are well simulated assuming a narrow distribution of visual attention and a leftward attention bias. The current findings emphasize the critical role of visual attention in single word recognition and support the visual attention span theory of developmental dyslexia.
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6:00-7:30 PM (1151)

Parafoveal Processing of Inflectional Morphology in Russian Native Speakers and Russian L2 Learners/English L1. ANASTASIA A. STOOPS, KIEL CHRISTIANSON, and TANIA IONIN, *University of Illinois at Urbana-Champaign* – Parafoveal processing of inflectional morphology of Russian nouns was examined in Russian native speakers and Russian L2 learners/English L1 (L2) via a boundary-change paradigm (Rayner, 1975) in a post-verbal argument position not examined previously. The native speakers elicited identical preview benefit for both first-pass measures (SF, GD, GPT) on the word n+1 and preview cost for the morphologically related (vs. identical) for GPT. L2 elicited identical preview benefit and preview cost for the morphologically related (vs. identical) in the Regressions out of the target word (n+1). The contribution of the study is three-fold. First, we provide additional evidence for parafoveal processing of linear concatenative inflectional morphology (Stoops & Christianson, 2012, 2017, submitted). Second, this is the first demonstration that inflectional morphology is processed parafoveally by English speakers in a non-native language. Finally, first-pass effects challenge the post-lexical focus of the parafoveal processing mechanism in reading proposed by Schotter & Leinenger, (2016).
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6:00-7:30 PM (1152)

Processing Speed for Semantic Features and Affordances. TYLER ADDISON SURBER, MARK HUFF, MARY BROWN, JOSEPH D. CLARK, JONATHAN DOYON, and ALEN HAJNAL, *The University of Southern Mississippi* (Sponsored by Alen Hajnal) – We investigated the effects of affordance priming using a semantic-categorization task. A list of 60 object nouns was compiled from the McRae et al. (2005) norms. Affordances denote functional characteristics of an object (e.g. chair-sit), whereas semantic features indicate definitional characteristics (e.g. chair-legs). Affordances and semantic features serve to prime the target object. Participants were randomly presented with prime and object pairs and asked to classify each target by indicating whether the presented word is abstract (difficult to imagine) or concrete (easy to imagine). Reaction times were measured. In Experiment 1 prime-object pairs were presented continuously to minimize backchecking strategies. In Experiment 2, prime-object pairs were blocked and participants only responded to the target object to encourage backchecking. We predicted that responses to objects primed with affordances will be faster than semantic features and non-associates due to their functional relevance in everyday behavior particularly when backchecking was encouraged.
Email: Tyler Surber, tyler.surber@usm.edu

6:00-7:30 PM (1153)

Functional Connectivity Predicts Reading Abilities in Dyslexic Readers. ERICA S. EDWARDS, KALI BURKE, and CHRIS MCNORGAN, *State University of New York, Buffalo* (Sponsored by Victoria Kazmerski) – Reading is a multi-sensory task that requires translation of orthographic to phonological representations. We investigate the efficacy of graph-theoretic metrics of task-related functional brain connectivity in predicting reading difficulty. We analyzed fMRI data collected from 24 young readers previously diagnosed with dyslexia as they made rhyming judgments. Hierarchical linear regression analyses found that functional connectivity measures that characterize network organization predicted reading difficulty. Children with more modular networks with fewer recurrent connections had lower reading scores. These results complement past findings indicating that disconnected processing within the reading network contributes to reading difficulties. These findings point to a connectivity-based account of reading difficulty that may inform strategies for reading intervention.
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6:00-7:30 PM (1154)

Misperception of Words During Reading: An ERP Analysis. ANDREW KIM, *Binghamton University*, JULIE GREGG, *University of Colorado*, ALBRECHT INHOFF, *Binghamton University* – Readers occasionally misidentify words, and this study examined whether misidentification during reading occurs due to initial misperception of one word for another, or later decision-making processes. We recorded EEG while participants read sentences containing target pairs of orthographic neighbors differing in frequency (e.g., 'brain' [high-frequency] and 'braid' [low-frequency]). Targets appeared at the end of sentences, and prior context was manipulated to be congruent or incongruent with target identity. Each word was presented using RSVP for 250 ms, except for the sentence-final target word, which was masked after 50 ms. Participants articulated the final (target) word of each sentence. Approximately 15% of the target words were misidentified, primarily in the incongruent pre-target context condition. Target ERPs showed left-lateralized differences between accurate and inaccurate responses for the N170 component, and subsequent differences between 200 ms and 400 ms. Supplementary analyses suggested both deviations were larger for less skilled readers.
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6:00-7:30 PM (1155)

An ERP/fMRI Study of the N450 Rhyming Effect. TIANYIN OUYANG, *University of Maryland, College Park*, DAN XIANG, *Northwestern Polytechnical University*, JOSEPH DIEN, and DONALD J. BOLGER, *University of Maryland, College Park* (Sponsored by Joseph Dien) – There has been widespread interest in the N450 rhyming effect due to its potential as a biomarker for phonological deficits in dyslexia. There has, however, been some question as to whether this effect could be due to orthographic or semantic confounds, given its relatively long latency. Chinese characters, which have an arbitrary link between orthographic and phonological information, were used to help resolve this concern. Furthermore, we enlisted fMRI data to identify its generator site. We recorded event-related potentials with 65 channels when twenty native Chinese speakers were making rhyming and meaning judgments. An N450 effect was observed in the phonological task. Moreover, BOLD data were collected in a 3T magnet using multi-plane EPI using the identical tasks with sixteen native Chinese speakers, resulting in a significant cluster at the right supramarginal gyrus that co-registers with the N450 source analysis. Results thus support the phonological account of the N450 effect.
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6:00-7:30 PM (1156)

Cooperative Activation of Orthography and Phonology Begins Parafoveally: Evidence From Eye Movements. JANE ASHBY, *Central Michigan University*, ASCENSION PAGAN CAMACHO, *Oxford University*, PETE SHLANTA, *Central Michigan University*, STEPHEN J. AGAUAS, *Northern Illinois State University* (Presented by Pete Shlanta) – This study investigated how readers process orthographic and phonological information parafoveally during silent reading by manipulating these factors in a 2 x 2 design. A gaze-contingent display presented previews that are phonologically and orthographically similar to a target (O+P+, beam: beam), phonologically similar to a target but include one wrong letter (O-P+, beme: beam), orthographically similar to a target but phonologically different (O+P-, bema: beam), or dissimilar in both orthography and phonology (O-P-, bemu: beam). Experiments 1a and 1b indicate that incongruent phonology can inhibit TL preview effects for certain words. Experiment 2 added a predictability manipulation to the four preview conditions. Again, incongruent phonology inhibited preview effects. Phonological preview effects were numerically larger for words in predictable than unpredictable contexts, but the interaction was not significant. These data indicate that cooperative activation of parafoveal phonological and orthographic information shapes word recognition during sentence reading.
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6:00-7:30 PM (1157)

On the Dynamics of Consonants and Vowels in Visual Word Recognition. GREGORY STONE, *Arizona State University*, ANTHONY BARNHART, *Carthage College* – Previous studies using briefly presented stimuli have suggested that the spelling to sound mapping in visual word recognition occurs earlier for consonants than for vowels. We present the results of two standard lexical decision experiments consistent with the fast consonant hypothesis. The first experiment replicated the spelling-sound consistency effect when the inconsistencies were in the vowel (WORD NERD), but not when the inconsistencies were only in the consonants (RICH HITCH). The second experiment replicated the pseudohomophone foil effect when the misspellings were in the vowel (WERD), but not when they were in the consonants (KLIP). These results are discussed in terms of a dynamic activation framework for modeling word recognition.
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WITHDRAWN

6:00-7:30 PM (1158)

Does Letter Legibility Influence Lexical Decision Accuracy in Russian? SVETLANA ALEXEEVA, *St. Petersburg State University* – It is believed that in the alphabetic scripts words are recognized via their constituent letters (Acha & Carreiras, 2014). However, letter identification is still the least studied subject in the field of visual perception (Finkbeiner & Coltheart, 2009). We conducted a lexical decision experiment to study whether letter legibility has an effect on the initial phases of visual word recognition in Russian. Russian is well suited for testing these effects, as Russain letters are visually more complex (Chang, Chen, & Perfetti, 2017), than characters of other widely studied alphabetic languages, like English or Spanish. 48 participants took part in the experiment. We selected 128 Russian nouns and in the half of them we replaced one of the internal letters with either visual similar or dissimilar letter thus creating two pseudoword conditions. Mixed effect logistic regression on those conditions showed that similar-letter stimuli produced more errors (p=.03), than dissimilar-letter ones, thereby revealing that letter legibility might affect lexical access. These findings have major implications on current models of visual word recognition as they usually disregard the letter confusability effect Funded by RSF#14-18-02135.
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6:00-7:30 PM (1159)

The Effect of Spelling Ability on Phonological Processing in the Visual Lexical Decision Task. MARK YATES, *University of South Alabama*, TIMOTHY J. SLATTERY, *Bournemouth University* – Phonological neighborhood spread is defined as the number of phoneme positions within a word that can be changed to form a phonological neighbor. Past research using CVC words in a lexical decision task has shown that words forming a neighbor across all three positions are responded to more rapidly than are words having only two positions that form a neighbor. The research reported here tested whether participants' spelling ability interacts with the phonological spread effect. The results indicate that the phonological spread effect increased as spelling recognition increased but decreased as spelling production increased. The influence of spelling ability on the phonological spread effect is interpreted in terms of a model where spelling and reading have independent orthographic systems that share information.
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6:00-7:30 PM (1160)

Predictability and Parafoveal Preview Effects in the Developing Reader. REBECCA L. JOHNSON, ELIZABETH C. OEHRLEIN, and WILLIAM L. ROCHE, *Skidmore College* – A great deal of previous eye-tracking research has focused on how skilled adult readers process text, largely ignoring the effects seen within children and how these effects might change with the development of reading skill. The current study examined the effects of predictability and parafoveal preview in developing readers ages 6-12 years old. Target words were manipulated both by sentence context (predictable vs. neutral) and by parafoveal preview (identity, visually similar, visually dissimilar). Developing readers showed effects of both context and preview and showed the greatest preview benefit within a predictable context, indicating that context effects can be modulated by low level visual information. Finally, more skilled developing readers received more parafoveal information and relied less on context than less skilled developing readers. These effects have implications for computational models of eye movement control in reading such as the E-Z Reader model.
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6:00-7:30 PM (1161)

Prior Reading Experience Explains Individual Differences in Nonword Reading. ANASTASIA ULICHEVA and KATHEEN RASTLE, *Royal Holloway University of London* – What explains large individual differences in people's performance on language tasks? One task that reveals striking differences across individuals is reading aloud English nonwords such as BETHOVE. Mousikou et al. (2017) found that disyllabic nonwords elicited many different pronunciations across participants and identified item-level variables that contribute to this variation. Here we explore variability across subjects—what factors influence it and via what mechanisms? We suggest that the driving force behind subject-based variability is related to differences in individuals' prior reading experience. In particular, in a reanalysis of Mousikou et al. data, we observed a correlation between individual orthography-to-phonology statistics that participants have accumulated through a life-long reading experience and their vocabulary and spelling performance: the further the subjects were from a corpus, the poorer they performed on language tasks. We discuss implications of this finding for modelling individual variation in reading. Mousikou P., Sadat, J., Lucas, R., & Rastle K. (2017). Moving beyond the monosyllable in models of skilled reading: mega-study of disyllabic nonword reading. JML, 93, 169-192.
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6:00-7:30 PM (1162)

Resource Depletion Demonstrates Controlled Processing of Familiar and Unfamiliar Similes. FELIX S. PAMBUCCIAN and GARY E. RANEY, *University of Illinois at Chicago* (Sponsored by Susan Goldman) – In a previous study (Pambuccian and Raney, 2017), we showed that inducing resource depletion (temporary impairment of executive control) slows comprehension of unfamiliar but not familiar metaphors. Because depletion affects controlled processes but leaves automatic processes unaffected, our findings suggested that metaphor comprehension shifts from controlled to automatic processes as metaphors increase in familiarity. The present study extended this manipulation to investigate simile comprehension. Following a task that induced depletion (depletion group) or had no effect (control group), we measured participants' comprehension times on familiar and unfamiliar similes. Based on prior research, simile comprehension relies on controlled processes regardless of familiarity. Therefore, we predicted that the effect of depletion on comprehension times (the difference between depletion and control groups) would be similar across the range of familiarity. Surprisingly, the impact of resource depletion was not uniform across levels of familiarity

but increased as familiarity decreased. Our findings suggest that all similes rely on controlled comprehension processes, but the difficulty of processing increases as familiarity decreases.
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6:00-7:30 PM (1163)

Can Response Congruency Effects Be Obtained in Masked Priming Lexical Decision? MARÍA FERNÁNDEZ-LÓPEZ, ANA MARCET, and MANUEL PEREA, *Universitat de València* (Sponsored by Manuel Perea) – Leading models of visual word recognition (e.g., Bayesian reader model, interactive-activation models) make different predictions on the role of the wordlikeness of the unrelated primes in masked priming lexical decision. We conducted three masked priming lexical decision experiments to examine whether the wordlikeness of the unrelated primes (high-frequency word; low-frequency word; orthographically legal pseudoword; consonant string) influences the processing of the target stimuli. The foils were wordlike nonwords (Experiment 1), illegal nonwords (Experiment 2), and orthographically legal hermit nonwords (Experiment 3). When the foils were orthographically legal, lexical decision responses were not affected by the wordlikeness of the unrelated primes. We only found an effect from the unrelated primes when the foils were illegal and the primes consisted of consonant strings: this condition was the slowest for word targets and the fastest for nonword targets. We discuss how this pattern can be captured by the above-cited models of word recognition.
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6:00-7:30 PM (1164)

Developmental and Serial Position Effects in Transposed Letters Masked Priming in Italian Children. LUCIA COLOMBO and FRANCESCA PERESSOTTI, *Università di Padova*, SIMONE SULPIZIO, *Università Vita-Salute S. Raffaele* – Colombo, Sulpizio & Peressotti (2017) showed a transposed letter (TL) nonword advantage compared to replaced letters (RL) nonwords in lexical decision. This advantage increased with age, and was more marked if the transposition was towards the final part, compared to the initial part of nonwords. This result contrasted with other data (Acha & Perea, 2008; Castles et al., 2007) but was consistent with data from Ziegler et al. (2014). The serial position effect might reflect either a serial mechanism operating during the orthographic analysis of the stimulus or the early influence of phonology. In the present study we investigated developmental and serial position effects for TLs with a masked priming lexical decision task. Priming effects were present from third-graders on, but were only significant for fifth graders and adults. The lack of priming effects for second- and third-graders might be explained as due to the still predominant use of decoding mechanisms. Moreover, the priming effect did not vary with position of the transposition. Thus, the masked priming effect suggests reliance on an initial orthographic processing mechanism, that allows some degree of flexibility towards mismatches in letter position.
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6:00-7:30 PM (1165)

Using Eye Movements to Investigate the Impact of Childhood and College-Level Word Frequency on Fixation Durations During Reading. BARBARA J. JUHASZ, *Wesleyan University* – The word frequency effect is a benchmark finding in the eye movement literature. High frequency words consistently receive shorter fixation durations. However, words may vary in their frequency trajectory across an individual's education. Some words are more frequent in texts in early grades (e.g. rabbit) while others become more frequent in college-level texts (e.g. brain). Other words maintain a high or low frequency across grades. In the current study, the effects of both childhood and college-level word frequency on fixation durations were explored. College students' eye movements were recorded as they read sentences containing words that varied on Grade 1 and College-level frequency (selected from the Educator's Word Frequency Guide: Zeno, Ivens, Hillard, & Duvvuri, 1995). Age-of-acquisition was included as a covariate. A robust effect of college-level frequency was observed in multiple measures. These results suggest that a word's recent frequency of occurrence impacts fixation durations during reading.
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6:00-7:30 PM (1166)

Orthographic Neighbor Effects on Visual Word Identification Differ Across Letter Positions. SAHIL LUTHRA, HEEJO YOU, and JAMES S. MAGNUSON, *University of Connecticut* – In visual word identification, access to a word is generally facilitated if the target has many orthographic neighbors (words mismatching the target by a single letter). Notably, each neighbor is considered an enemy at its mismatch location and a friend at all other positions (e.g., LANE is a third-position enemy of LAKE but a friend at other positions). Given evidence that processing may favor relatively more informative letter positions (Blais et al., 2009), we examine how the relative number of friends and enemies at each letter position influences word naming latency. We compare data from a human performance database (Balota et al., 2007) and a novel computational model (Visual Orthographic Input Serial Reader [VOISeR]) that processes orthographic inputs in parallel to produce an over-time sequence of phonemes. Results indicate that the benefit conferred by friends is inversely proportional to the degree of prior uncertainty (positional entropy) about letter identity.
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6:00-7:30 PM (1167)

From Letters to Words, Through Bigrams. YAMIL VIDAL and DAVIDE CREPALDI, *Scuola Internazionale Superiore di Studi Avanzati* – The proposal of bigram frequencies playing a role in reading can be traced back to the late 60s, and has recently received support from neuroimaging studies. But despite 50 years of research, the behavioral literature shows conflicting results. Here we present a new paradigm that by using an artificial script, recreates the process of learning word forms from scratch and attains a tight control of confounding factors that otherwise arise due to our lifelong experience

with reading. By orthogonally manipulating word and bigram frequencies, we show how bigram frequencies are automatically extracted during a word learning task.
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FALSE MEMORY I

6:00-7:30 PM (1168)

Tide Pods, Crystals, and Vaccinations: Desirable Difficulties and the Perception of Fake News. ALLISON G.H. NGUYEN, TRAVIS L. SEYMOUR, and JEAN E. FOX TREE, *University of California, Santa Cruz* (Sponsored by Jean Fox Tree) – We tested the role of desirable difficulties on people's evaluation of fake news. A desirable difficulty describes a situation where people learn material better when information is harder to process, such as when it is presented in a hard-to-read font. We tested whether people would be more skeptical about news items because they are thinking more deeply about what they are reading. News stories were selected from Snopes.com along a range of truth values: true, mostly true, mostly false, and false. Stories were presented in either an easy-to-read or hard-to-read font. Reading a story in the hard-to-read font made people more cautious of the story's truth value, regardless of the story's actual truth value. Thinking more about the stories made people more careful about accepting the message.
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6:00-7:30 PM (1169)

Elevated False Memories in Older Adults: Suboptimal Boost From Strategy Infusion. GABRIELLA V. HIRSCH and DAVID A. GALLO, *University of Chicago* – Why does aging increase false memory propensity? According to the brain impairment hypothesis, neural decline with advanced aging can increase false memories. According to the processing style hypothesis, aging is linked to shifts in information processing style (e.g., gist processing), which can increase false memories independently from neural decline. In this study, we used an instructional manipulation to artificially induce two information processing styles: intuitive (i.e., asked to use their gut and not try too hard) vs. strategic (i.e., given the best false memory encoding and retrieval strategies). Relative to the intuitive (no-strategy) baseline, the strategy manipulation boosted memory accuracy in younger more than older adults, maximizing the age gap in cognitive performance. Matching the two age groups on the most optimal "information processing styles" from the literature was not sufficient to eliminate (or even reduce) the age-related declines in memory performance, providing unique behavioral support for the brain impairment hypothesis.
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6:00-7:30 PM (1170)

How Stress Influences Older and Younger Adult Eyewitness Memory Accuracy. RENÉE DECARO and AMY M. SMITH, *Tufts University*, KATINKA DIJKSTRA, *Erasmus University Rotterdam*, LEAMARIE T. GORDON, *Assumption College*, AYANNA K. THOMAS, *Tufts University* – The pressure of investigative questioning or even court testimony may result in a physiological stress response in eyewitnesses. The present research investigated how the experience of acute stress influenced memory accuracy in older and younger adults within an eyewitness memory paradigm. Participants witnessed an event and were exposed to post-event information. Participants returned 24 hours later and underwent the Trier Social Stress Test or a no-stress control task. Memory for the original event was tested 20 min after stress induction. We measured the quantity and accuracy of memory for the original information using a forced followed by free selection methodology. When allowed to withhold responses, individuals were more accurate, but this pattern was influenced by item type, age, and stress induction. These results add to the growing body of literature that suggests that stress at retrieval may influence how learners, or in this case, eyewitnesses, approach memory tests.
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6:00-7:30 PM (1171)

Perception of Stereotype Threat and Production of False Memories in Aging. ANNE-LAURE GILET, FABIENNE COLOMBEL, and CHRISTELLE EVRARD, *Universite de Nantes - LPPL* – Research has shown that age-based stereotype threat impairs older adults' performance on cognitive tasks and especially in memory tasks. However, the results regarding false memory tasks are less clear with studies showing a decrease in older adults' susceptibility to false alarms related to critical lures and others an increase under induced stereotype threat. The current study investigated the links between perceived stereotype threat and the production of false memories using the Deese/Roediger-McDermott procedure followed by a free recall test in eighty-two older adults. Participants also completed several questionnaires assessing their perception of an age-based stereotype as well as their education level. The first analyses showed that false memories were positively and significantly associated with the perception of stereotype threat in highly educated older adults only, $r = .53$, $p < .001$. Results will be discussed in relation to recent literature on stereotype threat and memory in aging.
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6:00-7:30 PM (1172)

Correcting Misinformation: Can Negative Corrections Increase Belief? KEVIN S. AUTRY, SHEA DUARTE, and CASSANDRA AGUIRRE, *California State Polytechnic University, Pomona* – The various methods used to correct misinformation have been shown to be only partially effective at revising beliefs. Many of these techniques involve the use of negation; however, the inhibitory effects of negation may occur only when the negation counteracts preexisting information. The present study compared the effectiveness of affirmative and negative corrections when individuals had or had not been exposed to the misinformation. Participants read six short stories which presented misinformation (blue car) or not, follow by a negative correction (not blue), affirmative correction (red), or no correction, then answered open ended questions which were scored for use of the misinformation. When participants were exposed to the misinformation, negative corrections reduced misinformation use relative to the no correction control. However, when participants were not exposed to the

misinformation, negative corrections increased misinformation use. These findings suggests caution when attempting to correct misinformation among populations with varying levels of exposure.
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6:00-7:30 PM (1173)

'Pruning' False Memories Following Successful Associative Inference Using Context-Based Prediction Error. ALEXIS C. CARPENTER and DANIEL L. SCHACTER, *Harvard University* (Sponsored by Daniel Schacter) – Research suggests that the same retrieval-related recombination mechanism that supports successful inference (AB+BC->AC) also creates false memories (Carpenter & Schacter, 2017). Recombination may produce false memories in one of two ways: (1) AB/BC events are integrated and share associations with misattributed details or (2) misattributed details are independently bound to the overlapping event during retrieval. To distinguish these hypotheses, after inference, we selectively 'pruned' or weakened AB representations using context-based prediction error (Kim et al., 2014) and tested memory for the AB/BC representations. If AB/BC representations share associations with misattributed contextual details, then 'pruning' the AB memory should reduce both true AB memories and false memories from AB->BC. If misattributed AB details are independently bound to BC representations during retrieval, then 'pruning' should only reduce true AB memories. Results revealed a reduction in both true AB and false AB->BC memories following 'pruning,' suggesting that retrieval-related recombination mechanisms produce integrated representations.
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6:00-7:30 PM (1174)

False Memories for Fabricated Political Scandals During Ireland's Abortion Referendum. GILLIAN MURPHY, *University College Cork*, ELIZABETH LOFTUS, REBECCA HOFSTEIN GRADY, and LINDA LEVINE, *University of California, Irvine*, CIARA M. GREENE, *University College Dublin* – In May 2018, Ireland held a highly divisive referendum to remove a constitutional ban on abortion. One week prior to the referendum, 3366 participants viewed 6 news stories concerning events from the campaign, including two fabricated stories depicting scandals for the pro-life and pro-choice sides. 48% of participants reported a specific memory for at least one of these fabricated stories and an additional 15% stated that they had no specific memory but they believed the events had happened. Qualitative responses illustrate rich and emotional false memories for these events. There was a significant effect of political orientation, with pro-choice voters more likely to 'remember' an event that negatively depicted the pro-life campaign (43% 'remembered' this event) than pro-life voters (27% 'remembered' this event), and vice-versa. Campaign knowledge and media consumption were positively correlated with rates of false memories, while participants who scored lower on a measure of verbal cognitive ability were particularly susceptible to constructing false memories about the opposing side. This study contributes to our understanding of 'fake news' effects during political campaigns.
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6:00-7:30 PM (1175)

Do False Fame Effects Emerge Following an Internal Context Shift? DOROTHY ROSE BUCHLI, *Mercer University* – The present study sought to determine whether a false fame effect would emerge if a daydreaming task, designed to shift participants' internal context, was interpolated between the list of nonfamous names and the list of famous names. Results revealed that indeed, participants can be induced to erroneously judge nonfamous names as famous following an internal context change. Furthermore, the false fame effect was abolished when the initial context (in which the nonfamous list was studied) was reinstated. This suggests that a variety of mechanisms can reliably induce false fame effects and that in some cases, a contextual-change account of the phenomenon may be appropriate.
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6:00-7:30 PM (1176)

How Do Ordered Questions Influence Eyewitness Susceptibility to Misinformation? ROBERT B. MICHAEL, GABRIELLE GLORIOSO, NANCY NGUYEN, *University of Louisiana at Lafayette* – When questioned about a recently witnessed event, people believe they answer more questions correctly if the questions are arranged from the easiest to most difficult, compared to the other way round (Michael & Garry, 2015). But does this influence of ordered questions make eyewitnesses more or less susceptible to misinformation? We hypothesized that eyewitnesses who answer easy-to-difficult questions would have inflated confidence relative to their peers, would monitor information less stringently, and would be more susceptible to misinformation. To test that idea, subjects watched a video of a simulated crime, then answered a set of questions about the video. These questions were arranged either from the easiest to most difficult, or vice versa. Next, subjects read a report featuring misleading information before taking a final memory test. Across two samples, we found mixed results, but no strong evidence that ordered questions makes eyewitnesses more or less susceptible to misinformation.
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6:00-7:30 PM (1177)

The Cycology of Gender and Expectations. VALANNE L. MACGYVERS, TRENTE FRANCOIS, TAYLOR HEBERT, SEAN RILEY, JENNY WALSH, and CLAUDE G. CECH, *University of Louisiana at Lafayette* – Lawson (2006), using an incomplete drawing of a bicycle, found multiple completion errors (more so by women) suggesting people generally overestimate their understanding of how bicycles work. We look at two aspects of her results: Whether her gender effect may have been due to use of a traditionally male bike template (so less familiar to females), and whether her template may have inadvertently induced her participants to accept a looser standard of accuracy in their completions. Accordingly, one

group of 50 males and 50 females completed Lawson's task using Lawson's template, a second group received a more accurate rendition of a male's bike, and a third received a correspondingly accurate rendition of a female's bike. We replicated Lawson's findings of multiple completion errors and a gender effect. No differences were found in the two templates for men's bikes, but the template for a woman's bike led to differentially more completion errors in males and females, though perhaps not in the way anticipated.
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6:00-7:30 PM (1178)

Does Endorsing Mistaken Belief Render Corrections More or Less Effective? JARUDA ITHISUPHALAP, *Kent State University*, PATRICK R. RICH, *University of Mary Washington*, MARIA S. ZARAGOZA, *Kent State University* (Sponsored by Maria Zaragoza) – News reports sometimes contain mistaken information (misinformation) that is later corrected. However, studies of the continued influence effect (Johnson & Seifert, 1994) show that corrections are not entirely effective at eliminating the influence of misinformation. The present study sought to assess whether publicly endorsing belief in misinformation prior to receiving a correction makes it more or less difficult for readers to correct the misinformation. Publicly endorsing belief in misinformation prior to correction may increase the likelihood that readers will detect the correction as inconsistent, and increase the effectiveness of the correction (Rapp & Kendeou, 2009). Alternatively, overtly endorsing misinformation might increase belief in the misinformation and render it more resistant to correction. Results showed that publicly endorsing mistaken information increased belief in the misinformation without rendering it more resistant to correction. In some cases, endorsing misinformation prior to correction increased the effectiveness of the correction.
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6:00-7:30 PM (1179)

A Double Negative? The Impact of Negation Questions on Eyewitness Accuracy Following Post-Event Exposure to Misinformation. TREVOR R. HENNE, BLAIR E. BRAUN, TAMIQUA HANDSCHKE, ALLISON SMITH, ASHLEY JENSEN, and QUIN M. CHROBAK, *University of Wisconsin, Oshkosh* (Presented by Blair E. Braun) – In an attempt to confuse and thus discredit witnesses, lawyers will deliberately word questions in ways that make them difficult to answer. Previous research has demonstrated that such questions do indeed impair accuracy (e.g., Perry et al. 1995). More recently, Chrobak, Rindal, and Zaragoza (2015) demonstrated that this problem is exacerbated for participants that have been previously exposed to misleading information about the initial witnessed event. However, that study only focused one type of "lawyerese" question (i.e., multifaceted questions, which contain both a true and false proposition). The current study sought to extend those findings by examining the impact of questions containing negations (e.g., "Is it true Nicholas did not leave the door open?") and double negations (e.g., "Is it not true Nicholas did not leave the door open?"). Results indicated that while such questions impaired accuracy relative to simple questions (e.g., "Did Nicholas leave the door open?"), question type did not interact with the presence of misinformation – suggesting that different mechanisms contribute to the errors produced by various types of "lawyerese" questions.
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6:00-7:30 PM (1180)

Age of Collaborating Partners Influences False Recall in the Collaborative Inhibition Paradigm. SUMMER R. WHILLOCK, MICHELLE L. MEADE, and MEGAN D. TSOSIE, *Montana State University* – This study examined the influence of same-age and mixed-age dyads on the collaborative inhibition effect (reduced recall in collaborative groups compared to the combined recall of the same number people who recall individually). Younger (age 18-25) and older (age 65 +) adults recalled categorized word lists alone or in collaboration with a same-age or a different-age partner. On an initial recall test, the magnitude of collaborative inhibition for veridical recall was similar across groups, regardless of age. However, age differences emerged in false recall as younger adults were more likely to correct each other's errors than older adults. Mixed-age dyads also showed error correction, albeit not to the extent as young/young dyads. On a subsequent individual recall test, collaborative inhibition disappeared for all dyads, and older adults again showed greater false recall. The age of oneself and one's partner influences how information is discussed and exchanged on collaborative memory tests.
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6:00-7:30 PM (1181)

Do ToM and SL Influence on Memory and Acceptance of Suggestion in Preschoolers? An Analysis of Developmental Trajectories. NIEVES PÉREZ-MATA, AMPARO MORENO, MARGARITA DIGES, and MIRIAM PELÁEZ, *Autónoma University of Madrid* – We used an analysis of development trajectories (Thomas, Annaz, Ansari, et al., 2009) to analyze how the performance of preschoolers (3–6 years old) was influenced by two socio-cognitive developments—Theory of Mind (ToM) and Suggestibility Level (SL)—instead of their performance changes were exclusively due to the age of individuals. Results showed that ToM did not contribute to the explanation of participants' performance because its predictive value was annulled when age was introduced as a covariate of performance. However, the SL contributed to explain the acceptance of the information that an interviewer had suggested to the preschoolers one week earlier, since children with a higher LS were more vulnerable to that information suggested, beyond the age of those children. Research supported by Proyect PSI2015-69358-R. We acknowledge Dr. Iván Sánchez for his advice in the statistical analysis of the data.
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6:00-7:30 PM (1182)

Diminished Gist Processes in Adults With Autism: Evidence From False Memory Paradigm. DOMINIKA ZOFIA WOJCIK and EMILIANO DÍEZ, *University of Salamanca*, MARIA ANGELES ALONSO, *University of La Laguna*, MARIA VICTORIA MARTÍN-CILLEROSA, *University of Salamanca*,

ZOILA GUISURAGA-FERNÁNDEZ, *Asociación Asperger Salamanca*, MARIA FERNÁNDEZ, LAURA MATILLA, MARIA MAGÁN-MAGANTO, ANTONIO MANUEL DÍEZ-ÁLAMO, RICARDO CANAL-BEDIA, and ANGEL FERNANDEZ, *University of Salamanca* – Individuals with autism show episodic memory problems, especially in tasks that require the use of semantic inferences (gist traces), but not in tasks that entail the processing of surface properties of each item individually (verbatim traces). This talk will provide evidence from DRM paradigm (reliant on the encoding of the list gist) of diminished susceptibility to false memories in adults with autism. Our findings are in line with the suggestion that performance in autism will be affected in any task that relies on traces pertaining to the gist. We also found individuals with autism to be less accurate in differentiating the false memories (i.e. words I generated) from true memories (i.e. words I studied). This indicates that, unlike comparison group, they do not use verbatim processes to suppress the false memories effectively. The findings are discussed in the context of everyday challenges experienced by people with autism.
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6:00-7:30 PM (1183)

The Effects of Brief Mindfulness Meditation and Negative Mood on False Memory for Negative and Neutral Information. JOSEPH THADEUS MEEKS, RACHAEL RICE, MARISSA TAUL, DEVYN FONES, ZACHARY POSEY, and NESHA R. HARPER, *Southern Illinois University, Edwardsville* – Research on the effects of mindfulness meditation on false memories has produced mixed findings. In addition, studies have shown that mood and stimuli valence can affect false memory rates. In the current study, participants either completed a brief mindfulness meditation exercise or were told to let their mind wander. In addition, half of the participants then received a negative mood induction while the other half did not. All participants completed a DRM false memory free recall and recognition procedure using both neutral and negative lists. The results showed that mindfulness and mood had little effect on false memory for neutral lures. Negative mood reduced the false recognition of negative lures only for those in the mindfulness condition. This pattern was more applicable to individuals with higher negative affect. We discuss the results in terms of the source-monitoring framework and the effects of mindfulness and emotion on encoding and retrieval processes.
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RECALL I

6:00-7:30 PM (1184)

The Cognition of Liars and Truth-Tellers Depends on Affective State and Stereotype Threat. ELISE FENN, BAR GABAY, and MINEH SAHAKIAN, *California State University Northridge* – Cognitive approaches to investigative interviewing often assume that lying is more cognitively taxing telling the truth. We examine boundary conditions that attenuate this assumption. We investigate the effects of stereotype threat on the difficulty of lying and truth-telling. In Phase 1, Guilty-liars (n=47) and innocent-truth-tellers (n=42) answered cognitive interview questions under high or low stereotype threat conditions. Observers (n=186) rated video clips of Phase 1 interviewees on behavioral cues diagnostic of truthful or deceitful messages. In the low threat condition, observers rated truth-tellers as displaying more truthful cues than in high threat (Cohen's d=0.26) . There was no difference in observer ratings of liars between threat conditions (Cohen's d=.01). These results support that the difficulty of truth-telling is malleable, and should be considered when calibrating across cognitive interviewing approaches. Future studies will examine the impact of rapport-building on the cognition of truth-telling vs. lying.
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6:00-7:30 PM (1185)

Interference-Induced Versus Delay-Induced Forgetting in Younger and Older Adults. KARL-HEINZ T. BÄUML and OLIVER KLIEGL, *Regensburg University* (Presented by Oliver Kliegl) – We compared the effects of enhanced interference at test and prolonged delay between study and test on recall totals and response latencies of younger and older adults. Participants studied a list of target items that they recalled after short delay (control condition) or prolonged delay (delay condition); in a third condition, study of further nontarget items preceded encoding of the target items (interference condition). Relative to the control condition, recall totals decreased and response latencies increased in the interference condition, and both effects were larger in older than younger adults. In contrast, both recall totals and response latencies were reduced in the delay relative to the control condition, and the effects were similar in size across age levels. The latency results indicate that induced coactivation of nontarget items caused the forgetting in the interference condition, whereas unsuccessful sampling of target items caused the forgetting in the delay condition.
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6:00-7:30 PM (1186)

To Recollect or Not to Recollect? EEG Correlates of Memory Suppression and Substitution. GUSTAVO GAUER and CAMILA ARGUELLO DUTRA, *Universidade Federal Rio Grande do Sul*, ROBERTO GUEDES DE NONOHAY, *Instituto Meridional de Educação*, GUILHERME LANNIG DE SOUZA, *Universidade Federal Rio Grande do Sul* – Humans can voluntarily control their awareness of unwanted memories, perhaps through the act of stopping the retrieval process that would ordinarily bring past experiences into awareness. Stopping retrieval in the presence of reminders can cause later forgetting of the avoided memory, and engages brain regions implicated in cognitive control. However, the mechanisms preventing memory retrieval and how they relate to later forgetting are yet to be fully understood. Distinct strategies for retrieval stopping – direct memory suppression and self-distracting thought substitution – might contribute to forgetting of unwanted memories in qualitatively different ways. This study investigated EEG evidence from 22 participants in two experimental conditions: Suppress and Substitute. Only direct memory suppression reduced centroparietal positivity in the Event-Related Potentials (ERP) between 300 and 600ms post-

stimulus. That is consistent with a modulation in the ERP component related to conscious recollection. Results show that conscious recollection of information can be voluntarily avoided, but with diverse correlate cortical potentials for different strategies. That will help to clarify previous evidence from the TNT paradigm.
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6:00-7:30 PM (1187)

Emoji Use Influences Memory for Accompanying Sentences. KIMBERLY M. HALVORSON, *Metropolitan State University*, CAITLIN HILVERMAN, *Vanderbilt University Medical Center* – During face-to-face communication, we produce spontaneous co-speech hand gestures. Gestures contain iconic information that is incorporated into memory for the spoken language (Kelly et al., 1999). As computer-mediated communication increases, visual access to gestures decreases. Conversely, emoji – small digital icons depicting objects, faces, etc. – are widespread. We hypothesized that, like gesture, emoji influence memory for sentences. We had participants read sentences accompanied by emoji or not. We manipulated emoji type to mirror gesture function; some conveyed supplementary information (e.g., "She is heading to the gym {basketball emoji}") and some conveyed redundant information (e.g., "He went to move his car {car emoji}"). We tested whether participants remembered more sentences with emoji than without and whether iconic information was incorporated into memories for verbal information (i.e., "She is heading to play basketball") at recall. Emoji and gesture may have similar communicative functions including modifying memory for sentences.
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6:00-7:30 PM (1188)

A Memory-Based Model of Emotional-Context Insensitivity in Persistent Low Mood. RIVKA COHEN and MICHAEL J. KAHANA**, *University of Pennsylvania* (Sponsored by Michael Kahana) – Memories powerfully evoke emotion and, as such, are implicated in multiple emotional disorders. We introduce a context-maintenance and retrieval model of memory and mood that characterizes the role of memory in persistent emotional states. The proposed model accounts for the mutual interactions of emotion with the memory system, as well as the major qualitative patterns of mood in clinical depression. Further, the model generates novel predictions for the role of emotional-context insensitivity in depression. Via a single mechanism – i.e., the rate of contextual drift for emotional memory-source features – the model reconciles paradoxical empirical findings that emotional-context sensitivity predisposes patients to heightened distress upon encountering a negative stimulus, yet serves as a protective factor against persistent low mood. Finally, the model (provides a novel account of observed memory deficits in depression, particularly the mechanisms underlying the ubiquitous finding of decreased specificity in autobiographical recall.
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6:00-7:30 PM (1189)

Development and Validation of VM-REACT: A Computerized Verbal Memory Task. SHARON NAPARSTEK, MICHELLE L. EISENBERG, DAWLAT EL-SAID, RUTH O'HARA, and AMIT ETKIN, *Stanford University/Palo Alto VA* – When tracking the progression of neuropsychiatric or neurodegenerative diseases, tools that enable repeated measures of memory, and require little examiner burden, are crucial. In the current study, we describe the development and validation of the VM-REACT (Verbal Memory REcAll Computerized Test), which assesses recall abilities using a computerized, automated form. Four different versions of the test were validated on a cohort of 800 healthy adults (ages 20-80). Recall and learning scores were computed and compared to existing gender- and age-matched published norms for a similar paper-and-pencil test. There were no significant differences between performance on the computerized test and existing tests. Processing speed, initiation speed, and number and types of recall errors are also reported for each age group. Our findings suggest that VM-REACT can be utilized to study verbal memory abilities in a standardized and time efficient manner, and thus holds great promise for assessment in the 21st century.
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6:00-7:30 PM (1190)

The Effects of Selective Retrieval and Selective Suppression on Memory for Color. TAYLOR R. RUSSO, *Boston College*, JESSICA M. KARANIAN, *John Jay College of Criminal Justice*, BRITTANY M. JEYE and SCOTT D. SLOTNICK, *Boston College* (Presented by Jessica M. Karanian) – In a previous study, we assessed whether retrieval (think) or suppression (no-think) can enhance or impair memory for spatial location. In Phase 1 of that experiment (N=36), shapes were presented to the left or right of fixation. In Phase 2, two-thirds of the shapes from Phase 1 were presented at fixation and participants were instructed to either remember (think) or suppress (no-think) the spatial location of each shape. In Phase 3, all shapes were presented at fixation and participants identified each as previously "left" or "right". Null effects were observed, which suggested that memory for spatial location may be resistant to think/no-think effects. In the present follow-up experiment, we investigated whether retrieval or suppression effects would occur during memory for item color (i.e., red or green). Preliminary analysis (N=14) suggested that memory for color, like memory for spatial location, was not affected by the retrieval (think) or suppression (no-think) manipulation.
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6:00-7:30 PM (1191)

Memory Is Tuned to Remember Human-Related Words. ADA AKA and MICHAEL J. KAHANA**, *University of Pennsylvania* (Sponsored by Michael Kahana) – Episodic memory is adaptive: Fitness and survival-related events are better remembered, and the mnemonic advantage of animacy has been demonstrated using a variety of word pools and tasks. In data from two different multi-session free recall studies, we replicated better memory for animate items compared to inanimate items, but, remarkably, we also found that words describing humans and

their social roles are easier to remember. Animate human words were significantly more likely to be recalled than animate non-human words. Humanness may thus serve as an influential dimension in adaptive memory encoding.
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6:00-7:30 PM (1192)

US and Germany's Collective Memory of Pride and Shame for US and German History. AUDREY LIU, *Duke University*, SHARDA UMANATH, *Claremont McKenna College*, MAGDALENA ABEL, *University of Regensburg*, ALICIA TSAI, *Claremont McKenna College* (Presented by Sharda Umanath) – How does being a national of a country affect the way we perceive that country's past? The current study assesses collective memory for participants' own nation compared to a foreign nation. 94 US citizens generated events they are proud and ashamed of from US history and also generated events they thought German citizens should be proud and ashamed of from their history. Similarly, 106 German citizens did the same for German and US history. Germans and Americans nominated somewhat similar events for themselves and for each other, suggesting that participants tend to consider their country's history from the world's perspective when they are cued to think about pride and shame. Interestingly, participants agreed more on what events nations should be ashamed of, while they gave more varied and idiosyncratic responses for what nations should be proud of. Variations in category, specificity, location, and timing of events were also examined.
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6:00-7:30 PM (1193)

Quick to Learn, Slow to Forget: Faster Learners Retain More. CHRISTOPHER L. ZERR and KATHLEEN B. MCDERMOTT, *Washington University in St. Louis* (Sponsored by Kathleen McDermott) – People differ in how quickly they learn information and how long they remember it. Zerr and colleagues (2018) termed the relation between learning rate and retention as learning efficiency, with more efficient learning representing both a faster acquisition rate and better memory performance after delays of 5 min and 48 hr. Zerr et al. also demonstrated in separate experiments that how efficiently someone learns is stable across a range of days and years. The current project includes two experiments addressing additional questions regarding efficient learning. Experiment 1 (N = 119) indicated that efficient learning is generalizable across stimuli (r = .55), including Lithuanian-English (verbal-verbal) and Chinese-English (visuospatial-verbal) paired associates. Experiment 2 (N = 190) demonstrated that faster learners exhibit better retention at a longer delay of 1 week (r = -.34), and also preliminarily examined whether faster and slower learners demonstrate differential rates of forgetting.
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6:00-7:30 PM (1194)

When Items Are Retrieved Successfully and Slowly (Versus Quickly): The Accuracy-Latency Relationship. YOONHEE JANG, *University of Montana*, HEUNGCHUL LEE, *Net Intelligence & Research* – A core assumption in strength theory is an experimental manipulation that weakens the memory trace and reduces recall accuracy should increase recall latency. We examined the assumption, using paired-associate learning and cued recall. Some items were re-presented as the cue-target, and others as the cue alone. An initial test was included just before the re-presentation manipulation occurred. The cue-target re-presentation yielded higher accuracy and longer latency relative to the cue alone re-presentation. In another experiment, an initial test was included just after the cue-target re-presentation occurred or not (i.e., control). Both accuracy and latency increased in the cue-target re-presentation condition. These results are contradictory to strength theory. However, in agreement with strength theory, the faster the initial correct recall of a pair, the more likely a pair was to be recalled at the final test. We discuss the accuracy-latency relationship for initially forgotten but restudied items and initially retrieved items.
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6:00-7:30 PM (1195)

The Animacy Effect on Memory Is More Pronounced for Those Who Believe It. CARLEE M. DEYOUNG and MICHAEL J. SERRA, *Texas Tech University* (Sponsored by Keith Jones) – People are more likely to recall animate words than inanimate words. We investigated the role of people's beliefs about this effect in producing this outcome. Participants studied a list of animate and inanimate words and completed a free-recall memory test. We collected their beliefs about the memorability of animate versus inanimate words (either before or after the task) in two contexts: everyday memory and specific to the present task. An overall animacy advantage for recall was obtained, regardless of participant's beliefs. However, those who believed animate words were more memorable than inanimate words showed the largest animacy advantage, those who believed the words were equally memorable obtained a moderate animacy advantage, and those who believed animate words were less memorable than inanimate words showed the smallest animacy advantage. These results demonstrate that participants' beliefs contribute to the animacy effect for free-recall, although they cannot explain the entire effect.
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6:00-7:30 PM (1196)

Counterintuitive Concepts Across Domains: A Unified Phenomenon? JOSEPH SOMMER, PERNILLE HEMMER, and JULIEN MUSOLINO, *Rutgers University* (Sponsored by Pernille Hemmer) – This work aims to integrate two independent lines of research. Within cognitive psychology, the von Restorff effect (VR) predicts that in a homogenous list, outliers will enjoy enhanced memorability. Similarly, the literature on the cognitive science of religion posits that supernatural concepts (e.g., gods, ghosts, spirits) are memorable because they are minimally counterintuitive (MCI)—i.e., they contain characteristics that violate intuitive expectations. We seek to investigate whether the MCI and VR effects are behavioral manifestations of the same underlying cognitive processes. To permit a meaningful comparison of the two effects, we developed a novel set of normed stimuli to guard against a

number of existing confounds. We objectively measured a number of relevant parameters by obtaining ratings from a large M-Turk sample. We implement and compare several theoretical constructs, including imageability, thought provokingness, and Barrett's (2008) conceptualization of inferential potential. Results are discussed in terms of implications for memorability.
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6:00-7:30 PM (1197)

An Examination of the Production Effect in Preschool Children. STACY L. LIPOWSKI, *High Point University*, ANGELA M. CANDA, *John Carroll University*, MARY A. PYC, *Dart NeuroScience* – The production effect is the finding of enhanced memory for items studied aloud versus items studied silently. Although the effect is well-established, the majority of research has focused on undergraduates. The primary goal of the current study was to examine the effect in preschoolers. In addition to this, we were also interested in investigating the role of costs and/or benefits as a source of the effect for young children. Sixty-two preschoolers studied ten pictures of familiar items. One group studied all items silently, one group studied all words by saying them aloud, and the remaining children studied half of the items silently and said the other half aloud. After a three-minute distractor task, all children completed a free recall test. The production effect was replicated with both pure and mixed lists. Results suggest that the effect was due to both a benefit for produced items and a cost to items that were studied silently.
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6:00-7:30 PM (1198)

Sources of Interference in a 3-Phase Cued Recall Framework. JACK WILSON and AMY CRISS, *Syracuse University* (Sponsored by Lael Schooler) – In a cued recall task, participants must generate one target word given a probe. This should involve identifying the memory suggested by the probe (memory matching), identifying the targeted memory by considering the relationship between the probe and the target memory (concordance), and recovering and outputting the target word (recovery). We evaluated this general framework. In Experiment 1, we used 3 different types of cued recall: standard paired associates recall, extra-list cued recall, and a hybrid where retrieval is like paired associates recall but the cue is extra-list and the task is to recall the word that was studied with the word like the cue. We manipulate cue strength, target strength, and associative strength with each task and estimate performance at the three phases in a Bayesian Hierarchical Multinomial Process Tree. The data are consistent with a model where each phase contributes to performance and cue strength affects memory matching, target strength effects recovery, and associative strength effects concordance. In Experiment 2, we further considered the effects of cue and target items by introducing a studied pair with similar content to the test pair. Implications for models of memory will be discussed.
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6:00-7:30 PM (1199)

The Modality Effect in Free Recall: A Retrieved Context Account. JESSE K. PAZDERA and MICHAEL J. KAHANA**, *University of Pennsylvania* (Sponsored by Michael Kahana) – We conducted two large-scale immediate free recall experiments online using Amazon Mechanical Turk. In both experiments, participants studied visual and auditory lists of varying lengths and rates of presentation. During auditory trials in both experiments, we observed a recency advantage and primacy disadvantage relative to visual trials, reflecting both modality and inverse-modality effects commonly found in studies of free recall. Furthermore, we found that the improved recency performance during auditory trials was not due to an increased probability of initiating recall from recency items. An intrusion analysis revealed that visual presentation produced more recent prior-list intrusions in both experiments than did auditory presentation. Based on these results, we argue against short-term store accounts as an explanation for the modality effect in free recall. We discuss our findings within the framework of retrieved context models of episodic memory, and fit the Context Maintenance and Retrieval Model (CMR2) to our data in order to replicate the modality effect using a single-store model of memory.
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6:00-7:30 PM (1200)

Neural Dynamics of Memory Encoding and Retrieval. YUXUAN LI and MICHAEL KAHANA**, *University of Pennsylvania* (Sponsored by Michael Kahana) – Measures of brain activity during memory tasks can predict successful memory function. Using spectral features of multi-channel EEG, we used machine learning methods to build models that independently predict successful encoding and retrieval. We demonstrate reliably above-chance prediction of both successful encoding and retrieval in hold-out sessions. These models indicate that spectral biomarkers of successful encoding peak at around 750 ms post word onset and that 8-16Hz frequency signals provide the most reliable classifier performance. Furthermore, cross-decoding models show that there exist common patterns of spectral power between successful encoding and retrieval, suggesting that predictions of retrieval do not rely solely on speech-related brain activities. Applying these models to the time-course of the experiment allowed us to track the dynamics of memory-related neural activity as subjects studied items, performed math distractor tasks, and attempted to recall list items.
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WORKING MEMORY I

6:00-7:30 PM (1201)

Distinct Neural Signals Track Items and Locations in Visual Working Memory. GISELLA K. DIAZ, EDWARD K. VOGEL, and EDWARD AWH, *University of Chicago* (Sponsored by Edward Awh) – Oscillatory brain activity in the alpha-band (8-12 Hz) and slow wave EEG activity have both been implicated in the maintenance of information in visual working memory (WM). For instance, increasing WM load leads to monotonic

declines in alpha power and monotonic increases in the amplitude of a parieto-occipital negative slow wave (Fukuda et al., 2015). Here, we test the hypothesis that the negative slow wave is an item-based signal, while alpha power indexes the spatial positions of the stored items. We used grouping by collinearity to manipulate the number of individuated items while holding constant the number of locations. The negative slow wave was sensitive to both the number of locations and the number of individuated items, while alpha power was only modulated by the number of locations. In a behavioral study, we replicate prior observations that WM precision declines with set size and show that grouped stimuli have the same impact as a single item. Thus, we conclude that alpha power and slow wave activity index distinct aspects of online storage, with the former serving as a spatial index and the latter tracking the number of individuated representations in WM.
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6:00-7:30 PM (1202)

Post-Disaster Cognitive Functioning (Working Memory, Fluid Intelligence, and Sustained Attention) in 2016 Louisiana Flood Victims. TANUSHREE AGRAWAL, *University of California, San Diego*, EMILY M. ELLIOTT, MATTHEW R. CALAMIA, KATIE STANKO, ALYSSA DE VITO, and KATIE E. CHERRY, *Louisiana State University* (Sponsored by Emily Elliott) – We assess post-disaster cognition in the wake of the Great Flood of 2016, which caused catastrophic flooding in southern Louisiana. Flood victims were tested on multiple measures of cognition, such as memory, fluid intelligence, and attention, as well as on disaster measures such as flood-related losses, anxiety, and post-traumatic stress. Here, we report results across participants (N=153, screened for cognitive impairment) from the first wave of testing in this two-part longitudinal study. Performance on working memory complex span (Operation, Symmetry, and Rotation Spans), fluid intelligence (Raven's Advanced Progressive Matrices, Letter Tests, and Shipley Abstraction), and mind-wandering (Sustained Attention to Response Task) tasks are highlighted. We note that relations between processing, accuracy, and recall were as expected on all working memory tasks. Our results firstly provide insight into cognitive functioning in a community-drawn sample across a diverse range of ages, education, and income levels. Secondly, they provide a reliable baseline for comparing cognitive changes in future waves of this study, and lay the groundwork for better understanding how disaster-related stress affects everyday cognitive functioning.
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6:00-7:30 PM (1203)

A Latent Variable Analysis of Measures of Working Memory. KERRY ANN CHALMERS, EMILY E. FREEMAN, and JADE B. GOODMAN, *University of Newcastle* – Digit span and n-back tasks are extensively used in neuroscience and clinical studies to assess working memory, yet there is no general agreement as to the validity of these tasks. The aim of the current study was to examine the similarities and differences between simple span and n-back tasks. One hundred and ninety-five young adults (aged 18 to 25 years) completed three span tasks: digit span, shape span, and location span, designed to assess short-term memory for verbal, non-verbal and spatial stimuli, respectively. Participants also completed digit, shape and location n-back tasks at three levels of difficulty, 2-back, 3-back and 4-back. Confirmatory factor analysis was used to examine the underlying structure of these tasks to determine whether unitary or multi-component models of working memory are best fit by the data. Results are discussed in terms of current models of working memory.
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6:00-7:30 PM (1204)

Non-Target Cueing Benefit in Visual Working Memory Is Independent of Cue-Target Compatibility. RYAN S. WILLIAMS, JAY PRATT, and SUSANNE FERBER, *University of Toronto* (Sponsored by Jay Pratt) – We have recently shown that cueing the color of a non-target item benefits visual working memory (VWM) recall despite impairing performance in visual search. It is not known, however, whether the non-target cueing benefit is present for VWM recall in contexts where the cued dimension (e.g., color) is independent of the target dimension (e.g., orientation), as is typically the case in visual search tasks of this nature. To examine this, we had participants study displays of oriented bars, and report the angles of probed items. Critically, prior to the presentation of study arrays, a cue either indicated the color of one item that could be ignored, or provided no such information. Our results showed that participants held more precise representations of studied items following ignore cues compared to neutral cues. As such, the non-target cueing benefit remains present when individuals are required to switch from one feature dimension to another.
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6:00-7:30 PM (1205)

Time-Based Resource-Sharing and Switching Cost Accounts of Performance in Complex Span Tasks. MIRIAM DEBRAISE, *Université Côte d'Azur*, NICOLAS GAUVRIT, *Université d'Artois*, BENOÎT LEMAIRE and SOPHIE PORTRAT, *Université Grenoble Alpes*, FABIEN MATHY, *Université Côte d'Azur* – The complex span tasks generally used to evaluate working memory performance involve the alternation between processing and storage. These span tasks make use of a concurrent task in which distractors direct attention away from the maintenance of items at regular intervals. Previous studies may therefore have confounded the processing efficiency of participants with their switching efficiency (i.e., their capacity to alternate rapidly between storage and maintenance). This confound could unwisely lead to grant special privilege to the role of attentional refreshing in comparison to executive functioning. We present several experiments using a complex memory span task in a population of young adults, in which the number of switchs and the pace of the concurrent task were manipulated. Effects of regularity and switching load, when detected statistically, had minimal effect on performance in comparison to list length and

cognitive load. Several versions of the Time-Based Resource-Sharing (TBRS) model were implemented to account for the result.
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6:00-7:30 PM (1206)

Mapping the Effects of Cognitive Load and Delay on Serial Recall. JOSEPH J. GLAVAN, and JOSEPH W. HOUPT, *Wright State University*, VALÉRIE CAMOS, *University of Fribourg*, PIERRE BARROUILLET, *University of Geneva* (Sponsored by Joseph Houpt) – There is a growing interest in the temporal dynamics of working memory, particularly with respect to the effects of task-free and task-filled intervals on consolidation, attentional refreshing, and articulatory rehearsal mechanisms. More free time between the presentation of targets and distractors offers more time for consolidation and refreshing, whereas delays before recall may emphasize effects of refreshing or decay depending on whether they are filled by an intervening task. Alternatively, cognitive load may be distributed evenly between targets and recall, and there is some evidence that this pattern has a more adverse effect on recall than when load is clumped into a single block. We used an ACT-R implementation of the time-based resource-sharing model to predict which combinations of load and delay produce unique patterns in recall and which combinations mimic others. This identifies the manipulations that will be most effective for isolating consolidation, refreshing, and decay in human subjects.
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6:00-7:30 PM (1207)

Perfection Doesn't Exist in Working Memory: New Evidence in Favour of a Voluntary Sharing Between Storage and Processing. CLÉMENT BELLETIER, *Université de Fribourg*, PIERRE BARROUILLET, *Université de Genève*, VALÉRIE CAMOS, *Université de Fribourg* – Several working memory (WM) theories assume that participant share limited resources between the maintenance of information and its processing (Barrouillet & Camos, 2015; Cowan, 2005). This sharing is supposed to be at least in part under the voluntary control of the individuals that could prioritize storage over processing and vice versa. The prioritization of one task supposedly takes place to the detriment of the other. In the present experiment, we assessed these costs of prioritization. Participants' spans were evaluated during a scale procedure on a serial recall of letters and on a processing task (parity judgments). They then performed the same tasks either separately (single-task) or in combination in a Brown-Peterson task (dual-task) at their individual span. The prioritization was manipulated during the dual-task by asking participants to achieve perfect trials on either the recall or the processing task without ignoring the other task. Results indicated that on perfect trials in which prioritization was achieved, giving the priority to one task strongly impacted the other, with symmetric costs of storage on processing and of processing on storage. This brings support to a voluntary sharing of limited resources in WM.
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6:00-7:30 PM (1208)

Similarity Effects in Visual Working Memory. LI YANG, LEI MO, and CAROL A. SEGER, *South China Normal University* (Presented by Carol A. Seger) – Purpose: Similarity has been observed to have a positive effect and a negative effect on visual working memory (VWM) in different studies. How can we resolve this discrepancy? Methods: We used a change detection task to compare VWM performance across a broad range of similarity levels (Study 1) and to distinguish effects of categorical similarity from those of feature-space proximity (Study 2). Results: In Study 1, we found a U-shape relationship between degree of similarity and VWM performance: VWM for moderate similarity items was worse than that for either low or high similarity items. In Study 2, we found that VWM in a mixed-category condition was better than in a single-category condition, whereas VWM under high feature-space proximity was superior to that under low feature-space proximity. Conclusions: Memory performance varies for items with different degrees of similarity. Categorical similarity impairs VWM, whereas feature-space proximity facilitates VWM.
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6:00-7:30 PM (1209)

Refreshing and Removing in Working Memory: Different Processes or Two Sides of the Same Coin? EVAN N. LINTZ, ARIANNA N. DYE, and MATTHEW R. JOHNSON, *University of Nebraska, Lincoln* (Sponsored by Robert Belli) – Researchers have investigated "refreshing" of items in working memory (WM) as a means of preserving them, and other studies have examined removal of items from WM that are irrelevant. However, it is unclear whether refreshing and removal in WM truly represent different processes, or if participants, in an effort to avoid the to-be-removed items, simply refresh alternative items. We conducted two experiments to test whether these putative processes can be distinguished from one another. Participants were presented with sets of three words and then cued to either refresh one item or remove two items from WM, followed by a lexical decision probe containing either one of the just-seen words or a non-word. In Experiment 1, all probes were valid and in Experiment 2, probes were occasionally invalid (the probed word was one of the non-refreshed/removed items). In both experiments, participants also received a subsequent surprise long-term memory test. Results from both experiments suggested the expected advantages for refreshed (or non-removed) items in both short-term response time and long-term recognition, but no differences between refresh and remove instructions that would suggest a fundamental difference in processes.
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6:00-7:30 PM (1210)

Tracking Fluctuations in Working Memory Performance With Pupillometry. MATTHEW K. ROBISON, *Arizona State University*, NASH UNSWORTH, *University of Oregon* (Sponsored by Nash Unsworth) – In three experiments we investigated how fluctuations in working memory performance can be measured using behavior, subjective reporting of attentional state, and pupillometry. We used a discrete whole-

report visual working memory task to get a more detailed measurement of the contents of working memory on a trial-to-trial basis. Working memory performance was worse immediately preceding subjective reports of off-task attentional states (e.g., mind-wandering). Further, when asking people to report their attentional state immediately following a poor trial, participants reported being in an off-task state more often than when they were asked at random points throughout the task. Finally, task-evoked pupil diameter tracked working memory performance on a trial-by-trial basis. When participants reported relatively few items from the memory array correctly, their task-evoked pupil diameters were significantly smaller than when they reported a relatively high number of items correctly. This triangulating approach of using behavior, subjective reporting, and pupillometry can thus effectively detect lapses of working memory, and in future work may be applied prevent them from occurring.
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6:00-7:30 PM (1211)

Expectations at Encoding Modulate Prospective Task-Set Interference. PETER S. WHITEHEAD and TOBIAS EGNER, *Duke University* (Sponsored by Tobias Egner) – Holding an instructed task-set in working memory (WM) for prospective use can interfere with behavior on an intervening task – the prospective task-set interference effect – but the degree to which this effect is automatic or subject to cognitive control remains debated. The current study sought to investigate whether people can exert strategic control over prospective task-set interference based on their expectations at encoding as to whether the instructed task-set will have to be implemented or only recalled. We systematically manipulated the frequency of implementing versus recalling task instructions in a between-participants design and again using a block-wise frequency manipulation in a within-participants design. In both, the magnitude of the prospective task-set interference effect increased with the likelihood of prospective implementation. Thus, people are able to strategically control the manner in which task-set instructions are encoded in WM as a function of expected prospective use. This could be done by biasing the degree to which task-sets are encoded as either a procedural or declarative WM representation, or by modulating the strength of associations between declarative and procedural WM representations.
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6:00-7:30 PM (1212)

Multitasking Abilities Depend on Multitasking Requirements. AZUMI TANABE-ISHIBASHI and RYO ISHIBASHI, *Tohoku University*, MATTHEW R. LOGIE, *The University of Stirling*, ROBERT H. LOGIE, *The University of Edinburgh* – We investigated whether individual differences in verbal and visual working memory capacities correlate with semantic or perceptual aspects of multitasking in a virtual environment. Participants were first presented with a list of perceptual or semantic tasks, and then were asked to perform these tasks while moving through, and interacting with objects in a version of the Edinburgh Virtual Errands Test by Logie et al. [Memory and Cognition, 39, 1561-1574 (2011)]. Overall maintenance of task goals correlated with individual differences in verbal working memory capacity. Intrusion errors in the visual working memory task tended to correlate with errors in multitasking when the focus of the tasks was perceptual, but not when the task focus was semantic. Results suggest that there is not one multitasking ability, and that different, domain-specific cognitive resources are recruited according to what type of information is required for the multitasking requirements.
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6:00-7:30 PM (1213)

Does Confidence in Task Performance Influence the Decision to Offload Information? KIM-PHUONG L. VU, DAN CHIAPPE, HAILEY ARREOLA, UYEN BUI, CINDY SU, and THOMAS Z. STRYBEL, *California State University, Long Beach* – This study examined whether people's confidence in their task performance influenced their decision to offload or write down information that has to be recalled later. Participants performed a working memory task with set sizes of 2, 4, 6, 8, or 10 items. Confidence in task performance was manipulated by either presenting participants with easy (set sizes of 2, 4, or 6) or difficult (set sizes of 6, 8, or 10) trials during practice. Participants wrote more items down in the difficult than easy practice condition. Although participants in the two practice conditions did not differ in their estimated accuracy level on the test trials, participants who were given difficult practice wrote down approximately 40% more items for the low set sizes of 2, 4, and 6 during the test trials compared to participants were given easy practice. Thus, the difficulty of the practice condition influenced participants' decision to offload information.
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6:00-7:30 PM (1214)

Placekeeping Ability Is an Important Component of Fluid Intelligence. DAVID Z. HAMBRICK, ERIK M. ALTMANN, and ALEXANDER P. BURGOYNE, *Michigan State University* (Presented by Alexander P. Burgoyne) – Scientific interest in intelligence dates to the beginning of the field of psychology. Nevertheless, the question of what underlies individual differences in intelligence remains unanswered despite more than a century of intensive research. In this study, we assessed the contribution of placekeeping ability—the set of cognitive processes that support maintaining one's place in a sequence of operations. We had participants perform two placekeeping tasks, as well as tests of fluid intelligence (i.e., reasoning ability). Structural equation modeling revealed that placekeeping ability accounted for approximately 80% the variance in fluid intelligence. Moreover, placekeeping ability accounted for considerably more of the variance in fluid intelligence than did working memory capacity (32%). Placekeeping ability might be particularly important during reasoning when participants must maintain their place while testing a series of alternative solutions to a problem.
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6:00-7:30 PM (1215)

Uncovering the Shared Representation Between Visual Working Memory (VWM) and Perception: Neural Tuning Curves. CHUNYUE TENG (Graduate Travel Award Recipient) and DWIGHT J. KRAVITZ, *The George Washington University* (Sponsored by Dwight Kravitz) – VWM and perception have been considered as generally distinct, with relatively circumscribed interactions. However, the recent sensory recruitment model places VWM maintenance within the posterior visual areas (D'Esposito & Postle, 2015), suggesting a shared neural resource between VWM and ongoing perception. Here, we directly tested behavioral predictions from this common sensory recruitment. Specifically, the interference between VWM and perception was hypothesized to be modulated by their similarity along the dimensions with known tuning curves in visual cortex. While participants maintained a color/orientation, an irrelevant distractor was presented whose similarity to the memory item was parametrically manipulated. Across four studies, a monotonic relationship was consistently found that more similar distractors captured more attention, biased memory representation towards themselves and reduced memory uncertainty, as predicted by the tuning curves. Further, studies investigated the concomitant impact of VWM on perception. These results strongly support the sensory recruitment model and suggest a novel method for exploring the nature of VWM.

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6:00-7:30 PM (1216)

Tracking the Development of Automaticity in Memory Search With Human Electrophysiology. RUI CAO, THOMAS BUSEY, ROBERT NOSOFSKY, and RICHARD SHIFFRIN, *Indiana University Bloomington*, GEOFFREY WOODMAN, *Vanderbilt University* (Sponsored by Thomas Busey) – Shiffrin and Schneider (1977) demonstrated that highly efficient memory- and visual-search performance could be achieved through consistent item-to-response mapping (CM) training. It is theorized that subjects shifted from relying on working memory to learned item-response associations in long-term memory (Logan, 1988). The theory was tested and explored mostly through behavioral experiments and computational modeling. In a recent series of articles involving visual search (e.g. Woodman et al, 2013), Woodman and colleagues found that the contralateral-delay activity (CDA) of human event-related potentials is related to the maintenance of information in visual working memory and that the magnitude of the CDA decreases for repeated targets. We employed the CDA and other neural measures to study the nature of memory retrieval in CM memory search tasks. We observed a significant reduction in the magnitude of the CDA in CM training compared to a control condition where item-response mappings varied between trials (VM). The results provided converging evidence supporting the classic theoretical interpretation of the bases for CM and VM memory search. The results also raised interesting questions regarding the interpretation of CDA.

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6:00-7:30 PM (1217)

Refreshing and Elaboration Are Separable Processes With Distinct Impacts on Working Memory and Long-Term Memory Across the Lifespan. LEA M. BARTSCH, *University of Zurich*, VANESSA M. LOAIZA, *University of Essex*, LUTZ JÄNCKE and KLAUS OBERAUER, *University of Zurich*, JARROD A. LEWIS-PEACOCK, *University of Texas at Austin* (Sponsored by Klaus Oberauer) – Working memory (WM) maintenance is assumed to rely on rehearsal processes such as refreshing and elaboration, but, clear mechanistic descriptions of these processes are lacking. We developed a fMRI study to investigate the extent to which refreshing, and elaboration are distinct neural processes with dissociable behavioral outcomes. We used multivariate pattern analyses (MVPA) of fMRI data to differentiate brain activation patterns associated with these processes during a WM task in young and older adults. These neural measures were then linked to behavioral outcomes of both WM and long-term memory (LTM): We compared memory for lists of six words under four processing conditions: re-reading, refreshing, elaborating, or simultaneous refreshing and elaborating. We found successful differentiation of brain activity associated with all three processes. The degree of neural separation was predictive of the individuals' memory. Re-reading benefited WM more than refreshing did, but this relative advantage was reduced when the neural processes were more similar: refreshing benefited WM when it appeared, in the brain, to be like reading. Elaboration did not benefit WM, but improved LTM, and this benefit increased with neural separability.

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6:00-7:30 PM (1218)

The Contralateral Delay Activity Tracks the Storage of Visually Presented Letters and Words. JASON RAJSIC, *Vanderbilt University* – Electrophysiological studies using simple stimuli and pictures have demonstrated that the maintenance of items in visual working memory is indexed by the contralateral delay activity (CDA). Despite the use of letter stimuli in laboratory paradigms, it is unknown whether storage of letters also elicits a typical load-sensitive CDA. Given their close associations with language and phonological codes, it is possible that participants store letter stimuli phonologically, and not visually. Participants completed a standard visual change-detection task while their event-related potentials were recorded. We compared the CDA elicited by colored squares to uppercase consonants (Experiment 1) and colored bars to words (Experiment 2). Accuracy of change detection decreased with increasing set size for colored squares, letter, and words. We found a CDA was present for colored squares, letters and word arrays, as were the capacity limited set-size effects for all types of stimuli, suggesting that letters and words were not phonologically recoded, or were also stored in a visual format. These results suggest that, despite their verbal associations, letters also elicit the electrophysiological marker of visual working memory storage.

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6:00-7:30 PM (1219)

The Effect of Syntax in Serial Recall. STEVEN SCHWERING and MARYELLEN C. MACDONALD, *University of Wisconsin, Madison* – Is there hierarchical structure in working memory (WM)? Previous research demonstrated effects of transition statistics and semantics on serial order processing, supporting theories of WM maintained through long-term memory. Yet, these effects do not correspond to complex or unique linguistic structures and do not always reflect real-world statistics. Does long-term experience with abstract linguistic sequences uniquely impact recall of word order in a serial recall task? In multiple experiments, we examined effects of learned grammatical structures on WM while controlling for effects of semantics and transition probabilities. Transition probabilities and grammatical relationships were confirmed via corpus analyses. We found better recall for word orders consistent with learned structures, suggesting long-term linguistic experience affects performance on tasks tapping immediate verbal WM. These results support theories suggesting a closer link between language production planning and WM with consequences for both theories of language production/comprehension and the nature of WM.
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6:00-7:30 PM (1220)

A Resource Model of Phonological Working Memory. CHRISTOPHER RICHARDSON HEPNER and NAZBANOU NOZARI, *Johns Hopkins University* (Sponsored by Nazbanou Nozari) – Baddeley and Hitch's classic model divides working memory into domain-specific subsystems and a shared, domain-general central executive that plays a role in allocating resources to items stored in the subsystems. The nature of this resource—in particular, its quantization (discrete vs. continuous) and the flexibility of its allocation—has been studied extensively in the visual domain, with evidence from experiments using continuous responses to measure precision providing support for models with flexibly and continuously divisible resources. It remains unclear, however, whether similar mechanisms mediate the division of resources in phonological working memory. In two experiments, we show that the principles of resource division in phonological working memory are similar to vision: precision decreases monotonically as set size increases, and attended items are processed with greater precision at the expense of unattended items. A third experiment shows that attention affects both the encoding and maintenance phases of working memory.
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6:00-7:30 PM (1221)

Semantic and Categorical Relatedness Facilitate Item-Item Binding in Visual Working Memory. DWIGHT J. PETERSON, JACOB HANSON, and SARAH STRAND, *Concordia College* – Visual working memory (VWM) studies have shown that it is more difficult to remember item-item bindings compared to single items, typically referring to this phenomenon as a binding deficit (e.g., Peterson & Naveh-Benjamin, 2017). Recent findings suggest that VWM capacity can be increased when items appearing within the stimulus array are semantically related (O'Donnell, Clement, & Brockmole, 2018). Extending this work to examine the role of semantic (Experiment 1) and categorical (Experiment 2) relatedness in mediating the aforementioned VWM binding deficit, we predicted that this deficit would be smaller for semantically or categorically related object pairs relative to unrelated object pairs. Results revealed a binding deficit for unrelated pairs which was significantly reduced when pairs were either semantically or categorically related, suggesting that semantic and categorical relatedness support item-item binding in VWM. These results replicate and extend recent findings revealing that relatedness is an important organizational principle in VWM.
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6:00-7:30 PM (1222)

The Effects of Part-Set Cueing in Semantic Memory. SUSHMEENA A. PARIHAR, MADISON STREJC, ZOE L. WALTS, and MATTHEW R. KELLEY, *Lake Forest College* (Presented by Matthew R. Kelley) – The present study explored the influence of part-set cues in semantic memory using tests of "free" recall, reconstruction of order, and serial recall. Nine distinct categories of information were used (e.g., Zodiac signs, Harry Potter books, Star Wars films, planets). The results showed part-set cueing impairment for all three "free" recall sets, whereas part-set cueing facilitation was evident for five of the six ordered sets. A follow-up study explored the influence of part-set cues on semantic spatial memory. Results and implications will be discussed.
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6:00-7:30 PM (1223)

EEG Decoding Reveals That the Presentation of a Target Reactivates the Representation of the Target From the Previous Trial. GI-YEUL BAE, and STEVEN LUCK, *University of California, Davis* – Studies of serial dependence show that the stimulus on one trial can impact the perception and memory of the stimulus on the next trial. To explore the mechanisms underlying this effect, we recorded EEG while participants performed an orientation delayed estimation task. We found a typical serial dependence effect on behavior, with the reported orientation on the current trial being biased away from the orientation on the preceding trial. We also found that we could decode the orientation presented on the previous trial from the EEG topography of the current trial. This above-chance decoding started shortly after the onset of the stimulus for the current trial, suggesting that the presence of the new stimulus reactivated a representation of the previous orientation. We replicated this finding using a task in which the location and orientation of an object were independently manipulated. Together, these results suggest that serial dependence may be driven by a reactivation of the previously seen object.
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SENSATION AND PERCEPTION I

6:00-7:30 PM (1224)

Sound Guiding Vision: Using the Visual World Paradigm to Directly Compare Speech and Sound Cuing Image Search. SARAH OLSEN, *Binghamton University*, MARGARET DUFF, *US Army Research Laboratory*, ALECIA MOSER, *Binghamton University*, KELLY DICKERSON, *US Army Research Laboratory*, PETER GERHARDSTEIN, *Binghamton University* (Sponsored by Peter Gerhardstein) – In the everyday environment, observers are cued to events by hearing sounds, then orienting visual attention to the perceived source. Evidence suggests that these environmental sounds are encoded and recalled as part of a broadly specified semantic representation, rather than as a set of acoustic descriptors. However, unlike with related speech, the mechanisms of semantic competition for environmental sounds is unknown. The present study uses a visual world paradigm (VWP) to separate out lexical and semantic effects influencing visual object recognition. Eye movements were tracked as participants heard either a sound or spoken word while viewing arrays containing one target image, one semantically-related competitor, and two unrelated distractors. Results showed differences in gaze fixation accuracy and timing between speech and sounds for targets and competitors, which suggests differences in the strength of semantic competition effect between speech and sounds.
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6:00-7:30 PM (1225)

An Emotional McGurk Effect: Multisensory Integration During Emotion Recognition. SARAH J. MARCHEGIANI, CELESTE C. BARKER, and AARON D. MITCHEL, *Bucknell University* (Presented by Aaron D. Mitchel) – Multisensory integration, or the combination of multiple senses into a unified percept, is a core feature of cognition and perception. A classic demonstration of this ability in the domain of speech perception is the McGurk effect, in which incongruent audio and visual syllables may be perceived as a "fused" audiovisual syllable that is distinct from the unisensory inputs. To our knowledge, no study has examined whether a similar fusion illusion occurs during the recognition of incongruous audio and visual emotional expressions. In the present study, participants viewed both congruent and incongruent audiovisual displays of an actor expressing an emotion and completed a multidimensional scaling task (Experiment 1) or a forced-choice recognition task (Experiment 2). In both tasks, participants' emotion recognition was significantly altered by an incongruent visual or auditory display, evidencing both multisensory integration and a fusion illusion, similar to the McGurk effect, during emotion recognition.
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6:00-7:30 PM (1226)

Does Cross-Modal Aftereffect Occur in Variance Perception? SACHIYO UEDA, *Toyohashi University of Technology*, REIKO YAKUSHIJIN, *Aoyama Gakuin University*, AKIRA ISHIGUCHI, *Ochanomizu University* – Human observers perceive the statistical information of the various features in the environment and use it efficiently to interpret the world. In some cases, perceived variance affects subsequent decision-making and behavior because a large variance of stimuli set or outcome may indicate the abnormalities and risks. The perceived variance, however, is not necessarily equal to the physical variance. Previous research showed that the variance aftereffect occurred across different visual representations as well as within the same visual property. In this study, we investigated whether variance aftereffect extended across different sensory modalities. In experiment 1, participants reported the variance magnitude of auditory stimuli (e.g. pitch of sounds) before and after prolonged exposure to high/low variance of visual stimuli (e.g. size of disks). In Experiment 2, the magnitude of variance of visual stimuli was evaluated after adapting to the auditory stimuli. We found that variance aftereffect occurs partially across different sensory modalities. The result suggests the possibility of variance perception mechanism common to different sensory modalities.
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6:00-7:30 PM (1227)

The Automaticity of Cross-Modal Correspondence Between Loudness and Visuospatial Elevation. QI WANG and JUN WANG, *Sun Yat-Sen University* – Cross-modal correspondence describes the tendency that human brain systematically integrates information with specific features or dimensions across sensory modalities. Using a series of speeded discrimination task, we investigate whether the cross-modal correspondence exists between auditory loudness and visuospatial elevation. Results demonstrate that loud tones and low tones induce attention shifts to upper or lower location, depending on loudness. Further, this loudness-elevation audiovisual correspondence satisfies the criteria of automaticity on speed of processing and goal-independence. The cross-model correspondence is observed even when taking account of the responses within 400ms and when the explicit instruction is conflicting with the loudness-elevation correspondence. However, this loudness-elevation correspondence would be impaired by increasing perceptual load, which fails to support the load-insensitivity for automatically processing. These findings suggest a cross-modal correspondence between auditory loudness and visuospatial elevation and lend supports to the theory that the cross-modal correspondence might not be all of one type, as the level of its automaticity depends on the patterns of cross-modal mapping.
Email: Qi Wang, wangq227@mail.sysu.edu.cn

6:00-7:30 PM (1228)

Individual Differences in Auditory Working Memory Is Predictive of Compensation Response to Spectral Perturbation from EH to AE. SHANNON L.M. HEALD, STEPHEN C. VAN HEDGER, and HOWARD C. NUSBAUM, *University of Chicago* – Theories of speech production have postulated that the efficacy of a self-produced, speech-motor act is achieved by comparing an internally generated prediction (efference copy) to vocal output. As auditory working memory (WM) may play a role in maintaining the generated prediction for comparison to vocal output, WM may be important in achieving successful audio-motor adaptive processing. To

assess this, we investigated whether individual differences in WM (measured by an auditory n-back task) was predictive of individual differences in the amount of compensation to spectral perturbation of the first and second formants of the vowel EH as in BET to AE as in BAT. We found substantial differences in the amount of compensation, ranging from speakers who do not change their production in spite of the change in feedback (20% of Ss), speakers who compensate to maintain the intended target moving their formant frequencies in the opposite direction of change (70% of Ss), and speakers who actually mimic the feedback (10% of Ss). The degree of formant compensation was positively correlated with N-back performance. Such data supports the view that the comparison process that underlies auditory-motor adaption is an active cognitive process.
Email: Shannon L.M. Heald, smbowdre@uchicago.edu

6:00-7:30 PM (1229)

Facilitation of Speech-in-Noise Perception From Visual Analogue of the Acoustic Amplitude Envelope. YI YUAN and ANDREW LOTTO, *University of Florida* (Sponsored by Andrew Lotto) – It is well-known that an accompanying visual presentation of a talker can increase the accuracy of perception of speech in noise. Whereas some of the benefit of the visual stimulus may be disambiguating particular phonetic segments (e.g., the lip closure during a /b/), it is also possible that the dynamic movement of the mouth provides an analogue of the acoustic amplitude envelope. Information about the amplitude envelope could allow the listener to better track the speech signal in the noise. To test this hypothesis, listeners were presented spoken sentences in babble noise either in auditory-only or auditory-visual conditions. In this case, the visual stimulus was a sphere that increased and decreased in size synced to the amplitude of the speech signal (the envelope being extracted prior to being mixed with the babble noise). A significant improvement in accuracy in the auditory-visual condition was obtained even though there was no visual representation of phonetic information. These results provide evidence that visual representations of the amplitude envelope can be integrated online in speech perception.
Email: Yi Yuan, yiyuan56@ufl.edu

6:00-7:30 PM (1230)

Abstract Coding of Temporal Information? DANIEL BRATZKE and ROLF ULRICH, *University of Tübingen* – The pacemaker-counter model (PCM) assumes that temporal information is encoded in an abstract format. In a series of experiments, we tested the predictions of PCM in a temporal reproduction task in the sub- and the suprasecond range. Experiments 1-3 employed stimulus manipulations that typically affect perceived duration. These effects are explained within the framework of PCM by assuming different pacemaker rates. Experiment 1 employed auditory and visual stimuli. Experiments 2 and 3 employed intramodal (auditory) stimuli, which differed in their "filling" or in their intensity. In a control experiment (Exp. 4), we used visual stimuli of different shape. The patterns of mean reproductions largely matched with the predictions of PCM. With respect to reproduction variability, however, we observed larger congruency effects than predicted. Thus, the results are inconsistent with PCM's assumption of a purely abstract representation of temporal information.
Email: Daniel Bratzke, daniel.bratzke@uni-tuebingen.de

6:00-7:30 PM (1231)

Slowhand: Is Time Perception Altered in Near-Hand Space? JACOB S. ADAY, CHRISTOPHER C. DAVOLI, and EMILY K. BLOESCH, *Central Michigan University* (Sponsored by Christopher Davoli) – A variety of attentional and perceptual changes occur in near-hand space, including increases in visual temporal acuity. These changes in cognition have been related to an increase in magnocellular visual processing. Other processes which selectively engage the magnocellular pathway, such as emotion and motion, have been shown to lead to time overestimation. Additionally, both emotion and motion modulate the P3 ERP component; critically, the P3 component is also modulated when attending to near-hand space. Given that processes which depend on the temporally sensitive magnocellular pathway are linked to a sense of time slowing down, perhaps there is altered time perception in near-hand space. To this end, we recruited 25 participants to complete a temporal bisection task in conditions with hands near and far from the screen. Contrary to our predictions, we found no differences in time perception in near-hand space. These results suggest that while near-hand space can enhance temporal acuity, it does not seem to influence explicit temporal judgments. Further research is needed to fully elucidate the nuances of near-hand space and temporal processing.
Email: Jacob S. Aday, aday1js@cmich.edu

STATISTICS AND METHODOLOGY I

6:00-7:30 PM (1232)

Reaction Times Do Not Reliably Measure Individual Differences in Cognition: The Problem and Solutions. CHRISTOPHER DRAHEIM, CODY A. MASHBURN, and RANDALL W. ENGLE, *Georgia Institute of Technology* (Sponsored by Francis Durso) – The measurement of attention control and inhibition is becoming an increasingly problematic area for individual differences researchers (Friedman & Miyake, 2004; Rey-Mermet, Gade, & Oberauer, 2018). The problem mirrors that of task switching (Draheim, Hicks, & Engle, 2016; Hughes et al., 2014), and recent research illuminates that the issues are widespread in the assessment of executive functioning (Hedge, Powell, & Sumner, 2017; Paap & Sawi, 2016) as well as behavioral sciences more broadly. Here, we examine evidence in support of our position that reaction time, specifically reaction time difference scores, are the primary reason for these issues. Such scores ignore speed-accuracy interactions and are of lower unreliability, resulting in weak inter-correlations, latent factors that do not cohere, and occasionally nonsensical results. We outline many alternatives for differential researchers to consider, and our recommendation is for the field to move away from both reaction time and difference scores.
Email: Christopher Draheim, cdraheim3@gatech.edu

6:00-7:30 PM (1233)

Tree Inference: Factors Selectively Influencing Vertices in Mixtures of Multinomial Processing Trees That Represent Both Response Time and Accuracy. RICHARD SCHWEICKERT and XIAOFANG ZHENG, *Purdue University* – Multinomial Processing Trees (MPTs) are successful models of many cognitive tasks. Although usually used to account for response probability, they can also account for response time. A process such as memory retrieval is represented in an MPT by a vertex, and an output of the process, such as correct retrieval, is represented by an arc descending from the vertex. There is good empirical evidence that some experimental factors change parameter values at a single vertex in an MPT, leaving all else invariant. Such a factor selectively influences the vertex. A participant in an experiment might use different MPTs on different trials, so response time and accuracy are produced by a mixture of MPTs. We show that under plausible assumptions, if two factors selectively influence two vertices in every MPT of a mixture of MPTs, the entire mixture is equivalent to one of two relatively simple MPTs.
Email: Richard Schweickert, schweick@purdue.edu

6:00-7:30 PM (1234)

Design Factors in Mouse-Tracking: What Makes a Difference? PASCAL J. KIESLICH (Graduate Travel Award Recipient), *University of Mannheim*, MARTIN SCHOEMANN, TOBIAS GRAGE, and STEFAN SCHERBAUM, *Technische Universität Dresden* (Sponsored by Arndt Broeder) – The investigation of cognitive processes by tracking and analyzing mouse movements has become a popular method in many areas of cognitive psychology, including language, memory, and decision making. When creating mouse-tracking experiments, researchers face a number of design choices (e.g., about the mouse speed and starting procedure). In previous research, different settings have been employed, but so far little is known about how they affect mouse-tracking data. We conducted a series of experiments to systematically investigate the influence of multiple design factors. In all experiments, participants classified typical and atypical exemplars into one of two categories. In separate experiments, the design factors response indication (click vs. touch), mouse sensitivity, and starting procedure were manipulated between participants. The core finding that mouse movements deviate more towards the non-chosen option for atypical exemplars was replicated in all conditions. However, the strength of this effect, the curvature and shape of individual trajectories was influenced by several design factors, especially the starting procedure and response indication. We provide suggestions for the design of future mouse-tracking studies.
Email: Pascal J. Kieslich, kieslich@psychologie.uni-mannheim.de

6:00-7:30 PM (1235)

Parameter Collision in Probabilistic Models of Cognition: How to Separate Parameterization of Evidence Strength and Choice Noise. ANTONIA KREFELD-SCHWALB and BENJAMIN SCHEIBEHENNE, *University of Geneva*, THORSTEN PACHUR, *Max Planck Institute for Human Development* – In many cognitive models it is often assumed that behavior results from a probabilistic selection among alternatives. The evidence strength for each of these alternatives is governed by one or more adjustable parameters; in addition, there is often a parameter governing how deterministically a response selection follows from the relative evidence strengths of the alternatives. Conceptually, the computation of evidence strength and the noisiness of the response selection are independent processes. As we highlight, however, due to formal characteristics of the models, the parameters representing these characteristics are usually highly correlated, complicating their independent interpretability. We demonstrate this problem for several influential cognitive models, such as cumulative prospect theory for risky choice, the generalized context model for categorization and the SIMPLE model for memory. We explore the implications of these parameter intercorrelations and suggest approaches to reduce them. For instance, we show that changing the functional form of the value functions substantially decreases the parameter intercorrelations.
Email: Antonia Krefeld-Schwalb, a.krefeld-schwalb@unige.ch

6:00-7:30 PM (1236)

Precision Timing in the Browser With Lab.Js: A Free, Open, Online Study Builder. FELIX HENNINGER, *University of Koblenz-Landau*, YURY SHEVCHENKO, *University of Mannheim*, ULF K. MERTENS, *University of Heidelberg*, PASCAL J. KIESLICH, *University of Mannheim*, BENJAMIN E. HILBIG, *University of Koblenz-Landau* – Online experimentation and browser-based data collection in the laboratory hold substantial promise for basic psychological research, offering greater flexibility and more efficient access to larger, more diverse samples. However, the technical complexity of programming the requisite studies, as well as limitations regarding timing accuracy, have heretofore limited their adoption. We introduce lab.js, a free, open, online study builder designed for experimental and psychophysical research. It provides excellent presentation and response timing accuracy with an intuitive graphical interface for construction of studies with little or no programming. For data collection, lab.js offers a wide range of options, including cloud hosting, integration with third-party questionnaire tools, export to dedicated hosting under full experimenter control and self-contained offline data collection. It is designed to facilitate open research practices and cumulative science through the possibility of open archival, exchange, replication and extension of studies. The software is provided free of charge under an open-source license; further information, code and extensive documentation are available at https://lab.js.org.
Email: Felix Henninger, mailbox@felixhenninger.com

6:00-7:30 PM (1237)

Revealing the Nature of Carryover Effects: Using Big Data to Quantify Evidence Accumulation in Behavioral Data. MICHELLE R. KRAMER, PATRICK H. COX, DWIGHT J. KRAVITZ, and STEPHEN R. MITROFF, *The George Washington University* (Sponsored by Stephen Mitroff) – Every cognitive act (thought, behavior, etc.) is influenced by prior acts and can influence subsequent acts. While apparently tautological, this

fact is often ignored in experimental design and analysis. Some fields embrace that prior evidence guides subsequent behavior (e.g., statistical learning and contextual cueing), but most studies are agnostic to such influences, averaging across them. However, these carryover effects are interesting in their own right and understanding them may also yield insights that can be leveraged to improve design and analysis. Here, using a massive dataset of a series of binary decisions from the mobile application Airport Scanner, the effect of prior evidence on current behavior was found to be related to both its consistency and amount. The impact of these metrics on behavior followed a power curve, suggesting humans implicitly evaluate evidence in a way deeply related to inferential statistics. Moreover, these effects persisted to later testing sessions after an interfering task. These results suggest that implicit learning follows the general form of statistical inference and that accounting for this effect may increase the inferential power of cognitive psychology experiments.
Email: Michelle Kramer, kramerm@gwmail.gwu.edu

6:00-7:30 PM (1238)

Meta-Analysis of Studies Using D-Prime That Provide Only the Means and Variances of Hit and False Alarm Rates. JUAN BOTELLA and MANUEL SUERO, *Autonomous University of Madrid*, JESÚS PRIVADO, *Complutense University of Madrid*, JUAN I. DURÁN, *Centro Universitario Cardenal Cisneros-Madrid* – Sometimes studies of detection or recognition memory report the means and variances of hits and false alarms, but not the sample variance of d-prime. The lack of that variance impedes inclusion of those studies in meta-analyses synthetizing results based on sensitivities and response criteria. Suero, Botella & Privado (2018) have proposed a method to estimate the variance of d-prime under the realistic assumption that there are non-negligible individual differences in sensitivities and criteria. The efficiency of that method was assessed by means of a dual analysis. Primary studies that did report the variance of d-prime were combined to estimate the mean sensitivity with a random effects model weighted by the inverse variance method. Then, the variance of d-prime was estimated by the proposed method, and the meta-analysis was repeated with weighting by the inverse of the estimated variances. The results show that the method is a reasonable alternative when the empirical variance of the sample d-prime is not reported.
Email: Juan Botella, juan.botella@uam.es

6:00-7:30 PM (1239)

Measures to Integrate Speed and Accuracy: A Critical Assessment and Evaluation of Their Validity, Utility, and Problems. MARKUS JANCZYK, *Eberhard Karls University of Tübingen*, HEINRICH RENÉ LIESEFELD, *Ludwig-Maximilians-Universität München* – Participants are typically instructed to respond as fast as possible without sacrificing accuracy. How they interpret this instruction and which speed-accuracy tradeoff (SAT) they choose, might vary between experiments, participants, and conditions. Consequently, experimental effects can appear in either RTs or accuracy. Even more problematic, spurious effects might emerge that are actually due only to differential SATs. An often suggested approach to ameliorate these problems by combining speed and accuracy is the Inverse Efficiency Score (IES). Alternatives are Rate Correct Score (RCS), Linear Integrated Speed Accuracy Score (LISAS), and Balanced Integration Score (BIS). We report analyses on simulated data generated with the diffusion model showing that IES, RCS, and LISAS weight speed and accuracy unequally and are actually very sensitive to SATs. BIS strongly (but not fully) attenuates SAT effects. The results are discussed against the background of undesired research strategies and the general applicability of combined speed-accuracy scores.
Email: Markus Janczyk, markus.janczyk@uni-tuebingen.de

6:00-7:30 PM (1240)

Framing Experimental Results for Maximum Utility. THERESA T. KESSLER and ALEXANDRA D. KAPLAN, *University of Central Florida*, JOHN CHRIS BRILL, *Air Force Research Laboratory*, PETER A. HANCOCK, *University of Central Florida* (Sponsored by Peter Hancock) – While completing an extensive meta-analysis on human-human trust, we found that a disconcertingly large number of relevant studies neglected to include sufficient statistical information to yield actionable effect size reporting. Effect sizes allow data to contribute to synthetic research. Our purpose here is to provide a framework for reporting statistics to be included in reported data so that it can be maximally useful to future scientific endeavors. Our analysis included the screening of 5048 articles, spanning more than 120 years of investigation. Initial coding of the articles resulted in 332 quantitative articles representing 4907 potential effect sizes. As the topic of this analysis has been widely studied, there are enough effect sizes to draw definitive conclusions. However, many other surveyed research topics do not include such a strong research foundation. Therefore, it is vital for scientists to report relevant statistics if they wish to make influential contributions to their field.
Email: Theresa Kessler, theresakessler@knights.ucf.edu

6:00-7:30 PM (1241)

Investigating Human-Human Trust: The Underrepresentation of Experimental Psychology. ALEXANDRA D. KAPLAN and THERESA T. KESSLER, *University of Central Florida*, JOHN CHRISTOPHER BRILL, *Air Force*, PETER A. HANCOCK, *University of Central Florida* (Sponsored by Peter Hancock) – Trust between human beings has been extensively studied. However, during a thorough review of the mediators and factors affecting such relationships, the area of experimental psychology was surprisingly underrepresented, meaning that studies of business provided the bulk of includable data. Our aim is to evaluate this surprising lacuna and to suggest areas of psychology that can and should be more involved. We completed a review of over 450 qualitative and quantitative articles discussing trust between humans. Much of the data came from quasi-experimental economic studies of business (largely supply chain), with far fewer articles represented in experimental psychology. The areas of study missing solid quantitative data are identified with suggestions for the ways in which experimental psychology might become better represented in the field of trust studies.
Email: Alexandra Kaplan, adkaplan@knights.ucf.edu

POSTER SESSION II

Friday Noon
Elite A
Viewing 11:00-1:30, Author Present 12:00-1:30 PM

ANIMAL LEARNING & COGNITION

12:00-1:30 PM (2001)

Exploring the Density Bias in Primates. AUDREY E. PARRISH, *The Citadel*, KRISTIN FRENCH, BRIELLE JAMES, and COURTNEY CREAMER, *Georgia State University*, ALEXANDRIA GUILD, *The Citadel*, MICHAEL J. BERAN, *Georgia State University* – The density bias leads to mis-estimates of numerosity as a function of inter-stimulus distance. Human adults judge densely arranged sets as less numerous than sparsely arranged sets of equal numerosity. The opposite effect emerges for infants and callitrichid primates who prefer densely arranged food sets to equal amounts of sparsely arranged food. In the current research, we presented rhesus and capuchin monkeys with a computerized relative quantity task to explore whether this bias was a more general phenomenon that might emerge in non-food domains. Both species performed above chance levels in control trials with a true numerical difference, as well as performed better when both sets were densely arranged than sparsely arranged. Most monkeys displayed a density bias, preferring dense to sparse sets of equal numerosity. In a subsequent foraging task, capuchin monkeys preferred densely arranged food sets to sparsely arranged food sets of equal size. Thus, the density bias appears to emerge across multiple domains and presentation formats for some primate species.
Email: Audrey Parrish, audrey.parrish@citadel.edu

12:00-1:30 PM (2002)

Launch! The Insightful Discovery of Self-Agency. BROOKE N. JACKSON, CARMEN N. SHAW, MICHAEL J. BERAN, BARBARA A. CHURCH, and J. DAVID SMITH, *Georgia State University* (Sponsored by J. David Smith) – Awareness of one's own agency is a crucial aspect of metacognitive self-awareness (e.g. Metcalfe & Green, 2007). Whether other species share this kind of self-awareness is an important issue in comparative psychology (e.g., Couchman, 2011). However, examining agency without language, without any instructional set, is a difficult problem. To address it, we constructed an instructionless, nonverbal, agency-classification task. Human participants learned categories differentiated by whether or not their button-press controlled a rocket launch. They learned by trial and error following minimal instructions. Afterward, participants defined their categories and blind coders identified those who made self-agency attributions. Examinations of accuracy and latency data showed that self-agency attributions transformed performance positively and produced a qualitatively distinct latency signature. Thus, agency can be felt, self-discovered from task experience, and shown in performance, all without language or instructional set. Our new paradigm has immediate applications in exploring the sense of self-agency in nonverbal species.
Email: Brooke Jackson, bjackson55@student.gsu.edu

12:00-1:30 PM (2003)

Gender, Political Ideology, and Attitudes Toward Animal Use. MITCHELL METZGER, *Ashland University* – This study investigated the relationship between gender and political ideology on attitudes toward animal use. Males generally show less concern for animals than females (Herzog, 2008) and are less likely than females to support liberal policies and candidates (Norrander, 2008). This study further examined the relationship between these variables. 383 undergraduates completed the Animal Attitude Scale, measuring their concern for animal use in research and entertainment. They also completed a Political Ideology scale, measuring heir political leanings on social, economic, and legislative issues. Results indicate a strong correlation between political ideology and participant's attitudes toward animal use for both male ($r269 = .57$, $p < .01$) and female ($r269 = .33$, $p < .01$) participants (politically liberal participants showed greater concern for animal welfare). Additional analyses indicated that this relationship was significantly stronger for male participants ($z = 2.68$, $p < .01$). Given the declining support for animal research in the general population (Wilke & Saad, 2013), these data are important for researchers who may seek to change public opinion to be more favorable toward the use of animals in research procedures.
Email: Mitchell Metzger, mmetzger@ashland.edu

12:00-1:30 PM (2004)

The Role of Pre-Feeding on Temporal Discrimination: An Analysis With Signal Detection. OSCAR ZAMORA-AREVALO, *National Autonomous University of Mexico, UNAM*, MARIO PEREZ-CALZADA, ROXANA A. MORALES-MEDIA, and ADRIANA F. CHAVEZ-DE LA PEÑA, *UNAM, México City* – Notwithstanding the common use of the temporal bisection procedure as a task to evaluate the cognitive properties of timing, a recurrent critique to the use of this experimental paradigm is that the motivational issue and their implications not are considered. To assess this aim ten rats were exposed to a temporal bisection task in four different pairs of (short-long) durations. Once the discrimination criterion was obtained, in the generalization phase we manipulated two conditions, no pre-feeding and pre feeding with 7.5 g of pellets in home cages 40 minutes before these generalization phases. The data were analyzed through two perspectives: classic psychophysics and signal detection theory. Results suggest that in classical psychophysics analysis the sigmoidal functions changes as function of motivational variable pre-feeding. On the other hand, signal detection theory analysis suggests that pre-feeding does not affect the sensitivity, nor baseline nor manipulation. This is in accordance with the results of Akdogan and Balci (2016) so the discrimination is similar in both conditions baseline and pre-feeding. Nevertheless, B" parameter was affected by experimental conditions.
Email: Oscar Zamora-Arevalo, ozamoraa@gmail.com

12:00-1:30 PM (2005)

Monkeys' Performance on a Transitive Inference Task Requires a Cognitive Representation in Addition to Reward Prediction. GREG JENSEN, YELDA ALKAN, VINCENT FERRERA, and HERBERT TERRACE, *Columbia University* – Transitive inference in monkeys has been taken as evidence of their ability to make use of mental representations. Alternatively, "model-free" theories propose that TI can be explained entirely by reward learning. To test that hypothesis, we manipulated the amount of reward associated with stimuli in an ordered list. In one condition, stimuli that were correct more often were paired with lower rewards, such that the correct item in any pair was associated with smaller rewards than the incorrect item. This condition reduced accuracy, but performance remained above chance and subjects learned to make correct choices. In another condition, the opposite gradient was used, with larger rewards paired with stimuli that were correct more often. This also did not disrupt performance. These results demonstrate that cognitive factors overshadow reward value in accounting for monkeys' TI performance. Monkeys are able to make appropriate inferences in spite of competing reward associations.
Email: Greg Jensen, ggj2102@columbia.edu

12:00-1:30 PM (2006)

Decision Making in Humans and Rats: Effects of Physical Effort on Optimal Choice. HILLARY WEHE, *Davis and Elkins College*, REBECCA RAYBURN-REEVES, TINA NELSON, KIM PRESCOTT, and THEA SMITH, *Georgia Southern University, Armstrong Campus* – Previous research has shown that humans will carry out a task as soon as possible, even when it results in a greater amount of physical effort (Rosenbaum et al., 2014). Specifically, humans will choose to carry a weighted bucket closer to the start point and carry it farther, rather than a bucket closer to the end point. The current study was designed to further assess why humans make this non-optimal precrastination choice and what factors influence these choices. Additionally, the purpose was to explore this precrastination choice in another species. First, we recruited 50 undergraduate students to make a work effort decision between two buckets of equal weights placed at near and far intervals on the sides of a 16' runway. Over the course of 16 trials, participants chose the bucket closest to them 40% of the time. In Phase 2, we fatigued participants either physically or mentally prior to choice. For the comparative study, rats were tested using weighted wheels in a runway apparatus akin to the human task, where rats were given a choice between a close or far wheel from the start box over 12 trials. Results showed that for both species, adding weight to the items to be moved shifted choice to optimal performance.
Email: Hillary Wehe, weheh@dewv.edu

12:00-1:30 PM (2007)

Domestic Dogs' Recognition of Vowel and Consonant Mispronunciations in Their Own Names. AMRITHA MALLIKARJUN and ROCHELLE S. NEWMAN, *University of Maryland, College Park* (Sponsored by Rochelle Newman) – Consonants and vowels differ in their duration, volume, and articulation, as well as their function in speech recognition. Infants at 5 months of age can detect a vowel mispronunciation in their name, but not a consonant mispronunciation (Bouchon, Floccia, Fux, Adda-Decker, & Nazzi, 2014). At 14 months, infants notice both types of mispronunciations, and are especially attuned to consonant changes (Mani & Plunkett, 2007). In this study, we examine how dogs, who demonstrate clear recognition of certain words and their meanings, process vowel and consonant mispronunciations in their name. Dogs heard their name as well as a mispronounced version of their name that differed in either the first consonant or vowel in the stressed syllable. While dogs easily could tell their name apart from the vowel-mispronounced name, they did not reliably tell apart their name from the consonant-mispronounced version. This may be the result of the decreased salience of consonants; future studies could test this using either unstressed vowels (a less salient cue) or more sibilant consonants (a more salient cue) and see if dogs can detect alterations in familiar words containing these items.
Email: Amritha Mallikarjun, amritham@umd.edu

12:00-1:30 PM (2008)

The Cocktail Party Effect in Domestic Dogs. AMRITHA MALLIKARJUN and ROCHELLE S. NEWMAN, *University of Maryland, College Park* (Sponsored by Rochelle Newman) – Like humans, canine companions often find themselves in noisy environments, and are expected to respond to human speech despite potential distractors. Such environments pose particular problems for young children, who have limited linguistic knowledge. Here, we examine whether dogs show similar difficulties. We found that dogs prefer their name to a stress-matched foil in quiet conditions, despite hearing it spoken by a novel talker. They continued to do so at signal-to-noise levels as low as 0 dB. However, this result is primarily driven by dogs that are trained to do tasks for humans, like service dogs, search-and-rescue dogs, and explosives detection dogs. The tasking dogs were of several different breeds, and their tasks were widely different from one another. This suggests that their superior performance may be due to generally more training and better attention.
Email: Amritha Mallikarjun, amritham@umd.edu

12:00-1:30 PM (2009)

Post-Event Memory Interference in Chimpanzee Food Memory. BRIELLE T. JAMES, MACKENZIE SMITH, CHARLES R. MENZEL, MICHAEL J. BERAN, *Georgia State University* (Sponsored by Michael Beran) – It is well-known that human memory is vulnerable to suggestive but misleading post-event information that can cause confusion as to what was really experienced. In a comparative investigation of this type of memory error, a male language-trained chimpanzee completed a food naming memory task, in which he was shown food items in a video and/or presented with those items directly. Critically, on some trials, during the 10-min retention interval, conflicting information about the identity of the food item was shown after accurate information was provided. The chimpanzee's performance remained high across conditions. However,

error patterns in performance suggest that nonhuman primate memory is also vulnerable to interference effects from post-event experiences.
Email: Brielle James, bjames12@gsu.edu

12:00-1:30 PM (2010)

Working Memory Span for Nonhuman Primates? Of Corsi! WILL WHITHAM, J. ANTONIO SALAMANCA, and DAVID A. WASHBURN, *Georgia State University* (Sponsored by David Washburn) – Corsi block-tapping tests of nonverbal working memory (Corsi, 1972) require participants to recreate a sequence of block activations following a short retention interval. We developed a new recognition-memory Corsi task for use with joystick-trained nonhuman primates. Rhesus macaques and capuchin monkeys watched an array of colored boxes appear on a computer screen, one box at a time. After a retention interval of 600 ms, the monkeys were presented with 5 complete arrays - the correct synthesis of all presented boxes, and four other syntheses that were correct except for one randomly-colored box. Some monkeys demonstrated facility with this task up to arrays that were 3, 4, and 5 boxes in length, and their performances on this task were compared with previous indices of their memory abilities to understand this novel exploration of nonverbal working memory span-like responding by primates.
Email: Will Whitham, will.t.whitham@gmail.com

12:00-1:30 PM (2011)

Pigeons (Columba livia) Perceive Different Directions Than Humans From Hierarchically Structured Motion. YUYA HATAJI, HIKA KUROSHIMA, and KAZUO FUJITA, *Kyoto University* (Sponsored by Kazuo Fujita) – Many non-human animals have been shown to discriminate various types of visual motion. To understand the underlying processes they use, we tested how pigeons perceive hierarchically structured motion stimuli. Pigeons were presented random-dot motions (100% coherence) and response dots surrounding the stimulus. Pigeons were trained to peck to the response dots positioned in the same direction as the motion direction. In probe trials, a drifting grating on an ellipse window (Barber pole stimulus, Experiment 1) or two drifting gratings of different orientations (Plaid stimulus, Experiment 2) were presented. Results revealed that the pigeons responded based on luminance-defined motion direction (first order motion). Reponses for the Barber pole stimulus were based on grating orientation regardless of ellipse angle. Responses for the Plaid stimulus were based on the vector sum of two gratings. This is in contrast to the human case. The motion direction we perceive from these stimuli is according to 2-dimensional pattern motion. These results suggest a diversity in visual motion processing across vertebrate clades.
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12:00-1:30 PM (2012)

Exploring the Effects of Human-Animal Interaction on Cognition. ELISE R. THAYER and JEFFREY R. STEVENS, *University of Nebraska, Lincoln* (Sponsored by Jeffrey Stevens) – Therapy dogs have become standard fixtures on school campuses from elementary schools to universities. Though research has demonstrated that interacting with pet or therapy dogs can induce physiologically therapeutic effects on humans, we do not have evidence that interacting with dogs improves cognition. In this study, we aim to address this gap, exploring whether interacting with a dog can restore depleted cognitive resources. To address this question, we compared results from a battery of cognitive tests (e.g., continuous performance, digit span, verbal working memory) in participants either experiencing animal interaction or sitting quietly following a stressful arithmetic task. No performance differences emerged between groups across measures. Our findings call for a more robust investigation into the cognitive benefits of animal interaction, as well as deeper consideration into the theoretical underpinnings of this line of research.
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12:00-1:30 PM (2013)

Configural Cues in Language: Lessons From Animal Learning Models. GEOFF HOLLIS, *University of Alberta* – Baayen, Shaoul, Wilits, and Ramscar (2016) have recently demonstrated that infants' patterns of attention in statistical learning paradigms that are thought to index word segmentation (Saffran, Aslin, & Newport, 1996) can be accounted for by a simple model of animal learning (Rescorla & Wagner, 1972). However, when their methodology is applied to real-world corpora, it performs poorly at identifying the boundaries between words. This is because their methodology discounts the importance of configural cues in learning (the joint presence of two or more cues can itself act as an independent cue). We demonstrate that the model employed by Baayen et al. (2016) can be adapted to autonomously learn which configural cues are necessary to successfully anticipate future content in a language stream. When applied to a corpus of real-world language, the learned configural cues have clear resemblance to words, other morphemes, and common expressions, despite the model not being given information that such things exist. We argue that animal learning models provide useful insight into what words are: they are configural cues that help us successfully discriminate events that will occur in the near-future.
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AUTOMATIC PROCESSING

12:00-1:30 PM (2014)

Selection History: A Third Source of Bias in Attentional Control? KATELYN WILLS and SUSAN M. RAVIZZA, *Michigan State University* – Current models of attentional selection suggest that attention can be biased toward information based on top-down or goal-driven factors, and bottom-up or stimulus-driven factors. However, investigators have recently suggested a third source, known as selection history, to bias attention toward frequently selected features. Here, I present experiments to investigate this mechanism. Participants performed a search task during which the target could be presented in two possible colors. During a training phase, targets were presented more often in one color than the other, thus encouraging participants to prioritize the high probability color. In a subsequent test phase, the target

appeared equally in both colors to examine whether this bias would persist when it was no longer beneficial. The results of these experiments suggest that selection history might not bias attention automatically, but might depend on the difficulty of the task.
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12:00-1:30 PM (2015)

Solution Priming From To-Be-Ignored Sound: Implications for the Processing of Background Speech and the Processes Underpinning Insight and Analysis-Based Problem Solving. JOHN EVERETT MARSH, *University of Central Lancashire*, JAN P. RÖER, *Private Universität Witten/Herdecke gGmbH*, EMMA THREADGOLD, MELISSA ESME BARKER, and LINDEN J. BALL, *University of Central Lancashire* – We investigated whether solution priming can occur for problems whose solution words are presented within sequences of to-be-ignored distracters. Thus, solution words were either embedded within streams of changing distracters (e.g., b q, cheese, v l) or repeated distracters (e.g., g, g, cheese, g, g) while participants performed a serial recall task. Subsequently, participants undertook an "unrelated" norming study wherein they attempted solution of either insight- or analysis-based problems. As expected, sequences in which solution words were embedded impaired serial recall performance more than control sequences without solution words and changing-state sequences produced more disruption than steady-state sequences. For problem solving, insight and analysis tasks for which solution words were previously presented as distracters were solved with a higher probability than problems from a non-presented set. However, this priming effect obtained only when solution words were embedded within streams of changing distracters. Implications of these results for the processing of unattended sound and the processes underpinning insight- and analysis-based problem solving are discussed.
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12:00-1:30 PM (2016)

Using Temporal Order Judgments and Colour Perception to Dissociate Inhibitory Cueing Effects. RALPH S. REDDEN, AUSTIN J. HURST, and RAYMOND M. KLEIN, *Dalhousie University* (Sponsored by Ray Klein) – Early work on inhibition of return (IOR) using temporal order judgments (TOJ) showed no effect on arrival time judgments, suggesting IOR is acting at a post-perceptual information processing stage. Recent work, however, suggests that there are two forms of IOR; an input form affecting the quality of inputs and an output form affecting responding. We tested this theory in a TOJ task, where subjects were required to either make a prosaccade (output form) or antisaccade (input form) after the onset a spatially uninformative peripheral cue, and subsequently execute a TOJ or speeded colour identification response. Both groups showed inhibited RT for cued colour probes. We saw dissociations on colour identification and TOJ performance depending on which form of IOR was generated. These findings provide converging evidence that there are two forms of IOR: an input effect operating on a saliency map, and an output effect operating on a priority map.
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12:00-1:30 PM (2017)

Emotional-Induced Attentional Bias Does Not Modulate Interference Effects in the Simon Task. JESSICA HINKSON and MEI-CHING LIEN, *Oregon State University*, ROBERT W. PROCTOR, *Purdue University* – Schlaghecken and colleagues (2017) found smaller Simon effects for sad than happy faces. This reduction was also observed for nonvalenced objects requiring the same response as sad faces. We examined whether the reduction of the Simon effect is location- or object-based. In Experiments 1 and 2, participants pressed a left/right key in response to a happy/sad schematic face or a left-/right-pointing arrow. These stimuli appeared on the left/right side of fixation, with location being irrelevant. Faces and arrows were presented in different blocks in Experiment 1 and intermixed within blocks in Experiment 2. Consistent with Schlaghecken et al.'s results, we found smaller Simon effects for sad than happy faces. However, the Simon effect for arrows was not modulated by the emotional valence of faces. A similar finding was observed with pointing hands in Experiment 3. Our results imply that attentional bias is associated with specific objects (e.g., faces) not locations.
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12:00-1:30 PM (2018)

Eyes, Faces, and Attentional Shifts: A Test of Cue-Target Spatial Conflict Hypothesis. TAKATO OYAMA and MATIA OKUBO, *Senshu University* (Sponsored by Matia Okubo) – Green et al. (2013) rapidly presented eye regions as gaze cues and found the cueing effects were limited when a cue overlapped in time with a target. Based on this result they proposed the cue-target spatial conflict account of the gaze cueing effect. We used counterpredictive gaze cues to investigate whether the gaze cueing effect reflects cue-target spatial conflict or attentional shifts. As majority of studies presented the entire face as the gaze cues, we hypothesized that the entire face cues produce attentional shifts while the eye-region cues do not at least for short cue durations. To test this hypothesis, we rapidly presented the entire-face cues and the eye-region cues in the gaze cueing paradigm. The counterpredictive eye-region cues deteriorated the target detection at the gazed-at location while no effect was found for the entire-face cues. These results support the attentional shift account of the gaze cueing effect.
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12:00-1:30 PM (2019)

Semantic Priming for Scenes During the Attentional Blink Depends on Awareness. ALYSSA LOMPADO, OLIVIA STIBOLT, and JAMES E. HOFFMAN, *University of Delaware* (Sponsored by James Hoffman) – During the attentional blink (AB), participants are often unaware of the second of two sequentially presented words. Several studies, however, showed that "blinked" words are still semantically processed. These results provided important support for the two-stage

model's claim that all visual objects (attended and unattended) are processed to a deep semantic level, and that the AB is due to capacity limitations in late stages responsible for working memory consolidation and awareness. Although the two-stage model was thought to apply to visual stimuli in general, very few AB studies have used nonverbal stimuli, and none have examined semantic processing using the most common stimulus of all, the visual scene. The present study used the N400 component of the ERP to examine the effect of the AB on semantic priming between scenes. Contrary to predictions of the two-stage model, we found no evidence of semantic priming when participants were unaware of the prime pictures. For scenes, awareness and semantic processing appear to be closely linked.
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12:00-1:30 PM (2020)

Contextual Similarity Modulates Auditory Negative Priming: Evidence of Prime Response Retrieval Processes. SUSANNE MAYR and MALTE MÖLLER, *University of Passau*, AXEL BUCHNER, *Heinrich Heine University Düsseldorf* – Negative priming is caused by multiple processes, episodic retrieval of inappropriate prime response information is one of them. The similarity between learning and test context has been shown to improve memory retrieval. Consequently, the similarity between prime and probe context should affect the size of the negative priming effect which has been shown for the visual modality. We showed in two auditory experiments that negative priming was larger when the context repeated than when it changed between prime and probe. Most interestingly, the modulation by context could be exclusively attributed to an increase in erroneous probe responses with the former prime response in ignored repetition trials with a context repetition. However, no increase in prime response retrieval errors was found when only the context repeated but not the prime distractor. The results suggest that context is integrated together with prime distractor and response information into an event file. Retrieval of this event file can be activated when the prime distractor repeats, whereas a sole context repetition does not function as an effective retrieval cue. This implies that event files can be more complex than commonly assumed.
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12:00-1:30 PM (2021)

Event File Integration: The Influence of Intervening Events on Stimulus/Response Repetition Effects. LISA LORENTZ and BRUCE MILLIKEN, *McMaster University* (Sponsored by Bruce Milliken) – Repetition priming is one of the most well established effects in cognition. However, Spadaro, He, and Milliken (2012) recently demonstrated that repetition priming in a two-alternative forced choice task can be reversed simply by having participants respond to an intervening event between the two stimulus presentations. They proposed that intervening events disrupt an episodic integration process, following the event file logic proposed by Hommel (1998; 2004). A corollary of this proposal is that an intervening event in the conventional event file task ought to disrupt any effects that rely on this integration process—namely, complete match benefits and partial match costs. Across two experiments we found evidence that intervening events do not influence episodic integration; rather, they appear to selectively alter the influence of response repetitions across presentations of consecutive stimuli. These results call for a revised interpretation of the repetition priming account forwarded by Spadaro et al. (2012).
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12:00-1:30 PM (2022)

Comparing the Cognitive Impact of Short-Term Literacy Training in Adults and Children. ALEXANDRA REYES, ALEJANDRA SANTOS, NAYELI RIVAS, and ANGELIQUE M. BLACKBURN, *Texas A&M International University* (Sponsored by Anna Cieslicka) – Literacy programs have been shown to affect not only literacy and fluency, but also aspects of cognition related to reading automaticity, attention, and visuospatial processing. To test the cognitive impact of short-term literacy programs, response times during computer assessments of reading automaticity (the Stroop and Illiterate Stroop task) and visuospatial processing (Figure Matching) were first tested before and after a 3-5 day Spanish literacy program with adult males being detained at the US-Mexican border. To test whether potential benefits of a short-term program generalize across languages and ages, we replicated the study in an Indian orphanage. Understanding how literacy impacts cognition will aid in targeting literacy programs, specifically short-term programs in low resource settings like those of the detainee center and the orphanage.
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12:00-1:30 PM (2023)

Retrospective Proceduralization of Previously Instructed Task Sets. CARLOS GONZÁLEZ-GARCÍA, SILVIA FORMICA, BAPTIST LIEFOOGHE, and MARCEL BRASS, *Ghent University* – Unlike other species, humans share the outstanding ability to create new behaviors from instructions. Recent research has revealed that this ability rests partially in a rapid transformation of the declarative content of the instruction into a reflexive-like, procedural format. However, the neurocognitive mechanisms underlying this transformation are still unknown. In a series of experiments, we tested the hypothesis that internal attention selectively prioritizes relevant declarative content, converting it into an action-oriented representation. To do so, we devised a paradigm in which participants had to encode 4 stimulus-response mappings at the beginning of each trial. Immediately after, a retro-cue would reveal which 2 of the 4 mappings would need to be implemented. Based on previous studies, we expected this retrocue to elicit internal attention, which, in turn, would transform the declarative information of the selected mappings into procedural representations. The results obtained support this hypothesis and suggest that an interplay of memory and attentional mechanisms underlies the rapid implementation of novel task sets.
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12:00-1:30 PM (2024)

The Accessory Stimulus Effect Is Abolished by a Prepulse Preceding an Intense Startle-Eliciting Acoustic Stimulus. TERRY D. BLUMENTHAL, APARNA SIVAKUMAR, and LAWRENCE B. SNIPES, *Wake Forest University* – The Accessory Stimulus Effect (ASE) involves a speeding of reaction time to a target stimulus when that target is accompanied by an intense stimulus in another modality. An intense acoustic stimulus can elicit a startle response, and this intense stimulus speeds responding to a concurrent visual target. A weak acoustic pulse (a prepulse) presented shortly before the startle stimulus inhibits the startle response, referred to as Prepulse Inhibition (PPI) of startle. In the current study, startle eyeblink responses were measured while participants (N=41) completed a two-color Stroop task (pressing a red or blue button when presented with RED or BLUE in red or blue font on a computer screen). A 100 dB startle stimulus resulted in speeded reaction time (ASE) on the visual Stroop task, and this ASE was abolished by the presentation of a 70 dB acoustic prepulse 120 ms before startle stimulus onset. This suggests that the prepulse attenuated the processing of the startle stimulus, weakening the ASE. This finding has implications for processing task-relevant stimuli in the presence of cross-modality distracting and facilitating stimuli.
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12:00-1:30 PM (2025)

Visual Salience, Not Graspable Part of a Pictured Eating Utensil Grabs Attention. AIPING XIONG, ROBERT W. PROCTOR, and HOWARD N. ZELAZNIK, *Purdue University* – Three experiments tested the hypothesis that object pictures activate affordances for grasping with the corresponding hand when responding with keypresses. Participants made left-right responses to the handle or functional end (tip) of eating utensils using compatible and incompatible mappings. In Experiment 1, stimuli were images of spoons with the side to which the handle and tip pointed varying randomly. A benefit for compatible mapping was evident when the tip was relevant and a small cost of compatible mapping when the handle was relevant. In Experiment 2, the stimuli were chopsticks with pointed tip ends and squared handle ends. Participants showed similar benefits of the compatible mapping for both ends. In Experiment 3, the handles of the chopsticks were colored red, and participants showed a benefit of the compatible mapping when the handles but not tips were relevant. These results indicate that visual salience is the factor driving these compatibility effects.
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12:00-1:30 PM (2026)

An Electrophysiological Study of the "Weapon Focus" Effect. ANNABELL K. SCHULZ and MEI-CHING LIEN, *Oregon State University*, ERIC RUTHRUFF, *University of New Mexico* (Sponsored by Mei Lien) – Studies of eyewitness testimony have consistently found a weapon focus effect: witnesses remember less about the perpetrator's physical appearance when a weapon is involved in a crime scene. Some have argued that the "unusualness" of weapons within a context draws eyewitnesses' attention away from the perpetrator (the unusual object hypothesis), whereas others have argued that weapons capture eyewitnesses' attention automatically regardless of context because they are potentially dangerous objects (the automatic capture hypothesis). We tested these hypotheses using event-related potential measures of where people are attending: the N2pc. Participants searched the target display for a pre-specified face category (a chef vs. a cop) and indicated its gender. This target display was always preceded by a cue display containing a gun and a whisk. An N2pc was elicited by the gun regardless of target context, suggesting that weapons capture attention because they are potentially dangerous, not because they are unusual.
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12:00-1:30 PM (2027)

Negative Transfer Is Not Moderated by Retrieval in a Forward Testing Paradigm. MONIQUE CARVALHO and HARVEY MARMUREK, *University of Guelph* (Sponsored by Harvey Marmurek) – Tulving and Watkins (1974), demonstrated that learning of a second list was facilitated by an immediate test of a prior list compared to no testing of the first list. They proposed that explicit retrieval of the first list insulated the second list from negative transfer. However, they did not include a direct test of their hypothesis. The purpose of the present study was to examine whether both explicit and implicit retrieval would moderate negative transfer relative to a pure study condition in a forward testing paradigm. Participants first studied a list of 20 common word-pairs followed by a picture. They then completed either a explicit retrieval, implicit retrieval, or restudy task. Participants learned a second list of 20 word-pairs 10 of which were composed of stimuli from the first list paired with new responses (A-D) while 10 pairs were composed of new stimuli and responses (C-D). List two recall was higher following retrieval tests of the first list then for the restudy condition (forward testing effect). Recall was higher for C-D items than A-D items (negative transfer). Negative transfer was independent of first list testing.
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12:00-1:30 PM (2028)

Categorical Boundaries as a Facilitator and Attenuator of Attentional Control Transfer. ABHISHEK DEY, JACKSON S. COLVETT, JANELLI RODRIGUEZ, NATASHA L. FRONTERA, and JULIE M. BUGG, *Washington University in St. Louis* (Sponsored by Julie Bugg) – Previous research on context-specific proportion congruence effects has shown that attentional control settings can be bound to different contexts. For example, high control settings are bound to locations previously associated with high conflict and vice versa. However, the specific signal underlying this binding is unknown. To address this question, we leveraged the transfer effect, whereby previously learned control settings are adopted in novel unbiased locations. Experiment 1 examined whether categorical boundaries or spatial proximity served as the signal for location-based control using an illustrated map. Transfer was indeed facilitated by categorical boundaries despite spatial proximity signaling otherwise. Experiment 2 further examined the role of categorical boundaries as a signal for control using

a realistic map. Boundaries within the map attenuated transfer to novel locations outside those boundaries. Together, these experiments indicate that salient categorical boundaries are a signal used to bind attentional control settings to locations in space.
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12:00-1:30 PM (2029)

Assessing the Value of Exploration in Decision Making Under Uncertainty. DONG-YU DAVID YANG and DARRELL A. WORTHY, *Texas A&M University* (Sponsored by Darrell Worthy) – Exploration is valuable during decision-making, but its exact value is unclear. Here participants performed a four-choice binary outcome decision-making task where each option had a set probability, p, of giving a gain (+100), and a 1-p probability of giving a loss (-100). Critically, participants could choose to explore on each trial and would see the outcome for all options, but receive a set payoff that varied by group (either -5, 0, or +5). Thus, for a payoff of -5, 0, or 5 participants could see the outcomes for all four options. Participants in the -5 group explored less than participants in the 0 and +5 groups. We also found positive associations between amount of exploration and performance in the +5 and 0 conditions, but no association in the -5 condition. Thus, the small loss of five points led to less exploration, and greater exploration was advantageous for the other groups.
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ATTENTION CAPTURE

12:00-1:30 PM (2030)

The Role of Sequential Dependencies in Contingent Attentional Capture. CHARLES L. FOLK and EVA-MARIE ROCKS, *Villanova University*, ROGER W. REMINGTON, *University of Queensland* (Presented by Eva-Marie Rocks) – Huffman, et al. (2017) interleaved a partial report memory task within a spatial cueing RT task and found large memory cuing effects from irrelevant abrupt onsets compared to relatively modest RT cuing effects. They suggest that the apparent modulation of attentional capture by top-down set in spatial cuing paradigms may actually reflect intra-trial sequential dependencies: attention is captured by an irrelevant non-matching cue but its RT effects are masked by feature differences. Here we use their interleaved method to examine memory and RT cueing effects under more stringent feature-search conditions. Matching cues produced highly significant RT cuing effects whereas non-matching cues produced no cuing effects. Critically, we found no evidence of cuing effects for matching or non-matching cues in the memory task. These results suggest that sequential dependencies play little to no role in contingent capture.
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12:00-1:30 PM (2031)

Capture by Abrupt Onset Is a Top-Down Phenomenon. YEHOSHUA TSAL, *Tel Aviv University*, RICARDO MAX, *New York University* – Capture by abrupt onsets is defined as the epitome of bottom-up processing. Here we show that the expectation for a task-irrelevant abrupt onset at a given location results in processing prioritization of that location even without an actual abrupt onset. Critically, such an effect cannot be defined as bottom-up because no capturing stimulus is presented. We propose that the phenomena described as bottom-up capture of attention by exogenous stimuli derives from evolution-based all-pervasive "mental programs" that direct the attentional system to seek out dynamic discontinuities (even if detrimental to task performance) which are most relevant in signaling significant changes in the environment. Thus, we propose that the competition for attentional priority is not between top-down and bottom-up processes, but rather between voluntary top-down patterns dedicated to achieve best task performance and involuntary top-down patterns reflecting phylogenetic or ontogenetic history that may be inconsistent with the current goals of the observer.
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12:00-1:30 PM (2032)

Locating the Focus of Attention in Contingent Capture From Probe Identification. BRYAN R. BURNHAM, *The University of Scranton* – A debate has been the extent to which attentional capture by salient objects is moderated by top-down templates for target features. Folk, Remington and Johnston's (1992) contingent orienting hypothesis predicts only salient items that are relevant to a target template (e.g., red, onset) will capture attention, and studies have generally supported this hypothesis. To account for such findings, proponents of stimulus-driven capture have proposed alternative explanations (e.g., rapid disengagement, attentional dwelling) for evidence showing target-relevant cues capture attention, but target-irrelevant cued do not. This study mixed a probe identification task within a spatial cuing task to examine where attention was focused immediately after the onset of cues that were relevant or irrelevant to an observer's target template. Results showed a pattern of contingent capture in response times. More importantly, this pattern was observed for probe identifications: probes were identified more when they appeared in a location coinciding with a target-relevant cue, but not a target-irrelevant cue, supporting the contingent orienting hypothesis.
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12:00-1:30 PM (2033)

Examining the Attentional Prioritization of Trains Versus Faces. NICHOLE E. SCHEERER, TROY Q. BOUCHER, ELINA BIRMINGHAM, and GRACE IAROCCI, *Simon Fraser University* – To manage the vast amount of information bombarding our senses, our attentional system must prioritize particular inputs. In the visual domain, faces are particularly captivating, and are thought to have a 'special status' in the attentional system. Recent research suggests that similar attentional biases may exist for other classes of objects (e.g. birds), providing support for the role of exposure in attention prioritization. In this experiment, participants performed a visual search task while their eye-movements were tracked to determine whether other classes of objects (i.e. trains) can capture attention similarly to what has been reported for faces. Both reaction time and eye-tracking data indicate that target

identification was delayed when train distractors were present relative to face and neutral distractors. These results indicate that train distractors captured attention just as much as, if not more than, face distractors.
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12:00-1:30 PM (2034)

A New Method to Measure Attentional Capture: EEG Decoding of Visuospatial Attention. BO YOUN PARK, YE EUN KIM, and YANG SEOK CHO, *Korea University* (Sponsored by Yang Seok Cho) – The purpose of the present study was to find a way to discriminate allocations of visual attention to four different locations (up, down, left, and right) based on neurophysiological data. To examine attentional capture in both behavioral and neurophysiological ways, a spatial cuing paradigm was used while recording EEG signals. In the task, one of three different types of non-informative cues was presented at one of the four locations: target-colored, distractor-colored, and neutral-colored cues. A support vector machine (SVM) classifier was trained to predict the direction of attentional orienting caused by each type of cue. Consistent with other studies showing contingent attentional capture, only the target cue showed a significant cue validity effect in behavioral measurements and significant N2pc components in neurophysiological measurements. In addition, the classifier demonstrated superior prediction performance for the locations of the target-colored cue compared to that of other types of cue. The findings illustrated the applicability of EEG decoding algorithm to measuring attentional capture in more complex displays and tracking attentional allocation on each trial.
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12:00-1:30 PM (2035)

Target Upweighting vs. Distractor Suppression: What Is the Underlying Mechanism of the Singleton Suppression Effect? SEAH CHANG and HOWARD E. EGETH, *Johns Hopkins University* (Sponsored by Howard Egeth) – Although the signal suppression hypothesis (Sawaki & Luck, 2010) has been supported by recent empirical findings (e.g., Gaspelin, Leonard, & Luck, 2015), one caveat to the conclusion was that the previous findings cannot distinguish distractor-feature suppression from target-feature upweighting. The current study distinguished between the two mechanisms by using a new capture-probe paradigm in which search and probe trials were randomly presented. On search trials (70%), the singleton suppression effect was replicated; there was a significant benefit of having a singleton distractor. On probe trials (30%), we found clear evidence that target-feature upweighting and distractor-feature suppression mechanisms contribute to attentional guidance in separate and independent ways. This study showed that people can learn target and distractor features on search trials, and selectively use the information to guide attention in a heterogeneously colored probe display.
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12:00-1:30 PM (2036)

Saccade Latency as an Index of Covert Capture by Episodic Memory. ALLISON E. NICKEL, GRETA N. MINOR, and DEBORAH E. HANNULA, *University of Wisconsin, Milwaukee* (Sponsored by Deborah Hannula) – Previously, we reported overt (oculomotor) attention capture by encoded objects, especially when retrieval cues preceded search displays. Furthermore, saccades to targets were slower if search displays contained encoded distractors and retrieval cues were presented. Here, we examined whether slow saccade deployment is due to presentation of visual information prior to search. After encoding scene-object pairs, participants completed a visual search task and attempted to make single saccades to uniquely shaped targets. Search displays were either preceded by scene cues, scrambled scenes, or nothing at all, and encoded objects sometimes served as task-irrelevant distractors. Oculomotor capture effects were replicated, and saccade deployment to targets was slower for scene cue trials than for scrambled scene trials, though costs were evident for scrambled scenes as well. Future studies will examine whether saccade latency to targets is slow because retrieval processes are initiated by scene cues or because encoded associates capture attention covertly.
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12:00-1:30 PM (2037)

Voluntary vs. Involuntary Attention: How Capture Modulates Depth of Processing. JOSHUA MAXWELL and ERIC RUTHRUFF, *The University of New Mexico*, NICHOLAS GASPELIN, *Binghamton University, State University of New York* (Sponsored by Eric Ruthruff) – There is considerable evidence that salient stimuli, such as abrupt onsets, can involuntarily capture spatial attention. However, it is unclear how capture modulates subsequent stimulus processing. The traditional assumption is that involuntary capture works much like voluntary allocation: shifting processing resources to the stimulus, facilitating perception, identification, and response selection. To test this assumption, we examined whether salient irrelevant cues can prime the identity and/or response to the target. Participants searched for a number word in a specific color and indicated whether it was greater or less than five. Remarkably, although an irrelevant abruptly onsetting digit cue produced a clear spatial capture effect, it failed to prime the identity or response category of the target (e.g., the cue "3" failed to prime the target "three"). Priming was modest even for contingent capture. Meanwhile, priming was very large when these cues predicted target location, encouraging voluntary attention. Our findings question the widespread implicit assumption that involuntary capture and voluntary shifts are simply two different means of shifting the same underlying attentional resource.
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12:00-1:30 PM (2038)

Distractor Rejection via Location-Based and Feature-Based Statistical Regularities. BRAD T. STILWELL, BRETT BAHLE, and SHAUN P. VECERA, *The University of Iowa* (Sponsored by Shaun Vecera) – How do individuals learn to ignore salient, distracting stimuli during visual search? Salient distractors may

automatically capture attention because they are perceptually salient (Theeuwes, 1992). However, visual attentional control settings are adjusted through experience (Vecera, et al., 2014). If salient distractors appear in probable locations, individuals extract those statistical regularities and use them to configure attention: Attentional capture is reduced when salient distractors appear in more probable than improbable locations (Wang & Theeuwes, 2018). Does the visual system also extract feature regularities and use them to attenuate the effects of salient distractors on attention? Previous findings are equivocal in answering this question. In three experiments, we observed increased attentional capture when the distractor color changed and demonstrated reduced capture for high probability colors over low probability colors, all despite strong location-based distractor rejection. We conclude that both a distractor's features and its location contribute to effective distractor rejection.
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12:00-1:30 PM (2039)

Non-Salient Emotional Distractors Still Capture Attention. MINWOO KIM and JAMES E. HOFFMAN, *University of Delaware* (Sponsored by James E. Hoffman) – It has been claimed that task-irrelevant emotional distractors automatically capture attention. If emotional capture is truly automatic, it should occur even when the emotional distractor is not physically salient. We tested this claim by examining detection latency for target gaps appearing in objects moving in front of a task-irrelevant, RSVP stream of pictures. Each stream consisted of an emotional picture embedded in filler pictures that were physically similar or dissimilar to the distractor picture. Distractors in dissimilar backgrounds captured attention as reflected in the N2 component of the ERP and an increase in RT to the gap of approximately 40ms. In the similar background condition, the emotional distractor once again elicited an N2 but the RT slowing was reduced to 10ms. These results show that most of the emotional capture effect is due to physical salience but some purely emotional capture may remain.
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12:00-1:30 PM (2040)

Value-Driven Attentional Capture Is Modulated by Approach and Avoidance Movements. JIHYUN SUH and RICHARD A. ABRAMS, *Washington University in St. Louis* – Recent studies have shown that visual features that were previously associated with a high monetary reward attract visual attention, a finding referred to as value-driven attentional capture. The present study examined how approach and avoidance movements made to achieve a reward might modulate value-driven attentional capture. Experiments 1 and 2 revealed that a color that was previously associated with a high-reward was more likely to capture attention than a color that was previously associated with a low-reward, but only when the reward had been achieved by an approaching movement. In contrast, when the reward was previously achieved by an avoiding movement, a color that was associated with a low-reward was more likely to capture attention than a color that was associated with a high-reward. Experiment 3 showed that approaching and avoiding movements do not modulate attentional capture on their own, in the absence of any reward. Overall, the present study revealed for the first time that visual features that were previously associated with congruent action and reward pairs prioritize visual selection. These novel findings highlight the fact that the history of action and reward interactively modulates visual selection.
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ATTENTION: INDIVIDUAL DIFFERENCES AND DIVIDED ATTENTION

12:00-1:30 PM (2041)

Mental Imagery – Eyes Open and Shut. MICHAEL G. ALLEN and DAVID KIRSH, *University of California, San Diego* (Sponsored by Jeff Elman) – Studies of mental imagery often ask participants to attend to a visual scene at the same time as their mental imagery. Despite the common intuition that imagery and perception interfere with each other (known as the Perky Effect), this concurrent attention has not been commented in in these studies, and results are not distinguished from those found in studies of imagery with eyes closed and in which no such interference is possible. Nevertheless, significantly different results have been found between eyes open and shut mental imagery. We show here that these results are due to a concurrent attention to visual input in the eyes open case, and discuss a framework for understanding how attention is integrated across perception and imagery in these cases.
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12:00-1:30 PM (2042)

Targeting Multitasking Performance With Brain Stimulation. THOMAS MCWILLIAMS, *Tufts University*, TAD BRUNYÉ and ERIKA HUSSEY, *US Army NSRDEC*, NATHAN WARD, *Tufts University* (Presented by Nathan Ward) – Multitasking is an increasingly common cognitive activity, yet it often leads to performance declines—transcranial direct current stimulation (tDCS) offers a potential solution to mitigate errors. However, results remain mixed on the efficacy of tDCS to alter higher-level cognition, given the complex neural substrates supporting such tasks. Thus, we implemented an approach that used functional neuroimaging results on the same experimental task collected in one sample to inform tDCS montages to be administered in a second sample completing the same task. The task parametrically manipulated two sub-processes of multitasking: dual-tasking and task-switching. We administered High Definition (HD-)tDCS to target regions supporting each process separately, both together, and a sham control to 40 participants across four sessions in a within-subjects design. Although we observed traditional multitasking costs, we found no significant changes in performance as a result of stimulation, suggesting a need for more individualized tDCS montages to impact higher-level cognition.
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12:00-1:30 PM (2043)

Effect of Presence of Cell Phones on Attention During a Stroop Task. ADAM BROWN and ALTHEA KAMINSKE, *St. Bonaventure University* – Resent research has found that

the presence of cell phones impairs attention during learning (Mendoza et al., 2018; Thornton et al., 2014). The present experiment sought to better understand this phenomena by measuring the effects of cell phone presence, cell phone notifications, and phone ownership (participant's or experimenter's) on attention. Attention was measured using a Stroop task in a within-subjects design wherein participants (n = 113) completed five experimental conditions. All three factors—cell phone presence, cell phone notifications, and phone ownership—negatively affected attention during congruent and incongruent trials. The effects of these factors were different depending on whether the trials were congruent or incongruent. These results indicate that attentional load also plays a role in the distractibility of cell phones—the distractibility of cell phones in real world situations such as studying, classroom settings, or driving depends on the difficulty of the task being completed.
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12:00-1:30 PM (2044)

Look Here! The Impact of Attention and Camera Perspective on Memory and Judgments of Police Body-Worn Camera Footage. KRISTYN A. JONES, *John Jay College, City University of New York Graduate Center*, WILLIAM E. CROZIER and DERYN STRANGE, *John Jay College of Criminal Justice* (Presented by Deryn Strange) – Body-worn camera (BWC) footage is a prominent policing technology designed in part to increase evidentiary value and legitimatize the justice system. Yet, research suggests people have difficulty being objective observers of police footage, especially when it is ambiguous—a finding that might limit the usefulness of BWC footage. Here, we tested the effect of a misleading police report (the civilian was carrying a knife—though no knife was shown in the video), the perspective by which people watched the footage (BWC or surveillance), and instructions to attend to specific actors (the civilian, the officer, both, no instruction), and their influence on people's judgments of the encounter. We discuss our results in terms of the effect that attention has on memory for the event and on critical judgments, such as appropriateness of use of force and subsequent punishment decisions. Moreover, we discuss how attention interacts with people's social identification—in this case, the extent to which people identify and share similar values with police officers. Our results have important implications for the role of BWC footage in the legal system.
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12:00-1:30 PM (2045)

How Irrelevant Speech Affects Reading: The Role of Word Predictability. HAN ZHANG, KEVIN MILLER, and KAI CORTINA, *University of Michigan, Ann Arbor* (Sponsored by Kevin Miller) – Efficient reading involves predictions about upcoming text. How is this affected when reading is exposed to distractions such as irrelevant speech? We explored this question using eye-tracking and the PROVO corpus. The PROVO corpus includes natural passages with predictability measures of orthographic, syntactic and semantic information for each word. Irrelevant speech increased the effect of orthographic and semantic predictability for content words. Specifically, these effects (1) were driven by less-predictable words, which required notably more looking time in the irrelevant speech condition and (2) did not appear during first-pass reading and emerged only when re-reading was included, indicating a late effect of irrelevant speech. We propose that skilled readers can generate predictions about the upcoming text during first-pass reading even under irrelevant speech, but irrelevant speech increases the likelihood that reading will breakdown, necessitating repair processes. This involves allocating additional processing time to words that fit poorly with the reader's initial predictions. We also compared these results to other cases in which reading is distracted, such as mindless reading.
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12:00-1:30 PM (2046)

Context Memory for Behaviorally Relevant Events. ADAM W. BROITMAN and KHENA M. SWALLOW, *Cornell University* (Sponsored by Khena Swallow) – Attention influences memory for events in unexpected ways: Increasing attention to an item that requires a response (e.g., a detection task target) boosts memory for concurrently presented background items. It is unclear whether this memory advantage is limited to item-specific information, or if it extends to include context memory. If targets boost memory for context, then they should increase the contribution of recollection, as well as familiarity, to subsequent recognition. In several experiments, participants pressed a button whenever a target-colored square appeared with a background face. The number of times each face was presented and whether participants memorized or ignored the faces were varied. To infer whether attending to targets facilitates context encoding we used the DPSD model to estimate the contributions of recollection and familiarity to subsequent face recognition. Results showed that attending to targets boosts both recollection and familiarity, enhancing memory for the event as a whole.
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12:00-1:30 PM (2047)

Attention Contagion in the Classroom. ALYSSA C. SMITH, NOAH D. FORRIN, ALEX C. HUYNH, DANIEL SMILEK, and COLIN M. MACLEOD, *University of Waterloo* – Everyday experience suggests that attentiveness—or inattentiveness—can spread from person to person. We will present evidence concerning the social transfer of attention ("attention contagion") between undergraduate students in the classroom. In an initial experiment, pairs of undergraduates watched a pre-recorded lecture video on the history of Rome. One student (the participant) was seated behind another student (a confederate) who was randomly assigned to exhibit either attentive (e.g., frequent note taking, leaning forward) or inattentive (e.g., infrequent note taking, slouching) behaviour. We hypothesized that participants viewing the lecture with attentive (vs. inattentive) confederates would (i) pay more attention to the lecture, (ii) take more lecture notes, and (iii) have better memory for lecture content. Preliminary results were consistent

with these predictions. A theory of attention contagion will be proposed that has implications in the classroom and in numerous other contexts.
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12:00-1:30 PM (2048)

Measuring the Vigilance Decrement Under Divided Attention. NATHANIEL FOSTER, JAMES MANTELL, and MOHAMMAD M. AZIMI VAHDAT, *St. Mary's College of Maryland* – The vigilance decrement occurs when performance decreases as time on task increases. Here we extend work by Thomson et al. (2015) to determine how the vigilance decrement is affected when attention is divided between visual and auditory tasks. Subjects watched 1176 stimuli move across a computer monitor at a rate of one per second and pressed a key whenever the target stimulus randomly appeared (8% of trials). We manipulated task load by instructing subjects to simultaneously respond to auditory stimuli by pressing another key or to do nothing in response to the auditory stimuli. We measured vigilance decrement by comparing visual target accuracy (A') and response time across six watch periods. The results revealed an increase in response time across the six watch periods. We also observed a main effect of task load on accuracy, with better target detection for the passive condition than the active condition.
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12:00-1:30 PM (2049)

Using Cursor Movements to Measure Attention. RICHARD SHIFFRIN, KIRAN KUMAR, and SAM HARDING, *Indiana University, Bloomington* – Subjects are instructed to move a cursor to targets (and preferably not to foils). Targets and foils appear and disappear at three spatial positions at irregular intervals but quite rapidly so that the cursor tends to move continuously with only occasional stops. The long-term goal is a data-rich and rapid assessment technique that can be used to diagnose individual and clinical deficits of attention. Here we validate the method with college age subjects. We assume that cursor movements toward a position indicates attention has been directed toward that position. A modified Hidden Markov Model (HMM) uses four aspects of cursor movement and a probability that attention will move from one time interval to the next to predict the movement of attention: Five minutes of data are used to estimate parameters for each subject and those parameters predict the attention trajectory for the remainder of the hour of testing. The predicted trajectory is analyzed to infer individually varying aspects of attention.
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12:00-1:30 PM (2050)

Individual Differences in Intentionality of Mind Wandering: Ability or Motivation? MATTHEW S. WELHAF, BRIDGET A. SMEEKENS, and MICHAEL J. KANE, *University of North Carolina at Greensboro* (Sponsored by Michael Kane) – Mind wandering is sometimes characterized as an unintentional attention failure. Although recent work suggests people sometimes entertain task-unrelated thoughts (TUTs) on purpose, attention-control ability may correlate more strongly with unintentional than intentional TUTs (Robison & Unsworth, 2017). Here we asked two main questions: (1) Does probing for intentionality impact TUT rates? (2) Do executive-attention (EA) ability and self-reported motivation differentially predict intentional and unintentional TUTs? Subjects (N≈400) competed EA and motivation measures prior to a go/no-go task with periodic thought probes that asked subjects to report whether they were on- or off-task and then, for half the subjects, to report their intentionality. Intentionality probes did not affect TUT rate or its correlation with EA. Further, EA and motivation correlated negatively with only intentional TUT rates, but positively with each other. We found students' attention ability and motivation to influence their rate of intentionally, but not unintentionally, mind-wandering in the lab.
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12:00-1:30 PM (2051)

Inferring Attentional Aspects of Visual Information Processing Through Mouse Trajectories. KIRAN N. KUMAR and RICHARD M. SHIFFRIN, *Indiana University, Bloomington* (Sponsored by Richard Shiffrin) – This research analyzes overt aspects of spatial attention using mouse-controlled movement to targets on a computer monitor. Analyzing mouse cursor trajectories has shown promise in the assessment of confidence during decision making (Dotan, Meyniel, & Dehaene, 2018). Here we are using aspects of the cursor movement to inform us about attentional processing and capacities. The long-term goal is to pioneer an accelerated assessment technique that can be used to diagnose individual and clinical deficits of attention. We designed experiments where, participants attempt to move a cursor toward three spatial positions at which targets appear rapidly but at irregular times. This task is a simplified version of (Kumar, Chandramouli, & Shiffrin, 2015) to analyze continuous dynamics of cursor movement. They have to inhibit mouse movement toward foils appearing at those positions. We assume that cursor movements toward a position indicates attention has been directed toward that position.
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12:00-1:30 PM (2052)

"Stop Thinking About Inhibition as a Psychometric Construct" Revisited: Speed-Accuracy Tradeoffs Have No Impact. ALODIE REY-MERMET, *Catholic University of Eichstätt-Ingolstadt*, HENRIK SINGMANN, *University of Zurich*, MIRIAM GADE, *Medical School Berlin*, KLAUS OBERAUER, *University of Zurich* – Inhibition – that is, the ability to suppress pre-potent responses and/or ignore irrelevant information – has been put forward as a psychometric construct. Whereas some studies obtained evidence for inhibition as a factor, other studies have questioned its construct validity. One reason for the difficulty of establishing a coherent factor of inhibition might be that inhibition is mainly assessed through reaction times (RTs), and different participants can have different speed-accuracy tradeoffs. Thus, when the focus is on RTs, the variance in accuracy is neglected. To overcome this, we re-analyzed 9 inhibition tasks from our previous study (Rey-Mermet, Gade, & Oberauer, 2017, Journal of Experimental Psychology: Learning, Memory, and Cognition) by estimating

the drift rates of a Wiener diffusion model. The drift rate reflects the speed of information accumulation in response selection, and its estimation integrates both RT and accuracy data. Even with drift rates as indicators of inhibition, we still obtained no evidence for common variance. Thus, the difficulty of establishing an inhibition factor does not arise from individual differences in speed-accuracy tradeoffs. These findings question inhibition as a psychometric construct.
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12:00-1:30 PM (2053)

Does a Limited Time Perspective Make Younger Adults Perform More Like Older Adults in an Emotion-Induced Blindness Task? BRIANA L. KENNEDY and MARA MATHER, *University of Southern California* – The "positivity effect" refers to the propensity for older adults to favor positive stimuli over negative stimuli. Last year, we presented evidence that the positivity effect can be observed even in early cognitive processing stages: in an emotion-induced blindness (EIB) task, older adults were more distracted from positive stimuli compared to negative stimuli, and to a greater extent than for younger adults. Socioemotional selective theory suggests that the age-related positivity effect results from age differences in time perspective. Indeed, inducing a more "limited" time perspective in younger adults shifts them to show a more positive memory bias (Barber et al., 2016). In the present study, we prompted younger adults to write with a "limited", "expansive", or "control" perspective before completing an EIB task. Participants showed the predicted interaction in EIB performance, such that those with a limited time perspective showed greater distraction from positive compared to negative images than those with an expansive time perspective. In addition, other time horizons (e.g., time of semester participants chose to participate) also influenced the results.
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12:00-1:30 PM (2054)

Effects of Anxiety on the Trial Sequence in Emotional Attention Tasks. HIDEYA KOSHINO, KATHLEEN A. O'DONNELL, and GIA M. MACIAS, *California State University, San Bernardino* – Attentional control theory claims anxiety consumes attentional resources; individuals with high anxiety show impairment in executive functions. Using prime-probe designs, the present study investigated effects of anxiety on trial sequence in the emotional flanker task with happy and sad faces, and Stroop task with emotional words. In the flanker task, congruency effects were smaller following incongruent trials than following congruent trials (Gratton effect) when prime and probe targets were both happy or both sad. RTs were longer for the sad than happy target, and the difference was reduced following the sad target when prime and probe trials were both congruent or both incongruent. In the Stroop task, the high anxiety group showed longer RTs for emotional words following both neutral and emotional primes, whereas low anxiety group showed longer RTs following emotional words than following neutral words. These results suggest individuals with high anxiety are more sensitive to emotional stimuli.
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12:00-1:30 PM (2055)

Under an Umbrella of Uncertainty: Extracting Mean and Variability Across Instances in Two Different Tasks. KIMBERLY S. SPAHR, CHRISTOPHER D. WICKENS, BENJAMIN A. CLEGG, JESSICA K. WITT, and C.A.P. SMITH, *Colorado State University* (Sponsored by Jessica Witt) – This project explored whether common cognitive abilities are evoked across different tasks in understanding means and variability. In a spatial task, participants experienced a set of trajectories, learning to predict likely endpoints through inferring the mean of the underlying distribution. Estimates of variability of the distribution were also obtained. A second numeric task comprised instances of random numbers, requiring estimation of mean and variability of number lists. The true mean and variability were used to derive measures of bias and precision in both tasks. Correlations between the two tasks revealed a strong common ability to estimate mean behavior, but only modest evidence of common variability estimation. Subsequent data showed no relationship between performance on the numeric and spatial tasks and verbal and spatial working memory capacity, suggesting working memory was not the source of common performance. Collectively, these results inform both theory and application of cognitive abilities.
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12:00-1:30 PM (2056)

Correspondence Between Preferred Modes of Processing and Strategies of Response Organization in Multitasking. JOVITA BRUENING and DIETRICH MANZEY, *Technische Universitaet Berlin* (Sponsored by Andrea Kiesel) – Recent investigation of individual differences in multitasking revealed evidence for individual preferences for modes of task processing (serial vs. overlapping) in a task-switching with preview (TSWP) paradigm and different strategies of response organization (blocking, switching, response grouping) in a free concurrent dual-tasking (FCDT) paradigm. However, this research was followed in separate lines by involving independent samples of participants. In the current study, we investigated whether the two levels of task organization were linked intra-individually. As individuals preferring an overlapping processing mode can generate time gains particularly at switch trials, we predict that they prefer a switching strategy of response organization. In contrast, individuals preferring a serial processing mode are expected to prefer a blocking strategy to reduce dual-task demands. These predictions were confirmed in an experiment based on n=72 participants. Moreover, multitasking efficiency was higher when the mode of task processing and strategy of response organization was compatible instead of incompatible.
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12:00-1:30 PM (2057)

Cueing Effects for Simple Detection Are Consistent With a Decision Model of Selective Attention. MIRANDA PETTY and JOHN PALMER, *University of Washington*, CATHLEEN M. MOORE, *University of Iowa*, GEOFFREY M. BOYNTON, *University of Washington* (Sponsored by John Palmer) – When given a visual cue indicating where a target is likely to occur, observers are better at detecting the target when it appears at

the cued location versus an uncued location. Two competing hypotheses have been used to account for this partially-valid cueing effect: selective perception with limited-capacity in space, and selective decision with unlimited-capacity in space. The current experiment aimed to distinguish these hypotheses using simultaneous and sequential displays. In the simultaneous condition, the cue was spatial, indicating where the target was most likely to occur. In the sequential condition the cue was temporal, indicating when during a trial the target was most likely to occur. The selective perception hypothesis predicts no cueing effect for sequential displays, while the selective decision hypothesis predicts cueing effects for sequential displays. Results show cueing effects for the sequential condition, indicating that for simple stimuli, the cueing effect occurs in decision.
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12:00-1:30 PM (2058)

Induced Gratitude, Indecisiveness, and P3 Amplitude in an Auditory Oddball Task. LILY R.W. SEGAL, SYDNEY L. LOLLI, ANDREA L. PATALANO, and CHARLES A. SANISLOW, *Wesleyan University* (Presented by Andrea L. Patalano) – We previously found that inducing gratitude increases motivated attention to choice stimuli during preference-based decision making. In the present study, we tested whether the gratitude effect extends to perceptual processes. Electrophysiological data were collected during an oddball task in which 89 participants (assigned to a Gratitude or Neutral condition) responded to rare target (oddball) tones presented in a string of non-target (non-oddball) tones. Participants also completed several individual difference measures, including an indecisiveness scale. The dependent measure was the amplitude of the P3 waveform, an electrophysiological measure thought to index motivated attention. Unlike past work, there was no main effect of a gratitude manipulation on P3 amplitude. However, self-reported decisiveness was associated with an increased difference in P3 amplitude for oddball relative to the non-oddball trials, especially in the Gratitude condition. The findings indicate more focused attention to goal-relevant stimuli by more decisive individuals, further magnified by the experience of gratitude.
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12:00-1:30 PM (2059)

Are Two Heads Better Than One? Systems Factorial Technology Provides New Insights on the Group Decision-Making Process. CHENG-TA YANG and CHENG-JU HSIEH, *National Cheng Kung University*, MARIO FIFIC, *Grand Valley State University* – Are two heads better than one? Aggregate group-level decisions are considered to be superior to individual decisions when response accuracy is considered. However, it is still unclear whether group decisions are more efficient than individual decisions. We applied systems factorial technology to study the efficiency of group decision-making by assessing the measure of processing capacity. Presumably, groups with high efficiency would exhibit large processing capacity, i.e., supercapacity. An oddball detection task was conducted in Experiment 1 and a simple detection task was conducted in Experiment 2. Our results replicated the previous findings using the accuracy-based measure; that is, group detection sensitivity is better than the detection sensitivity of the best individual, especially when the two individuals had similar detection sensitivity. Surprisingly, the reaction-time data suggested that the group decision-making process was of limited capacity to moderately limited capacity. Only a few pairs of participants showed supercapacity processing with a violation of race-model inequality. Results of the current study provide a new insight on the efficiency (capacity) in group decision making.
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12:00-1:30 PM (2060)

New Paradoxes of Choice Under Experience? NICHOLAS PAPPAS and DAVID KELLEN, *Syracuse University* (Sponsored by David Kellen) – Research of risky decision making focuses on individuals' preferences for different lottery options that yield outcomes with known probabilities. The currently dominating theory, Cumulative Prospect Theory (CPT), has been shown to fail to accommodate a large set of choice patterns. These "new choice paradoxes" suggest that CPT should be replaced by an alternative account, such as the Transfer of Attention Exchange model (TAX) or extended Decision Field Theory (DFTe). Importantly, these two theories ascribe a major role to attentional processes (and their failure). Although these paradoxes are well established in contexts in which the different options are described, it is currently unknown whether they also hold when the options are experienced. Previous investigations obtained very similar characterizations of description and experience-based choices, but these were obtained under very simple options (sure things and two-outcome lotteries). The present work reports two experiments focusing on these new choice paradoxes in the sampling paradigm. Using Bayesian methods, we evaluated the presence of paradoxical preferences, as well as the ability of CPT, TAX, and DFTe to account for the extant individual choice data.
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12:00-1:30 PM (2061)

Chaotic Minds: Individual Differences in Creative Divergent Thinking. HOLLY A. WHITE and FATMA A. ALSHAIBA, *University of Michigan* – Chaotic cognition is characterized by a spontaneous, disorganized approach to creative generation that is divergent and highly original (Finke, 1996; Finke & Bettle, 1996). In theory, individuals with a chaotic cognitive style and wide breadth of attention are likely to be "outside the box" thinkers and may excel at certain divergent thinking tasks. The present research used an individual differences approach to examine the relationship between chaotic cognition and several measures of verbal and visual divergent thinking among a large sample of undergraduates at the University of Michigan (N=158). An index of chaotic cognition was derived from a combination of the CFQ-MAL (McVay & Kane, 2009), a subset of items from the CAARS (Conners, Erhardt, & Sparrow, 1999), and a subset of relevant descriptive adjectives from the Gough Personality Scale (Gough, 1979). Using a mixture of conventional scoring methods and innovative techniques (e.g., latent semantic analysis), we found that chaotic cognition predicted specific aspects of divergent thinking. Our results

provide preliminary support for the validity of the chaotic cognition construct. Findings have relevance for individual differences approaches to the study of creative cognition.
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12:00-1:30 PM (2062)

Memory for Emotional Objects in Spatial Locations: Examining Effects of Attentional Load. ALEXANDER L.M. SIEGEL and ALAN D. CASTEL, *University of California, Los Angeles* – The ability to remember spatial locations can be influenced by features of objects, such as their importance and emotional valence. In the current study, we examined how emotional information can be selectively remembered and bound to spatial locations. Participants studied negative, neutral, and positive emotional objects in a spatial layout, and then recalled the location of each object across a series of trials. Attentional load during encoding was manipulated by varying the presentation format (sequential or simultaneous) and the presence or absence of a secondary auditory discrimination task. After participants completed the spatial memory task, subjective ratings of emotional valence, arousal, and importance were measured for each object. Object-location memory was significantly more accurate when attention was full relative to divided and when information was presented simultaneously relative to sequentially. Further, the locations of emotional (especially negative) objects were better remembered than locations of neutral objects. Subjective ratings indicated that arousal may predict spatial memory accuracy under conditions of higher, but not lower, attentional load.
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MUSIC COGNITION

12:00-1:30 PM (2063)

Visual Complexity Interacts With Music Reading Expertise: Evidence From Eye Movements. ABIGAIL L. KLEINSMITH and HEATHER SHERIDAN, *University at Albany, State University of New York* (Sponsored by W. Trammell Neill) – Experts in many domains are remarkably efficient at encoding domain-related visual patterns. To examine the visual component of music expertise, we monitored the eye movements of 30 expert musicians (≥10 years of music reading experience) and 30 novices (who could not read music) while they searched music scores for a single note that was changing during a music-related flicker paradigm task. Relative to the novices, the experts displayed larger saccades, shorter fixations, fewer fixations, faster times to the first fixation on the changing note, and faster reaction times. Also, expertise effects on eye movements and reaction times were larger for visually complex music scores compared to visually simple music scores. We interpret these results as support for the predictions of chunking and template theories. Specifically, it is possible that expert musicians acquire a large vocabulary of domain-related visual patterns, which allows them to compensate for increases in visual complexity.
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12:00-1:30 PM (2064)

Expertise Differences During a Music-Related Visual Search Task: Evidence From Eye Movements. KINNERA S. MATURI and HEATHER SHERIDAN, *University at Albany, State University of New York* – Experts are faster than novices at focusing their attention on relevant aspects of domain-specific stimuli. To investigate relevancy effects during a music-related visual search task, we monitored the eye movements of 30 expert musicians (≥10 years of music reading experience) and 30 novices (who could not read music) while they rapidly located a target bar of piano sheet music within a larger music score. To examine relevancy effects, we contrasted the pattern of eye movements on target bars (i.e., relevant regions) relative to distractor bars (i.e., irrelevant regions). Relative to the novices, the experts had higher accuracy rates, and they had larger relevancy effects during the early part of the trial, as shown by their larger initial dwell durations on targets relative to distractors. Consistent with chunking and template theories, the results indicate that expert musicians have a perceptual advantage for domain-specific stimuli.
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12:00-1:30 PM (2065)

Do You Chill When I Chill? A Cross-Cultural Study of Strong Emotional Responses to Music. ELEONORA J. BEIER, *University of California, Davis* (Sponsored by Fernanda Ferreira) – While research suggests that listeners can infer the mood expressed by music of a different culture, whether peak emotional responses can also be induced cross-culturally remains unanswered. In particular, the chill response is a sudden increase in emotional arousal that can be measured physiologically through skin conductance and which is typically induced by unexpected acoustic and structural events in music. In this experiment, excerpts of Western classical, traditional Chinese, and Hindustani classical music were presented to groups of participants familiar with each style. All participants felt a similar number of chills to both familiar and unfamiliar musical styles, but significantly fewer chills to scrambled music, which acted as a control. The degree to which participants paid attention to the music and rated the music as emotional was also associated with the number of chills. Overall, this research counters the idea of musical meaning as being entirely generated within cultural conventions and supports the claim that some aspects of musical structure may be shared across cultures, similar to the way languages around the world share many grammatical properties.
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12:00-1:30 PM (2066)

Music Listening Creates a Profile Conducive to Creativity. KATHERINE E. ESKINE, AUBREY FAGGEN, EMILY GRIFFIN, and ZACHARIAH BROWN, *Wheaton College* – Previous research from our lab (Eskine, under review) has shown parallel, positive effects on creativity, semantic clustering, and mood after listen to music. The current study examined the hypothesis that the parallel effects may be associated with differential activation of networks known to underlie creativity; the default mode network, cognitive control network, and

salience network. Resting state EEG was recorded for eight minutes for 16 participants before and after listening music. Continuous EEG was recorded using a 128 sensor montage and post-processing was conducted using EEGLAB. After visual inspection and band pass filtering the mean spectral power (SP) was calculated using the fast Fourier transform procedure. The SP was analyzed using the standard physiological frequency delta (0.25 – 4Hz), theta (4.25 -8Hz), alpha1(8.25-10Hz), alpha2(10.25-13Hz), beta (13.25-20Hz), gamma (20.25-30Hz) bands. Spectral analysis revealed significant cortical changes inthe theta, alpha1, alpha2, beta, and gamma range after listening to music, consistent with network predictions. These findings help to explain previous findings from our lab and may have implications for understanding the nature of creativity.
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12:00-1:30 PM (2067)

Music and Encoding Specificity: Investigating the Role of Visual and Auditory Presentation. AMY L. BOSLEY and STEPHANIE A. KAZANAS, *Tennessee Technological University* – The current study examined encoding capabilities in musicians and non-musicians through a musical incidental learning task (Balch, Bowman, & Mohler, 1992; Mishra, 2010; Tulving & Thompson, 1970). Participants watched a video on music theory and then were asked to complete an encoding task in which they rated music segments along a consonance-dissonance scale. After participants completed the encoding task, they were asked to distinguish target segments from novel segments. In both tasks, segments were presented either auditorily or visually to the participants (Mishra, 2010). Participants who encountered matched conditions, such as a visual encoding task and a visual recognition task, recognized more target segments than those who encountered mismatched conditions. There was no difference in recognition scores between musicians and non-musicians. These results support previous encoding specificity investigations and show that participants can learn and utilize information to complete tasks that lie outside of their domain of knowledge.
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12:00-1:30 PM (2068)

Instrumental Music Earworms Interfere With Phonological Working Memory. CALLULA KILLINGLY, PHILIPPE LACHEREZ, and RENATA MEUTER, *Queensland University of Technology* – 'Earworms' –the experience of a catchy melody that repeats in the mind– are a common occurrence for many. While mostly reported for songs, anecdotal evidence suggests that the phenomenon can be triggered by instrumental music. The present study investigated the role of phonological working memory in instrumental earworms, exploring potential differences among musicians and non-musicians. Five popular instrumental tunes were selected as potential earworm candidates, and five series of random tones generated (auditory stimuli unlikely to elicit earworms). Participants (n = 40) undertook a serial recall task in silence (baseline), then while listening to either instrumental music or random tones (alternating, within-groups), and again in silence. There was evidence that certain tunes continued to be subvocally rehearsed during the silent block following presentation, thus producing phonological interference; however, this was moderated by musical experience. Following exposure to random tones, performance was similar to baseline. This study is the first to investigate the cognitive processes underlying instrumental earworms, and findings will inform current theories of working memory.
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12:00-1:30 PM (2069)

Auditory Dominance and Tempo Discrepancies. MARILYN G. BOLTZ, *Haverford College* – Although vision often dominates audition, one exception occurs in the presence of tempo discrepancies between the two modalities: variations in auditory rate typically influence perceived visual rate, but not versa. The purpose of the present research was to examine the impact of affective information on this effect. Subjects viewed a montage (slideshow) of positive or negative photos accompanied by positive or negative music whose rate was either the same as, or 15% faster or slower than the visual montage. Relative to a no music control group, an immediate recognition rate task indicated a higher false alarm rate to faster and slower visual sequences in the presence of faster and slower music, an effect that significantly increased when audiovisual pairings both displayed a positive and negative affect, respectively. Variations in visual rate, however, exerted no effect on auditory rate recognition. These findings have implications for both cinematography and theories of cross-modal perception.
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12:00-1:30 PM (2070)

The Influence of Tonal Pitch on the Identification of Brief Musical Excerpts. JAMES T. MANTELL, REBECCA FAUBION, and HANNAH MADDEN, *St. Mary's College of Maryland* – Individuals maintain absolute pitch (AP) knowledge in long term memory but the time course of AP access is not well known. We investigated the speed and strength of AP memory activation with music recognition and recall tasks. Stimuli comprised 400 ms excerpts from 50 popular songs. Half of the excerpts were presented in their original tuning and half were presented in mistuned keys (± two semitones). Participants listened to each excerpt once and indicated their recognition by timed keypress. Next, for recognized songs, participants guessed song and artist names and reported their confidence. Results revealed that participants recognized and recalled original songs statistically significantly more than mistuned songs, suggesting that AP memories are activated by acoustic signals less than one half second in duration. However, the fact that participants recalled such brief, mistuned song excerpts at all supports the substantial role of timbre cues in the activation of musical memories.
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12:00-1:30 PM (2071)

Style Cue Density Affects the Processing of Harmonic Progressions. DOMINIQUE VUVAN, *Skidmore College*, BRYN HUGHES, *University of Lethbridge* – Recent research

indicates that different styles within Western tonal music employ distinct harmonic structures, and that listeners discriminate these structures in ratings tasks (Vuvan & Hughes, submitted). In the current study, we investigated the impact of musical style on accuracy and response time during a tuning judgment. Participants were presented with a style context (rock vs. classical), followed by a timbre-matched two chord progression (V-I vs. bVII-I). Whereas V-I is highly expected in both styles, bVII-I is unexpected in classical music but expected in rock music. Participants responded as quickly and accurately as possible as to whether the first chord in the progression was in- or out-of-tune. Results from Experiment 1 (style cue = timbre) indicated no effect of style on the processing of harmony. In contrast, in Experiment 2 (style cues = instrumentation, rhythm, melody, and harmony), participants processed V-I cadences significantly faster and more accurately than bVII-I cadences in the classical, but not the rock context. Our findings suggest that style cues alter the processing of musical chords, but only when enough cues are presented to reliably elicit the style-appropriate harmonic schema.
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12:00-1:30 PM (2072)

Individual Differences in Absolute Pitch Performance: Contributions of Working Memory, Musical Expertise, and Tonal Language Background. STEPHEN CHARLES VAN HEDGER and HOWARD CHARLES NUSBAUM, *University of Chicago* – Individuals with absolute pitch (AP) can categorize an isolated musical note with near perfect accuracy. This definition implies a uniformity of performance across people; however, in reality AP is a complex ability shaped by early and recent auditory experiences. In the present study we assess how differences in working memory (WM), musical expertise, and language background relate to AP accuracy. In a standard AP test, all AP participants performed virtually perfectly. When tested on more challenging notes, WM positively related to AP performance, though only among individuals who reported a tonal language background. This interaction between tonal language and WM, however, may have been partly grounded by differences in musical expertise between tonal and non-tonal groups. Supporting this possibility, we observed an interaction between WM and musical expertise across all participants. Taken together, these results highlight the complexity of AP categorization when considered as an auditory skill rather than a native talent. The idea that WM may be an important component of auditory processing in AP for difficult notes is consistent with theoretical accounts of how WM and expertise relate to auditory recognition more broadly.
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12:00-1:30 PM (2073)

Validating Emotions Evoked by Mindful Music. YUCHEN YE and MARIA K. WOLTERS, *University of Edinburgh* (Presented by Maria K. Wolters) – The musical mindfulness app Soulight (Musemantik, 2018) provides custom samples of instrumental, synthesised music that let users explore emotions through music (among other functions). In this study, we sought to validate the four music samples that had been designed to differ maximally in valence and arousal: calm (high valence, low arousal), depressed (low valence, low arousal), angry (low valence, high arousal), and joyful (high valence, high arousal). Since there are cross-cultural differences in the emotions associated with colours, we recruited Chinese and Western participants to assess whether there might be a similar effect for the music samples. Perceived valence and arousal were assessed using the Self-Assessment Manikin. We found the expected pattern for arousal, but not for valence - angry and calm had similar valence (mean: 5), with depressed lower (mean: 2) and joyful higher (mean: 8). Ratings were not affected by the participants' culture (Chinese vs Western). We discuss possible reasons based on qualitative verbal feedback from participants and implications for validating music-based emotional wellbeing interventions.
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12:00-1:30 PM (2074)

Embedding Familiarized Rhythms or Pitch Sequences in Musical Pieces Increases Subjective Song Familiarity. KATHERINE L. MCNEELY-WHITE, ANNE M. CLEARY, and ALEXANDER B. CLAXTON, *Colorado State University* (Sponsored by Carol Seger) – Research has demonstrated that isolated musical features on recognition tests seem more familiar if taken from recently-heard but unretrieved songs. In the current study, we examined whether the reverse holds true – Do songs seem more familiar if a feature, such as rhythm or pitch sequence, had been previously heard in isolation? Additionally, does increased exposure to isolated features increase later feelings of familiarity with songs? We found that songs with experimentally familiarized rhythms or pitch sequences elicited greater familiarity levels than songs that had not had any features experimentally familiarized. A second experiment showed that repeatedly hearing a song's isolated rhythm significantly increased later perceived familiarity with the song itself relative to hearing its isolated rhythm only once. These findings support the long-held theoretical assumption that memory traces consist of features that are bundled into a whole, and which are responsible for the feelings of familiarity that underlie familiarity-based recognition.
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12:00-1:30 PM (2075)

Is Serial Order Reconstruction of Tone Sequences Influenced by Rhythmic Grouping? SIMON GORIN, *University of Geneva* – Contrary to the verbal domain of short-term memory (STM) which has been extensively studied, little is known about the mechanisms involved in representing serial order information in the musical domain. At the same time, recent studies suggested that the processing of sequential information in the two domains could be supported by domain-general processes. The present study aims at investigating with more details the nature of the ordering codes involved in musical STM, and the extent to which they are shared with the verbal domain. To reach this, we investigated the effect of rhythmic grouping on the serial order reconstruction of tone sequences. Rhythmic grouping effects are of theoretical importance because, in the verbal domain, only positional theories can accommodate

them. Thus, this study should improve our understanding of the codes representing serial order in musical STM and deepen our knowledge of the domain-generality of ordering mechanisms in STM.
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12:00-1:30 PM (2076)

Musical Sensitivity Correlates With Pitch Production Ability in Speech. JOSELYN HO, GREG HICKOK, and CHARLES CHUBB, *University of California, Irvine* (Sponsored by Greg Hickok) – Does musical sensitivity correlate with the ability to manipulate pitch patterns in one's speech? In a speech task, individuals attempt to speak target words with pitch accent patterns of cue words. High performance is determined by a lower sum of the squared error between pitch heights of corresponding syllables of cue and target words. In a tonality task, individuals strive to classify major vs. minor tone sequences, with feedback. This task reliably divides individuals into low-performers (70% of individuals) and high-performers, based on scale sensitivity to pitch differences between musical tonalities (Dean & Chubb, 2017). Data from 28 participants indicate a strong correlation between performance on the speech and tonality tasks, such that individuals who are highly sensitive to tonality can more precisely produce specific pitch patterns in their speech. In summary, musical scale sensitivity may transfer to sensitivity to pitch prosody in speech.
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12:00-1:30 PM (2077)

Tonality-Color Synesthesia and Absolute Pitch. LISA TOBAYAMA and KAZUHIKO YOKOSAWA, *The University of Tokyo* (Sponsored by Kazuhiko Yokosawa) – Tonality of music and colors are known to be associated in one type of synesthesia (e.g. C major). We investigated whether tonality-color synesthesia required cognitive processing of tonality by comparing colors elicited by tonality with or without presenting tonality names. We hypothesized that if cognitive processing were required, synesthetes without a sense of absolute pitch who are unable to specify tonality by themselves would not experience colors without knowing tonality names. Several tonality-color synesthetes participated in the study and only some of them had a sense of absolute pitch. They listened to phrases based on the typical chord progression of a specific tonality and answered the evoked color. One synesthete without absolute pitch could select similar colors with or without hearing the tonality names, suggesting that the phrase directly elicited the color without cognitive processing. This finding is surprising because the generally accepted theory proposes that synesthesia requires cognitive processing.
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REASONING & PROBLEM SOLVING

12:00-1:30 PM (2078)

Examining Individual Differences in the Development of Probabilistic Decision Making. SAMANTHA GUALTIERI, TARA MCAULEY, and STEPHANIE DENISON, *University of Waterloo* (Sponsored by Britt Anderson) – Individual differences in cognitive abilities and thinking styles account for variation in adolescents' and adults' decision-making (Kokis et al., 2002; Toplak et al., 2014). With much less known about the role of individual differences in children's decision-making, it is difficult to interpret their variable performance in probabilistic decision tasks (e.g., Girotto et al., 2016). In two experiments, 3- and 4-year-olds completed a set of probabilistic reasoning problems, a battery of executive function (EF) measures, and a general intelligence task. In Experiment 1 (N=50), 3- and young 4-year-olds relied heavily on their executive functions to succeed at the probability problems, with these abilities contributing to their probabilistic reasoning beyond the influence of their general intelligence. Older 4-year-olds produced ceiling-level performance on the probability problems; thus, in Experiment 2, a new set of children completed a similar experiment with more difficult probability problems. Current results (ongoing, N=45) replicate the relationship between decision-making and EF in younger children and suggest that older 4-year-olds' decision-making is similarly impacted by EF as long as problems are sufficiently difficult.
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12:00-1:30 PM (2079)

Partition Dependence in Children's and Adults' Resource Allocation Decisions. SHERI REICHELSON, ALEXANDRA ZAX, KATHERINE WILLIAMS, ANDREA PATALANO, and HILARY BARTH, *Wesleyan University* (Presented by Katherine Williams) (Sponsored by Hilary Barth) – Partition dependence (PD), the influence of the arbitrary groupings of options on decisions, can bias individuals toward some selections and away from others, sometimes 'nudging' decision makers in a distinct direction. PD has been demonstrated in a wide range of contexts in adults, but few studies have investigated the developmental trajectory of this behavior. In 3 experiments (N = 514), we examined whether children and adults exhibit PD using a novel resource allocation task: distributing food tokens to zoo animals. While this novel task did not elicit PD in adults, our developmental sample demonstrated strong PD effects. Both older children (age 7-10), and younger children (ages 3-6) made partition dependent allocations, and younger children exhibited larger effects than did older children. This work provides the first evidence that children's decisions are influenced by the the partitioning of options, and suggests that younger children may be more susceptible to these effects.
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12:00-1:30 PM (2080)

Interactive Effects of Stopping Rules and Personality on Decision Making. THOMAS GORALSKI, ALEXIS HANSEN, and MARIO FIFIC, *Grand Valley State University* (Sponsored by Mario Fific) – One of the most important topics in the decision making is how individual subjects determine to stop evidence collection and to make effective decisions. This is defined as the stopping rule problem. Typically, the research in this area is focused on determining the decision strategies (stopping rules) people use. In a series of studies so far we have explored whether personality traits could be used to explain personality driven individual differences in decision making.

The current study is a conceptual replication aiming at reducing a number of trials to design a more compact task. The results revealed a complex interplay of decision making strategies and personality traits in predicting decision making accuracy and amount of information processed. Using the Big Five Inventory we observed a direct impact of Conscientiousness, Extraversion and Agreeableness in predicting decision making achievement, as well as in moderating the effect of various decision making strategies.
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12:00-1:30 PM (2081)

Structural Explanation Promotes Rectification of Inequality in a Resource Allocation Task. NADYA VASILYEVA, MAHESH SRINIVASAN, MONICA ELLWOOD-LOWE, SIERRA DELANEY-RUBIN, ALISON GOPNIK, and TANIA LOMBROZO, *University of California, Berkeley* – Dividing resources is a fundamental task faced by any society, with adopted strategies shaping the ultimate distribution of wealth. We probed 4-5-yr-old children's intuitions about allocation of resources under conditions of existing inequality. Specifically, we examined how explanation of the inequality influenced decisions to allocate new resources. Prior research shows that attributing resource-scarcity to internal causes is associated with perpetuating inequality and endorsing social stratification (Hussak & Cimpian, 2017; Rizzo & Killen, 2017) in children as young as 4. However, it remains unclear whether a structural explanation, attributing inequality to stable social constraints on access to resources, can promote actions rectifying inequality (Ellenbaas & Killen, 2017 suggest it might). We offered children either a merit-based (one group worked harder) or structural explanation (one group had privileged access to finances) of a resource inequality, and asked them to divide new resources between the two groups. Only the structural explanation shifted a baseline preference to divide resources equally towards rectification of inequality (giving more to the poor group), illustrating how explanation shapes social reasoning.
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12:00-1:30 PM (2082)

Distraction of the Executive Functions on the Impasse Stage Facilitates the Insight Problem Solving. ILYA YU VLADIMIROV, POLINA N. MARKINA, and IGOR N. MAKAROV, *Demidov Yaroslavl State University* – One of the main difficulties of an insight solution is the rejection of an incorrect initial representation of the problem. Inability to implement a solution in an obvious way is experienced by the participant as an impasse. In our opinion, the reason for this difficulty is the retention of the scheme by the central executor that lead to an incorrect solution. We assumed that disabling the executive functions at the impasse stage helps to increase the efficiency of the insight solution. The study was conducted on a sample of 27 people, each of which solved 5 match stick problems. Participants were solving the problems with interruption to a secondary task requiring the executive functions distraction (10, 20, 40, 80 seconds), and also in control conditions without interruption. It was assumed that an interruption in the middle of the solution would lead to a decrease in solution time compared to the control conditions and interruption in the later stages. The results correspond to the structure we expect. Thus, we can argue that disabling executive functions at the impasse stage contributes to the effectiveness of the insight solution. Supported by RSF 16-18-10030.
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12:00-1:30 PM (2083)

Knowing What to Avoid: Verbal Example Exposure Improves Originality, Visual Example Exposure Hinders It. TIM GEORGE and JENNIFER WILEY, *University of Illinois at Chicago* – Creative generation tasks require overcoming accessible and common ideas. On one hand, exposure to common examples can fixate people. However, knowing which ideas are commonplace may help people to shift focus. The present studies tested whether instructions encouraging people to avoid a set of common ideas improves or hinders originality on the alternate uses task. Exposure to a written list of common ideas (expressed in words) along with "avoid" instructions increased originality relative to a control condition (no examples) and a condition not given "avoid" instructions. In contrast, when examples of common ideas were presented visually using a set of images, this led to reduced originality compared to a control condition, suggesting mental fixation. Although "avoid" instructions helped reduce this fixation, originality did not surpass a control condition. These results suggest that knowing which ideas to avoid helps improve creativity, so long as those examples ideas are not presented visually.
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12:00-1:30 PM (2084)

Commonality Search Between Unrelated Objects Helps Finding Obscure Features. MAYU YAMAKAWA, *Nagoya University/JSPS*, SACHIKO KIYOKAWA, *Nagoya University* (Sponsored by Kuninori Nakamura) – Finding obscure features of objects is necessary for inventions or generating novel ideas. We hypothesized that people can discover more obscure features of objects by searching for commonalities between unrelated objects than by thinking about an object itself. Seventy-seven undergraduates from Nagoya University were assigned to one of three conditions: a commonality search and either of two control conditions. The participants in the commonality search condition listed a feature shared by a pair of objects; those in the control conditions listed a feature associated with an object. Forty-three undergraduates were asked to rate how easily they could associate the features listed by the participants with the corresponding objects on a 5-point scale. The results showed that the participants in the commonality search condition listed less salient features than those in either control condition. We concluded that commonality search between unrelated objects is effective in discovering obscure features.
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12:00-1:30 PM (2085)

Reasoning Under Uncertainty as Problem Solving: The Role of Application of Methods and Restructured Understanding. SYLVIA KUZMAK, *Rise Coaching and Consulting LLC* – Reasoning under uncertainty can be viewed as a form of problem solving, with an initial step being to search for applicable solution methods, including forms of statistical reasoning. Much of the literature on reasoning under uncertainty presents subjects with situations described with a particular statistical method in mind, and the focus is on whether subjects respond in line with the method or show errors and biases in judgment. This study focuses on the identification of applicable statistical methods in a simple context, by analyzing verbalizations of 24 college students who interacted with and predicted outcomes for simple random phenomena involving the mixture of colored marbles. Under varying conditions, subjects applied a random equal probability model, or applied alternative models of the situation. Subjects' reasoning is summarized. The step of identifying applicable methods is related to controversies over what is normative reasoning, and to difficulties in teaching and learning statistics application.
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12:00-1:30 PM (2086)

The Low-Level and High-Level Cognitive Processes in the Insight Problem Solving. NATALIA YUR'EVNA LAZAREVA, ILYA YUR'EVICH VLADIMIROV, and ALEXANDRA V. CHISTOPOLSKAYA, *Yaroslavl State University* (Presented by Alexandra V. Chistopolskaya) – The important problem is the relationship low-level and high-level cognitive processes in the insight problem solving. On the one hand, high-level processes determine low-level processes, such as eye movements. On the other hand, low-level processes can affect high-level processes. The main goal of our research is to study the influence of low-level processes (eye movement activation by additional task) on the «Nine Dots» insight problem solving process. Hypothesis:The eye movement activation can activate the «Nine Dots» problem solution. The subjects had to solve the «Nine Dots» problem. The additional task of eye movement activation is the modified version of the Schulte tables. This task could activate a congruent solution A or B types. There was also an incongruent condition - solution from "A" dot and the answer was provoked from "B" dot. Results. Preliminary results showed activation of the appropriate to the hint solution. However, it is necessary to investigate the motor facilitation mechanisms. It is necessary to study what exactly is activated: the motor program, the perceptual pattern or the principle of solution (on the cognitive level). This work is supported by Russian Foundation for Basic Research (grant 18-313-00123)
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12:00-1:30 PM (2087)

Causal Analogies Are Processed in the Same Way as Other Analogies. MATTHEW R. MYERS and DEDRE GENTNER, *Northwestern University* (Sponsored by Dedre Gentner) – Analogical reasoning is generally thought of as a domain-general structure-mapping process, applying from perceptual comparison to causal reasoning (Gentner & Markman, 1997; Doumas & Hummel, 2013). This view has been challenged (Holyoak, Lee, & Lu, 2010; Lee & Holyoak, 2008), based on studies of causal analogies that included factors that either generated or prevented an effect (E). The results showed a disassociation between the rated likelihood of E in the target and the rated similarity between base and target. Because structure-mapping predicts that inductive strength is positively related to structural similarity, they argue that structure-mapping fails, and conclude that causal analogies require a separate model. We argue that this analysis is incorrect. We describe three studies that show that structure-mapping makes correct predictions for causal analogies, including those studied by Lee and Holyoak.
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12:00-1:30 PM (2088)

Not All of Empirically Suspect Beliefs Can Be Intensified by Mind Perception. YOSHIMASA MAJIMA, *Hokusei Gakuen University*, HIROKO NAKAMURA, *Aichi Shukutoku University* – It has been suggested that mentalizing (i.e. mind perception) is one of the key mechanisms that boost religious beliefs and behaviors at the intuitive level of our cognition. However, little is known whether other type of empirically suspect beliefs such as belief in the pseudoscience are associated with the mind perception. Participants recruited from crowdsourcing sample answered to the Mind Survey asking to estimate the perceived experience and agency of various targets. They also completed questionnaires measuring their cognitive styles and their beliefs in the pseudoscience and complementary and alternative medicine (CAM). The result indicated that the mind perception, particularly the perception of experience to non-human targets, was positively associated with the belief in the CAM, but not associated with the belief in pseudoscience. Furthermore, the reflective thinking contributed differently to two beliefs. Present results suggested that the mind perception may intensify some of unwarranted beliefs, but not everything.
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12:00-1:30 PM (2089)

Investigating Motivated Rejection of Science Using a Within-Subjects Design. MICHELLE M. ARNOLD, MATTHEW W. CHRISTIAN, HENRY W. STRUDWICKE, TOBY PRIKE, and TYLER J. ROSS, *Flinders University* – Motivated rejection of science refers to the tendency of people with higher reasoning ability to correctly interpret evidence for neutral topics but inaccurately interpret evidence that disagrees with a core belief. The seminal paradigm tested participants on a single trial in one of three contexts; neutral, congruent with political beliefs, or incongruent with political beliefs (Kahan et al., 2017). The current study focused on adapting this paradigm to test for the effect within-subjects to ensure the motivated rejection pattern could be found for a given individual (vs. across groups). Two initial pilots looked for the effect using political beliefs (news article stimuli) and alternative medicine beliefs (contingency table stimuli), but neither showed the expected pattern. In Experiment 1 we simplified our within-subjects paradigm to

political beliefs and contingency table stimuli to better align with the seminal study. Results are discussed in terms of reasoning ability and the Identity-Protective Cognition thesis.
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12:00-1:30 PM (2090)

Cueing Problems During Sleep to Enhance Solving and Test Mechanisms. KRISTIN GRUNEWALD, KEN A. PALLER, and MARK BEEMAN, *Northwestern University* (Sponsored by Mark Beeman) – Anecdotes and limited research suggest that sleep could be a particularly useful incubation period to improve chances of solving difficult problems. Extrapolating from memory research, sleep-related facilitation could result from the reactivation and reorganization of problem information. If so, then targeted problem reactivation during sleep could facilitate subsequent solving. Across two evening sessions, 61 participants attempted to solve distinct puzzles each uniquely associated with a sound cue. Overnight, half of the 12 unsolved puzzles' associated sounds were played during slow wave sleep. The following morning, participants re-attempted previously unsolved puzzles, solving reliably more cued than uncued puzzles ($p<.003$). This facilitation was limited to analytic (rather than insight) solving, and associated with improved puzzle memory, suggesting that cueing facilitated reactivation and restructuring of the puzzle memory. A new experiment contrasts cueing of puzzles that do versus do not induce fixation/misdirection, to investigate how memory for misleading information affects incubation during sleep.
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12:00-1:30 PM (2091)

The Effect of Strategy Specificity on Mental Set. ERIN E. SOVANSKY and STELLAN OHLSSON, *University of Illinois at Chicago* – Mental set occurs when a person continues to use a previously successful problem-solving strategy, even when it is no longer ideal. Individuals differ with respect to their susceptibility to mental set. One source of individual differences is strategy use. In previous research with the Water Jar Task, we found that people who used highly specific strategies (e.g., formula memorization) were more likely to experience mental set compared to those who used general problem-solving heuristics (i.e. guess-and-check, difference reduction). To further test the effect of strategy specificity, we created a version of the Water Jar Task in which the order of the jars was rotated from problem to problem, preventing the memorization of a specific solution formula. This condition had a lower rate of mental set than the standard presentation. Differential strategy use accounted for the group differences in mental set.
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12:00-1:30 PM (2092)

How Do Red Herrings Moderate Fixation in Problem Solving? ZSOLT BEDA, ALAN HERNANDEZ, and STEVEN M. SMITH, *Texas A&M University* (Sponsored by Steven M. Smith) – Exposure to misleading clues, also known as red herrings, makes problems more difficult to solve, a fixation effect. For example, seeing the word ANALOGY makes it more difficult to solve the word fragment A_L_ _GY. Will the number of similar, but wrong answers moderate fixation effects? Participants were exposed to 0, 1, 3, or 5 red herrings, words that were orthographically similar to word fragment solutions. Word fragment completion rates were gradually worse the more red herrings the participants had seen. Our results suggest a potential serial retrieval of possible, but wrong answers. These results have implications for theories of fixation in creative problem solving, suggesting that fixation may be greater when more wrong solutions are considered.
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12:00-1:30 PM (2093)

Individual Differences in the Use of Optimal Causal Inference (Troubleshooting) Strategies. LEO GUGERTY and MICHAEL SHREEVES, *Clemson University* – We studied diagnostic reasoning (causal inference) using a task where participants made tests to find the faulty component in systems generating abnormal output. This troubleshooting task is more complex than many tasks used to study diagnostic reasoning. Systems had about 100 components and participants had to repeatedly make tests and update their system knowledge (Bayesian updating). We showed how strategies for completing the troubleshooting task, i.e., elimination and inference to the best explanation (IBE), can be derived from simpler inferences (local diagnostic and predictive inferences), which in turn can be derived from basic assumptions about human causal reasoning using the Marr-Anderson approach for developing rational cognitive models. Three empirical studies demonstrated that: 1. few participants (<13%) used elimination and IBE consistently; 2. Fluid intelligence and thinking dispositions correlated positively with elimination and IBE use; 3. Using elimination and IBE minimized the number of system tests at the cost of additional time per test, while using the backtracking strategy reduced time per test at the cost of additional tests. Findings are discussed in terms of reflective strategies vs. fast heuristics.
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12:00-1:30 PM (2094)

Attention to the Local Level of Hierarchical Stimuli Increases Creative Flexibility. TIFFANI NG and MARK BEEMAN, *Northwestern University* (Sponsored by Marcia Grabowecky) – A prior study reported that individuals showing less local interference in the Navon global-local task (indicating more selective attention) demonstrate more flexibility on an alternative uses (AUT) divergent thinking task (Zmigrod, Zmigrod, & Hommel, 2015). Here, we tested whether performing a hierarchical letter task modulates selective attention and subsequent performance on the AUT. Specifically, we contrasted whether judging global target letters affects flexibility and fluency differently than judging local letters. As predicted, participants demonstrated greater interference from the non-target level (indexed by larger congruency effects) when identifying global rather than local letters, suggesting that ignoring local letters demanded more selective attention. Participants in both conditions reliably produced more AUT responses (increased fluency) compared to baseline. However, only participants who judged local targets reliably increased

their flexibility on the AUT. Thus, attention to either global or local level improves creative fluency, but only attention to the local level stimulates creative flexibility.
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12:00-1:30 PM (2095)

Individual Differences in Use of Optimal Causal Strength and Structure Estimation. MICHAEL SHREEVES, LEO GUGERTY, and DEWAYNE MOORE, *Clemson University* (Sponsored by Leo Gugerty) – We studied individual differences in causal reasoning in a task where participants were shown contingency data and judged the strength of the causal relationship and their confidence in it. Participant responses were compared to existing rational Bayesian models of causal strength and structure and to proposed novel variations of these models, including one variation with predictions nearly identical to Cheng's (1997) non-Bayesian causal power model. Past studies of causal learning examined group-average responses and found that participants reduced strength estimates with problem sample size. Using an individual differences approach, we found that a subgroup (38%) consistently estimated strength based on causal power alone, i.e., strength estimates did not decrease with sample size. 26% of participants made confidence estimates in close agreement with Griffiths and Tenenbaum's (2005) causal support model. The extent to which participants used causal power for strength and causal support for confidence were each moderately (positively) correlated with intelligence but weakly correlated with each other.
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12:00-1:30 PM (2096)

Contrastive Constraints on Self-Explanation. SETH CHIN-PARKER, *Denison University* – When people engage in explanation, there is some evidence that they are better able to identify relevant information, to integrate information more successfully, and to generalize what they have learned to new situations. This is all "good news" in terms of how explanation relates to learning outcomes. However, potential limitations have not been fully examined. In the contrastive account of explanation generation (Chin-Parker & Bradner, 2017), the situation in which the explanation is prompted influences both the content and form of the explanation via available contrastive information. This idea has important implications for understanding the relationship between explanation and learning. In two studies, we examined how these factors impacted the relationship between generating explanations and the ability (a) to transfer a solution in analogical problem solving and (b) to learn an underlying relational structure of a novel topic. In analogical reasoning, transfer of an explained solution was impaired when contrastive information that was not pertinent to the solution was available. Conversely, situational information facilitated learning of a relational structure when it provided a useful contrast to the target topic.
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12:00-1:30 PM (2097)

Causal Invariance as a Constraint on Purely Empirical Learning for More Generalizable Causal Knowledge. JEFFREY K. BYE, PEI-JUNG CHUANG, and PATRICIA W. CHENG, *University of California, Los Angeles* – We tested two views of how reasoners generalize causal knowledge. Previous work has shown that reasoners are capable of learning empirical integration functions specifying how certain causes combine to produce an outcome. A view that treats causal learning as purely empirical might predict that reasoners generalize that knowledge based on similarity—within a domain or to a similar context. An alternative view posits that human causal induction requires formulating representations, and the aspiration for useable causal knowledge requires formulating whole causes—consisting potentially of interacting causal components—that operate the same way to produce an outcome in both application and learning contexts. Whereas the empirical-only view predicts that reasoners would generalize an acquired integration function to causes based on similarity without differentiating between whole causes and component factors, the causal-invariance view predicts that even while interacting causal components follow specific empirical functions, reasoners apply invariance functions to whole causes. Our results favor the causal-invariance view, suggesting that the goal of forming useable causal knowledge constrains human causal induction.
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12:00-1:30 PM (2098)

Multiple Measures Show a Negative Relationship Between Schizotypy and Creativity: Exploring the Mediating Roles of Associative Processing and Executive Control. MARC S. WILSON, GINA M. GRIMSHAW, and SOPHIE E. HEDLEY, *Victoria University of Wellington* (Presented by Sophie E. Hedley) (Sponsored by Todd Jones) – Positive schizotypal traits are often linked to creativity. This relationship is thought to reflect "loose" associative processing in schizotypy that facilitates creative thought. However, closer inspection reveals considerable heterogeneity in the effect (r = -.42 to +.83 Acar & Sen, 2013). To better understand the relationship between schizotypy and creativity, we conducted a large (N = 428) pre-registered online study, using multiple measures of schizotypy and performance-based measures of creativity. Positive schizotypy correlated negatively with performance on both creativity tasks (r's ranging from -.045 to -.213). We hypothesise that the relationship between schizotypy and creative thought is mediated by both associative processing and executive control, as suggested by contemporary theories of creativity. We test this hypothesis in a large lab-based study in which participants complete working memory and associative processing tasks alongside measures of schizotypy and creativity, providing insight on the factors that explain individual variability in creative thought.
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REWARD, MOTIVATION AND DECISION MAKING

12:00-1:30 PM (2099)

Predicting Personality Profiles: The Case of International Migration. DAVIDE GENTILE and CONSTANCE IMBAULT, *McMaster University*, JASON RENTFROW, *University of Cambridge*, SAMUEL GOSLING, *University of Texas at Austin*, JEFF POTTER, *Brown University*, VICTOR KUPERMAN, *McMaster University* (Sponsored by Victor Kuperman) – The psychological behaviour of migrant populations is a novel focus in geographical psychology, originating from recent findings on the regional variation of personality traits and the academic and societal interest in psychological causes and consequences of migration (Jokela, 2009; Rentfrow, 2014). We examined the personality traits from the Five-Factor model to predict the profile of migrants across the English-speaking world. Personality and demographic data were collected from millions of participants at https://www.outofservice.com (n = 9,328,610). The results showed that immigrants scored higher in openness, conscientiousness and extraversion than the native population in their new country. Additionally, emigrants also reported higher agreeableness and lower neuroticism than their original compatriots; this differentiation increases over time. Finally, a K-means cluster analysis on the difference scores between migrant and non-migrant populations showed grouping of countries based on geographic and linguistic proximity.
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12:00-1:30 PM (2100)

Neural Mechanisms of Reduced Inhibitory Control Following Associative Reward Learning. HAENA KIM (Graduate Travel Award Recipient) and BRIAN A. ANDERSON, *Texas A&M University* (Sponsored by Brian Anderson) – Reward learning has the ability to bias both attention and behaviour. The current study presents behavioural and neural evidence that previously reward-associated stimuli escape goal-directed inhibitory control using a combined go/no-go and flankers task. Participants responded to a target only when it appeared in a cued colour, while ignoring flankers which could appear either in the cued colour or uncued (i.e., "no-go") colour. The colours were also associated with either a high reward or low reward in a prior training phase. Response codes generated by task-irrelevant, low-value flankers were effectively suppressed in a response-irrelevant context. However, those generated by high-value flankers bypassed this suppression. This interaction was evident in the motor cortex and cerebellum. Activations in the parietal cortex were also consistent with this pattern: high-value stimuli attract attention regardless of response relevance. These results demonstrate that reward learning produces a general approach bias, which undermines inhibitory control.
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12:00-1:30 PM (2101)

Cooperation and Costly Punishment: A Study on Gender Effects. LAURA MIETH, AXEL BUCHNER, and RAOUL BELL, *Heinrich Heine University Duesseldorf* – People expect women to be more cooperative and less egoistic than men. We examined whether people punish women for not living up to these benevolent stereotypes. Participants played a Prisoner's Dilemma game with female and male partners. After each round, the participants could punish their partners by spending money to decrease their partners' payoff. In Experiment 1, participants spent more money to punish defective behavior of female partners compared to male partners. However, this effect was only indirect: Participants cooperated more likely with female partners than with male partners, giving participants more opportunity for moralistic punishment when their cooperation was not reciprocated. In Experiments 2 and 3, we separately analyzed the behavior of female and male participants. Female participants cooperated more with female partners than with male partners whereas male participants treated female and male partners equally. Female participants also showed more cooperation and altruistic punishment, and, thus, their decisions were more social and less rational from an economic point of view which is consistent with social-role theory and evolutionary accounts.
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12:00-1:30 PM (2102)

The Effect of Impulsivity on Delay Discounting Depends on Whether You Are Thinking About Yourself or Thinking About the Group. REBECCA B. WELDON, ANH LE, and AUSTIN C. MEYER, *Juniata College* – Humans tend to make decisions that are not consistent with their long-term goals in favor of something "now." The present study examined how self-construal (thinking about oneself as independent or interdependent) affects delay discounting. Participants were randomly assigned to an individualistic or collectivistic prime before completing the Monetary Choice Questionnaire (Kirby et al., 1999) that involved a series of choices between a smaller immediate versus a larger delayed reward. Participants also completed the Barratt Impulsiveness Scale (Patton et al., 1995). We found an interaction between prime type and impulsivity, in that participants lower in impulsivity made more choices for the delayed option after a collectivistic prime, but participants higher in impulsivity made more choices for the delayed option after an individualistic prime. These findings lend insight into the effects of impulsivity and self-construal on pursuing an immediate versus a delayed reward.
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12:00-1:30 PM (2103)

Iron Deficiency Is Related to Altered Behavior After Rewards and Penalties. LISA DE STEFANO, STEPHANIE RHOTEN, MICHAEL WENGER, and TORY WORTH, *University of Oklahoma* (Sponsored by Michael Wenger) – Previous research suggests that iron deficiency may be related to altered monoamine metabolism, which could impact response selection in probabilistic learning tasks by way of effects on dopamine-dependent reward prediction error. Thirty-one non-anemic women (18 iron-deficient, ID, serum ferritin <16 μg/L; 13 iron-sufficient, IS, matched to ID) were recruited to participate in an observational study during which they engaged in a variant of the Iowa gambling task with concurrent EEG. Participants were presented with 4 virtual decks of cards and they were offered the

opportunity to "play" or "pass" a card from a randomly selected deck. If they chose to "play," a monetary reward or penalty was given, otherwise the trial ended. Two of the decks led to a net gain if all opportunities were taken to play, while two decks led to a net loss. Behavior after a previous reward or penalty was examined across groups (ID vs. IS). Initial behavioral results support the hypothesis that ID and IS participants differ in response selection and response latency after receipt of a penalty, suggesting the possibility that ID affects responses to rewards and penalties, perhaps due to deficits in encoding contingencies or integrating previous knowledge.
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12:00-1:30 PM (2104)

Motorvation: Reward From an Action's Effectiveness Is Preserved in Severely Depressed Individuals. SHIREL BAKBANI ELKAYAM, SIGAL ZILCHA MANO, and BARUCH EITAM, *University of Haifa* (Sponsored by Baruch Eitam) – Blunted motivation is one of the core symptoms in Major Depressive Disorder (MDD); The current study aimed to explore whether people suffering from MDD are motivated by information about the effectiveness of their actions. Clinically depressed participants were asked to respond to cues with a specific key-press with their responses leading to 'effects' or no such 'effects' (i.e. control feedback). While higher levels of depression were related to slower reaction time (psychomotor retardation), control feedback decreased reaction time. Surprisingly, this difference was bigger (~60 ms) than the one established in the same task with healthy individuals (~40 ms). Moreover, Control feedback seemed to mitigate motor retardation in clinically depressed individuals and this was evident regardless of depression severity. The results may suggest that the reward system is in fact preserved in MDD. These conclusions have implications for understanding the human motivational system, its effects on action selection and the treatment of MDD.
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12:00-1:30 PM (2105)

Belief Similarity Interferes With Self-Similarity Memory Effect. ALLISON M. SKLENAR, MATTHEW P. MCCURDY, ANDREA N. FRANKENSTEIN, and ERIC D. LESHIKAR, *University of Illinois at Chicago* (Sponsored by Andrew Mienaltowski) – The self-similarity effect occurs when memory is influenced by the degree of similarity between the self and a social target. Prior work has only defined similarity using traits. The current study investigated the self-similarity effect defining similarity using beliefs. Participants formed impressions (positive/negative) of targets based on their picture and a statement about a political-ideological belief the social target held; memory for details associated with each target (impression, belief) was tested. Results indicated an absence of the typical self-similarity effect. However, a positivity effect (better memory for positive than negative), was found for both impression memory and behavior memory. Processing political ideology belief statements seems to have disrupted the self-similarity effect, suggesting that the effect does not extend to similarity defined by beliefs.
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12:00-1:30 PM (2106)

Examining the 'Cost' of Affective States on Effortful Decision Making. KAILEIGH BYRNE, *Clemson University* – Previous work suggests that affective components can contribute to goal-directed cognition and behavior. However, much research is still needed to identify the specific effects and mechanisms of how affect alters decision-making. Consequently, the purpose of this investigation was to determine the effect of emotion induction on effort-based decision-making. Across two studies, participants viewed an affective image (positive, negative, or neutral, depending on condition), rated the image on valence and arousal, and then completed a trial of the Effort Expenditure for Rewards Task (EEfRT). In this task, participants chose between an easy and hard task that varied in the probability and magnitude of reward. Results indicated that individuals in the negative affect condition chose the high-effort, hard task significantly less often than those in both the positive and neutral conditions. These findings suggest that negative affective states may alter the cost of effort expenditure and impair one's willingness to engage in effortful activities. The mechanisms of these results are discussed with regards to the role of physiological activation, emotion regulation strategies, and regulatory fit on effort-based decision-making.
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12:00-1:30 PM (2107)

Response Inhibition During Reward and Punishment Anticipations. JONG MOON CHOI, JI YEONG NOH, and YANG SEOK CHO, *Korea University* – The present experiment was conducted to examine how response inhibition in the stop-signal paradigm is modulated by reward and punishment anticipations. Forty-eight participants were encouraged to withhold their response at a stop-signal while making correct responses rapidly to target stimuli. They received small or large monetary incentives (Reward group) or avoided losing the incentives (Punishment group) with each rapid correct response on go trials or successful withdrawal on stop trials. Results showed that stop-signal reaction time (SSRT) was not modulated by motivation type, incentive size, or the interaction of those. However, participants with a higher Drive score of BIS/BAS scales showed longer SSRT in Reward group, but shorter SSRT in Punishment group. These findings suggest that the approach motivation to win the monetary incentives impairs inhibitory control of behavior while the avoidance motivation not to lose the incentives facilitates it, especially in those who are sensitive to the incentives.
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12:00-1:30 PM (2108)

The Influence of Motivation on Evidence Assimilation in a Repeated Judgment Task. PRACHI S. SOLANKI and ZACHARY HORNE, *Arizona State University* (Sponsored by Zachary Horne) – Prior research suggests that people ignore

evidence that is inconsistent with what they want to believe. However, research on motivated reasoning has focused on how people reason about familiar topics and in situations where the evidence presented to participants could interact with their prior beliefs (e.g., death penalty). This makes it difficult to assess how rational (or irrational) people are in motivated reasoning contexts. Indeed, recent work by Jern and colleagues (2014) suggests that apparent instances of motivated reasoning may actually be instances of rational belief updating. Inspired by this new account, we reexamined motivated reasoning in a controlled categorization task. Contrary to earlier research on motivated reasoning, five studies with children and adults (N = 865) suggest that participants' beliefs were driven primarily by the evidence, even when the evidence was incongruent with their motivations. This work provides initial evidence for the account proposed by Jern and colleagues.
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12:00-1:30 PM (2109)

Medial Prefrontal Cortex Activation for Food Tracks Individual Differences in Food-Reward Sensitivity. TIMOTHY KELLEY, JASON VAN ALLEN, and TYLER DAVIS, *Texas Tech University* (Sponsored by Tyler Davis) – Individual differences in reward motivation are associated with a number of important health related outcomes. Within participants, valuation mechanisms in the medial prefrontal cortex (mPFC) are known to track differences in subjective value between items. Previous studies have examined whether between participant differences in reward motivation impact mPFC valuation signals, however these studies have relied heavily on self-report measures. Here we investigated how individual differences in food reward motivation impacts mPFC activation to food cues using a relative reinforcing value (RRV) task in which participants played a video slot machine to receive food rewards. Participants were scanned while viewing pictures of food and non-food objects and then completed the RRV task outside the scanner. We found that mPFC activation to food cues was positively associated with the amount that participants played the RRV task. These results suggest that mPFC is involved with both within and between participant differences in valuation.
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12:00-1:30 PM (2110)

Investigating the Role of Motivation in Procedural and Conceptual Learning. KELLY BODEN, ERIC KUO, TIMOTHY NOKES-MALACH, and TANNER WALLACE, *University of Pittsburgh*, MUHSIN MENEKSE, *Purdue University*, QUENTIN KING-SHEPARD, *University of Pittsburgh* (Sponsored by Timothy Nokes-Malach) – Students learning math and science often struggle to develop the conceptual understanding necessary to adapt and apply their knowledge to solve novel problems. Studies examining procedural and conceptual learning typically focus on the cognitive processes involved and less on student motivation. In contrast, motivation research has largely focused on the relations between motivational factors and broad academic behaviors and performance, without differentiating between different types of learning outcomes. Our current study aims to integrate these lines of work by exploring the role of motivation in procedural and conceptual learning. We examined 6th grades students' self-efficacy and achievement goals in relation to two topics in science: speed and density. Results revealed self-efficacy as a significant predictor of conceptual learning, but not procedural learning. This relationship held while controlling for students' prior knowledge about the topic. We will discuss the implications of these results for theories of learning and instruction.
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12:00-1:30 PM (2111)

The Power of Crowd: The Difference of Multi-Voice and Multi-Sound. KICHUN NAM, JACHUN RYU, JINWON KANG, JUNWOO KIM, JAEHEE RYU, KATHLEEN KANG, and SUNGHUN CHO, *Korea University* – This study is based on the hypothesis that voice of crowd can have more impact on implicit learning than voices of one person when giving positive / negative feedback. Participants were asked to select a picture with a high likelihood of positive feedback in the two presented pictures. Three pictures stimuli were presented for each of the single and multiple voice / sound feedbacks. The experimenter instructed the subject to receive as much positive feedback as possible. The voice stimuli were the 'you are right' and 'you are wrong' monotone voices. And the sound stimuli were 'ding-dong'(positive) and 'dong-ding'(negative) six different instrumental sound. Single-voice stimuli are randomly presented one of six male and female voices, and Multi-voice stimulus is presented recorded voice simultaneously by six men and women. Likewise, Single-sound stimuli are randomly presented one of six different instrumental sound, and Multisound stimulus is presented synthesized the sounds of six instruments. As a result, multiple stimuli showed significantly higher performance than single stimuli, and human voices stimuli performed higher than instruments sound stimuli.
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12:00-1:30 PM (2112)

Predicting Success for Professional Rehabilitation. ANGELA BRUNSTEIN, *GUST; FAW gGmbH*, JOERG BRUNSTEIN, MICHAELA WEISS, and STEPHAN MARTIN, *Fortbildungsakademie der Wirtschaft gGmbH* – Losing your profession due to health reasons and building a new promising career option for yourself is a challenging task for most clients during professional rehabilitation. This study investigated self-perception, goal adjustment, perceived ability to cope with trauma, current symptoms and work related attitudes and behaviors with 20 clients during professional rehabilitation and age-related healthy controls at begin, after 6 weeks and after 3 months of training. At beginning, later successful participants demonstrated a greater difference in their actual self from ideal self and from odd self, greater importance of work and greater quality of life compared to participants that were not yet successful after 3 months of training. It seems that perceiving the current crisis in life as an opportunity for trying out something

new instills motivation to master that challenging situation. In contrast perceiving that situation as a potential threat seems to impair coping with those challenges.
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12:00-1:30 PM (2113)

Negotiators' Mental Model: Negotiating for Goods and Services. EINAV HART and MAURICE E. SCHWEITZER, *University of Pennsylvania* – Individuals obtain highly consequential outcomes, from salaries to homes, through negotiation. In contrast to negotiations for goods, service contracts are typically incomplete, and relational outcomes may influence behavior. However, we know surprisingly little about how the negotiation process might influence post-negotiation behaviors, motivation, and productivity. If the negotiation process affects relational outcomes that influence productivity, the negotiation process itself – in addition to the negotiated outcome – will change the agreement value. The absence of research investigating how negotiations affect service quality represents a serious oversight: more than two-thirds of the world's Gross Domestic Product involves services. Across lab and field studies, we find that individuals expect negotiations to harm relational outcomes. These beliefs influence behavior: we find that individuals are both less willing to negotiate for services than for goods, and less assertive when they do negotiate for services. Our investigation demonstrates the dynamic relationships among negotiation, relational conflict, and motivation.
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12:00-1:30 PM (2114)

Go for It: Differential Effects of Reward and Loss Targets on Motor Excitability. THOMAS CARSTEN, CARSTEN BUNDT, FREDERICK VERBRUGGEN, and RUTH KREBS, *Ghent University* (Sponsored by Frederick Verbruggen) – Reward prospect is commonly associated with action, while loss avoidance is associated with inaction. We tested whether these valence-related action tendencies are motorically represented. Colored targets signaled reward prospect (for above average performance), loss prospect (for underperformance), or no-incentive outcomes. Behaviorally (study 1), both reward and loss targets led to faster and more accurate responses than no incentives. Moreover, participants were faster in reward trials than in loss trials, which suggests an inherent reward-action mapping. Measuring motor excitability with Transcranial Magnetic Stimulation (TMS) during the response period (study 2) confirmed this notion. In addition to an overall stronger motor excitability for incentives as compared to no-incentives, we found an initial decrease followed by boosted motor excitability only for reward, but not for loss trials. This unique effect of reward prospect on motor excitability as early as 150 ms after target onset might explain the behavioral advantage of reward over loss signals. In a follow-up experiment (study 3), we aim to replicate these findings while controlling for differential TMS pulse timings relative to the response.
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12:00-1:30 PM (2115)

Evidence for a Strictly Motor System-Based 'Judgment of Agency'. EITAN HEMED, NOAM KARSH, and BARUCH EITAM, *University of Haifa* (Sponsored by Yaffa Yeshurun) – Several literatures have explored how people (and other animals) learn an action's effectiveness for obtainment of rewards. The behaviorist reinforcement learning literature (among others) has shown that people's reward seeking behavior often follows a calculation termed 'Delta p' — the difference between the probability of obtaining an outcome (e.g., food) given an action compared to the probability of obtaining the same outcome without performing the action. More recently, our lab has demonstrated that influencing the environment (without obtaining any tangible outcome) can facilitate action-selection similarly to receiving some tangible outcome (such as monetary gain). In the current study we describe a robust novel finding that such motivation from influencing the environment does not follow the 'Delta p' measure but is sensitive only to sensations that follow self-generated actions. The findings provide support a strictly motor-based computation of the 'sense of agency' and suggest that the motor-system is not only influenced by reward but in-fact can drive reward-related processes.
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12:00-1:30 PM (2116)

Procrastination Among Undergraduate Students: A Longitudinal Study of Research Credit Completion. LISA VANGSNESS and MICHAEL YOUNG, *Kansas State University* (Sponsored by Michael Young) – Procrastination can be identified using behavioral measures such as task initiation, task completion, and time-on-task. Because task completion is a continuous process that is best explained by several metrics, we tested a new method of identifying procrastinators using distributional characteristics. Using historical data on research credit completion from our university's research management system, we identified four clusters of task completion behavior among our undergraduate students. An exploratory factor analysis on various behavioral and self-report measures of procrastination and associated traits confirmed that distributional characteristics loaded onto a single factor. Predictive analysis suggested that conscientiousness modestly predicted membership in a cluster of students who distributed their participation throughout the semester and completed the prescreening survey. In light of these findings, we advise researchers to consider multiple measures of task completion behaviors when identifying procrastination among students.
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12:00-1:30 PM (2117)

The Role of Liking in Evaluative Conditioning of Affective States. CHRISTINE E. WEBER (Graduate Travel Award Recipient), DOUGLAS H. WEDELL, and SVETLANA V. SHINKAREVA, *University of South Carolina* (Sponsored by Douglas Wedell) – In evaluative conditioning, attitudes toward neutral stimuli can become either positive or negative by prior pairing with positively or negatively valenced stimuli. The present study investigated whether evaluative conditioning can operate on affective states evoked by the presentation

of the unconditioned stimuli, rather than just on attitudinal evaluations of the stimuli themselves, a possibility not previously investigated. Short neutral video clips were paired with music that evoked either positive or negative states. Music was selected for each individual to covary with liking ratings or not. Results showed that evaluative conditioning effects on valence state ratings associated with the video clips were linked to the valence of the unconditioned stimulus rather than participants' liking for it. This provides evidence that evaluative conditioning can be generalized beyond effects on liking or other measures of attitude to include changes in affective states in response to stimuli. Although affective valence and liking are related, we show that these constructs can be successfully dissociated, and that affective reactions can be altered by manipulating valence even when liking is held constant.
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PSYCHOLINGUISTICS I

12:00-1:30 PM (2118)

The Impact of Companions on Medical Conversations With Older Patients: Understanding Communication Behaviour. RENATA MEUTER and JOANNE BRASSINGTON, *Queensland University of Technology* – Effective communication is key in medical consultation. Often older patients bring a companion who becomes part of a communication triad. We explored their impact on communication behaviors by analyzing 7 practitioner-patient hospital consultations, with or without a companion. We used Discursis (a visualization tool), followed by in-depth analysis using Communication Accommodation Theory. Compared to patients, companions contributed more, less, or similarly to patients to a conversation. Overall engagement was higher in triads and more information was shared. Positive and negative communication behaviors were seen in all consultations. In triads practitioners tended to align with the companion, excluding the patient. While the triadic consultations showed more negative communication, companions largely impacted positively by supporting patients, facilitating information sharing and increasing engagement. Patient ratings of their experience was positive in all consultations. The varied speaker contributions reveal the individual and targeted nature of consultations, and our analyses suggest that companions' contribution to and impact on the practitioner-patient engagement must be closely monitored to protect the patient's voice.
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12:00-1:30 PM (2119)

Perception of Sound Symbolism in Monolinguals and Bilinguals. LINDSEY R. HASAK, *Stanford University*, LISE ABRAMS, *Pomona College* – Certain words have sound symbolism, a property in which a word's phonemes are linked to its meaning. For example, some nonwords feel inherently round and sharp (e.g., "bouba" and "kiki"), as demonstrated by adults reliably mapping them to round and angular shapes. The present study examined whether language experience, i.e., bilingualism, affects sensitivity to sound symbolism. Bilinguals' access to multiple sets of phonemes and their familiarity with maintaining multiple representations for singular concepts may provide them with an advantage for detecting sound symbolism. English monolinguals and Spanish-English bilinguals were tested on three sound symbolism tasks: (1) a nonword Bouba-Kiki task, (b) a task that required choosing the meaning of a foreign language word, and (c) a task that evaluated learning of sound-symbolic associations. Contrary to our hypothesis, results showed no differences between groups in accuracy or response time, suggesting that additional language experience does not aid judgment of sound-to-meaning correspondences. These results are discussed in terms of the role of other mechanisms underlying sound symbolism, such as perceptual sensitivity to cross-modal correspondences between sound and meaning.
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12:00-1:30 PM (2120)

Predictability and Word Frequency Effects in Speech-Perception-in-Noise Task By Non-Native Speakers. SHAN WAN and CATHERINE L. CALDWELL-HARRIS, *Boston University* – Native and non-native listeners were presented with English sentences in which the final word varied in predictability and word frequency and were instructed to repeat out loud the final word. Word recognition of English-proficient native Mandarin, Russian, Spanish speakers, immigrants to the U.S., depended on multiple factors. These non-native speakers used different compensatory information to enhance word recognition when listening to sentences embedded in multi-speaker babble. Relative to low predictability, all non-native listeners' final word recognition improved in recognizing high-predictability words. The importance of word frequency varied according to the subject's native language. High word frequency aided Mandarin speakers more than it did Russian and Spanish speakers. We observed that many of the high frequency words in our list were similar to canonical phonological structure in Mandarin. An effect unique to Mandarin speakers was the influence of age of arrival, which suggests that the L1-L2 difference between Mandarin and English is sufficiently high as to make childhood learning more necessary to attain high levels of adult L2 proficiency.
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12:00-1:30 PM (2121)

Determinants of Adult Native Grammatical Mastery. JANET L. MCDONALD, *Louisiana State University* – Differences in adult grammatical mastery have been found based on a) education or language experience in native speakers (Dabrowska, 2012), b) language learning aptitude in L2 speakers (Abrahamsson & Hyltenstam, 2008) and c) working memory capacity in native and non-native speakers (McDonald, 2006, 2008). We examined the relative roles of these three factors on native-speaking adults' grammaticality judgment. Working memory best predicted performance on a set of easier grammatical constructions (determiners, progressives, word order), while language experience (measured by a vocabulary test) and working memory made independent contributions to performance on a set of difficult constructions (tense correctness across clauses, verb agreement). Examination of the

individual difficult constructions showed that tense correctness constructions were generally predicted by working memory capacity, while complex verb agreement was predicted by language experience along with language learning aptitude. Thus, native grammatical mastery is subject to a variety of influences which may vary across constructions.
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12:00-1:30 PM (2122)

Tracking the Behavioral and Neural Signatures of Intensive Short-Term Language Learning in Two Learning Contexts. ELEONORA ROSSI, *California State Polytechnic University, Pomona*, ISABEL EYER, *University of Groningen*, MILDRED RANGEL and SANNA TAHIR, *University of California, Riverside*, MEGAN NAKAMURA, *California State Polytechnic University, Pomona*, CHRISTINE CHIARELLO and JUDITH KROLL, *University of California, Riverside* – Recent evidence suggests that adults can demonstrate rapid learning of a new language (L2) after relatively little exposure. We considered how immersion modulates the trajectory and outcomes of new learning by examining intensive short-term learning of a new language (Dutch, 10 days of learning, 1 hour a day through a computerized program) in over 60 participants and controls in two different contexts. One group was immersed in Dutch in the Netherlands and the other in English in the US. Behavioral and EEG indices of new language learning and cognitive control measures were collected to investigate the consequences of language training. Results showed a significant language learning trajectory in both behavioral and EEG measures. In addition, a number of cognitive factors were significant predictors of learning. Initial findings suggest that immersion in the L2 not only facilitates new learning, particular for speech, but may differentially draw on available cognitive resources.
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12:00-1:30 PM (2123)

The Effects of Linguistic Labels on Object Categorization and Perception. XUAN PAN and DEBRA JARED, *The University of Western Ontario* (Sponsored by Debra Jared) – Lupyan's (2012) Label-feedback Hypothesis proposes that linguistic labels affect our conceptual and perceptual representations. We tested this hypothesis by investigating the effect of Chinese word structure on picture categorization and perception. In Chinese, some nouns provide explicit category information (likesunflower in English), while some nouns do not. In Experiment 1, English monolinguals showed typicality effects in categorization RT data, with atypical objects being categorized more slowly than typical objects, and in the N400 of ERP data, regardless of whether the object name had a category clue in Chinese. In contrast, Chinese-English bilinguals showed a larger typicality effect for objects without category clues in their name than objects with clues. In Experiment 2, a visual oddball detection task with ERP was used. In Chinese speakers, the visual mismatch negativity elicited by deviant stimuli was larger when standard and deviant pictures did not have category clues in their names than when they did, but in English speakers the vMMN was similar for the two types of pictures. These results demonstrate that linguistic information embedded in object names affects people's object categorization and perception.
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12:00-1:30 PM (2124)

Explicit vs. Implicit Learning of Chinese Numeral Classifiers and Native-English Speakers' Object Categorization Preferences. YEE PIN TIO and USHA LAKSHMANAN, *Southern Illinois University, Carbondale* – The current research contributes to debates on the link between language learning and cognition by examining whether Native-English speakers' learning of Chinese numeral classifiers impacts how they categorize objects. Specifically, we conducted a training study to experimentally compare the differential effects of explicit versus implicit learning of numeral classifiers on Native-English speakers' (N= 153) object categorization preferences in a forced-choice task. There is substantial evidence within second language learning research supporting the positive effects of explicit learning. However, following DeKeyser (1995), we hypothesized that implicit instruction will have a stronger impact on the learning of fuzzy morphological rules, a characteristic property of numeral classifiers. The results of a one-way ANOVA confirmed that both the explicit and implicit learning groups performed significantly differently from the control group by favoring a classifier-based object categorization. At the same time, explicit learning was observed to have a stronger impact on object categorization compared to implicit learning. We discuss the implications for future research on language learning and cognition.
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12:00-1:30 PM (2125)

The Grammaticality Asymmetry in Agreement Attraction Reflects Response Bias: Experimental and Diffusion Modeling Evidence. CHRISTOPHER HAMMERLY, ADRIAN STAUB, and BRIAN DILLON, *University of Massachusetts, Amherst* (Sponsored by Adrian Staub) – Cue-based memory retrieval models have dominated theories of how dependencies such as subject-verb agreement are formed. A cornerstone of the arguments in favor of these models is the grammaticality asymmetry in agreement attraction—the observation that non-subject nouns may interfere with the computation of agreement in ungrammatical, but not grammatical, sentences. This asymmetry is most often accounted for via the interaction of categorical number marking and the dynamics of retrieval interference. We challenge this interpretation of the grammaticality asymmetry, arguing instead that it is an artifact of response bias. In three experiments, we show that neutralizing bias eliminates the grammaticality asymmetry in acceptability judgments. This favors an account that attributes attraction to a gradient representation of number. We link gradient number marking to the rate of evidence accumulation in a diffusion process, and show that the magnitude of the grammaticality asymmetry is captured through shifts in the decisional starting point.
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12:00-1:30 PM (2126)

(In)Visible Dimensions: Implicit Affect and Basic Emotion Categorizations in Emotion Terms. HALSZKA KINGA BĄK, *Adam Mickiewicz University*, JEANETTE ALTARRIBA, *University at Albany, State University of New York* – One of the fundamental assumptions of emotion research is that emotion terms carry implicit affective and emotional meaning. In this study we looked for correlations between explicit and implicit evaluations of affect and basic emotion categorizations of happiness and sadness in male and female voices. Raters evaluated valence, categorized the valence in the voices (explicit tasks), or engaged in free naming of the emotion. The responses in the free naming task were tagged for the implicit valence and basic emotion categories they carried. We found a strong correlation between the implicit and explicit categorizations by basic emotions in female voices expressing happiness and male voices expressing sadness. The results provide further support for the role of gender stereotyping as an important factor in emotion processing. Results are discussed with reference to the Behavioral Ecology View of Emotions.
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12:00-1:30 PM (2127)

Developing an Emotional Perception Measure for Individuals With Autism Based on the Milestones Scale of Development. MAURA L. KRESTAR, STEPHEN D. OLLER, and SARAH BAKER, *Texas A&M University, Kingsville* – Despite the well-documented language differences exhibited by individuals with autism, a fine-grained, accurate assessment of differences in the representation of emotion and emotional experiences in the spectrum does not currently exist. The current project focuses on The Milestones Scale of Development, an assessment being developed based on the general sign theory of communication that has been applied to the analysis of Autism Spectrum Disorders. Representations needed to correctly identify and use emotional language, engage in metacognitive and metalinguistic activities, and achieve general success in complex social situations will be examined and compared to expert judgments by speech language pathologists, parent/guardian behavioral reports, and basic measures of spoken word recognition. The project focuses on the levels of the Milestones Scale, a launching point for testing the reliability and validity of 17 distinct levels of the scale, 16 normal developmental behaviors and a null level.
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12:00-1:30 PM (2128)

Situating Real-Time Language Comprehension in Context: A Processing Account. KATJA MÜNSTER and PIA KNOEFERLE, *Humboldt-Universität zu Berlin* (Presented by Pia Knoeferle) – Real-time language processing is rapidly influenced by (real-world and depicted) objects or action events via a temporally coordinated interplay of what comprehenders see and their interpretation of language. The (social) Coordinated Interplay Account ((s)CIA) explicitly integrates interpretation of language with perception of objects, events, and speakers and permits modulation of the interplay of these processes with comprehenders' characteristics. This is achieved via representations in a working memory workbench. These keep track of the interpretation, (socially-derived) expectations, and the scene (including speakers), all of which an be indexed with properties of the comprehenders and the type of the comprehension process (to distinguish different language-scene mappings). This (non-implemented) but detailed processing account captures visual and social context effects on language comprehension, effects of comprehender characteristics such as their age, and effects of both voice and visual speaker characteristics (e.g., gaze, mimics) on a comprehender's language processing.
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12:00-1:30 PM (2129)

Short Exposure to a Foreign Accent Impacts Subsequent Cognitive Processes. ALICE FOUCART, *Ghent University, Universitat Pompeu Fabra*, HERNANDO SANTAMARÍA-GARCÍA, *Pontificia Universidad Javeriana, INCyT, Hospital SanIgnacio*, ROBERT J. HARTSUIKER, *Ghent University* – Although speaking a foreign language is undoubtedly an asset, foreign-accented speakers are usually perceived negatively. It is unknown, however, to what extent this bias impacts cognitive processes. We used ERPs and pupillometry to investigate whether the negative bias generated by a short exposure to a foreign accent influences the overall perception of a speaker, even when the person is not speaking. We compared responses to written sentence comprehension, memory and visual perception, associated to native speakers (high and low social status) and a foreign-accented speaker (high social status). Responses associated with the foreign-accented speaker consistently fell in-between the high-status native speaker and the low-status native speaker. This is the first physiological demonstration that short exposure to a foreign accent impacts subsequent cognitive processes, and that foreign-accented speakers are considered less reliable than native speakers, even with equally high social status.
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12:00-1:30 PM (2130)

Engineering Creativity: Electrophysiological Responses to Novel Metaphors Differ as a Function of Prior Knowledge. RAFAL JONCZYK, *Pennsylvania State University*, GÜL E. KREMER, *Iowa State University*, ZAHED SIDDIQUE, *University of Oklahoma*, JANET VAN HELL, *Pennsylvania State University* – Recent neurophysiological evidence suggests that novel metaphor comprehension provides a window on creative cognition. Little is known, however, how prior knowledge and topic familiarity influence this process. To this end, we collected electrophysiological responses to literal, nonsense, and novel metaphorical sentences that referred either to engineering or general knowledge, testing engineering (n=24) and non-engineering (n=20) students. In an EEG/ERP experiment, participants read sentences and made judgments about their meaning. The findings indicate that prior knowledge modulates novel metaphor processing at the meaning re-analysis stage, indexed by the Late Positive Complex (LPC). Specifically, novel metaphors referring to engineering rather than general knowledge lead to decreased LPC amplitudes in engineering students only, suggesting less effortful re-evaluation of novel

engineering metaphors in engineers. These results provide novel evidence that prior knowledge and topic familiarity modulate electrophysiological responses to novel metaphorical language, which suggests that prior knowledge and topic familiarity affect creative language use.
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12:00-1:30 PM (2131)

Adapting Interpretations of Disfluency Based on Local Context. SI ON YOON, *University of Illinois at Urbana-Champaign*, SARAH BROWN-SCHMIDT, *Vanderbilt University* – Disfluency in speech leads listeners to expect upcoming reference to unfamiliar or discourse-new objects. We examined if this expectation is adapted based on the way disfluency has been used in the current discourse context. Participants listened to pre-recorded instructions to look at an object on a screen containing two familiar and two novel objects, while gaze was monitored. We manipulated the co-occurrence of disfluency and reference to novel vs. known objects. In the predictive condition, disfluent expressions always referred to novel objects, and fluent expressions to familiar objects. In the non-predictive condition, disfluent trials referred to either familiar or novel objects. Analysis of gaze revealed that the tendency to interpret disfluency=new was attenuated in the non-predictive condition. Thus, listeners adapted their expectations about upcoming words based on recent experience with disfluency. Disfluency is not invariably processed, but instead is a cue that is flexibly adapted within the local context.
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12:00-1:30 PM (2132)

Seeing Double, Seeing Clear: Implications for the Architecture of Language. QATHERINE ANDAN, PETER BEX, and IRIS BERENT, *Northeastern University* (Sponsored by Joanne Miller) – Across languages, certain phonological forms are preferred. But whether such preferences arise from abstract linguistic rules or sensorimotor pressures is unknown. Previous research showed that English speakers shift their off-line responses to doubling from aversion (when naming a single object) to preference (when doubling signals plurality). This shift is significant because it dissociates linguistic preferences from sensorimotor properties. To determine whether these principles apply on-line, here, we replicate these experiments while monitoring participants' eye movements. Results show doubling preferences emerge automatically. When participants chose among bare phonological forms, doubling was avoided, and it elicited shorter first fixations, fewer regressions, and shorter looking times relative to no-doubling controls. This pattern reversed when doubling signaled morphological plurality. These results show for the first time that doubling automatically elicits competing linguistic parses that affect on-line behavior. Since the stimulus is invariant, these findings suggest that some linguistic principles are abstract.
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12:00-1:30 PM (2133)

Alleviating the Translation-Ambiguity Disadvantage: Effects of Individual Differences on the Use of a Placeholder to Represent Translation-Ambiguous Words. GABRIELA TERRAZAS and NATASHA TOKOWICZ, *University of Pittsburgh* (Sponsored by Natasha Tokowicz) – Translation-ambiguous words are words with two or more translations across languages. These words are remembered less accurately and at slower rates than words with only one translation (so-called translation-unambiguous words; e.g., Eddington & Tokowicz, 2013; Tokowicz & Kroll, 2007). Previous research has investigated different training methods that could reduce the translation-ambiguity disadvantage. Degani et al. (2014) found that presenting multiple translations in the same session improves retention of translation ambiguous words compared to training translations in different sessions. The current study explores the effects of informing second language learners that a word has multiple translations, and that the second one will be presented later in vocabulary training. We predicted that the use of a placeholder will produce similar accuracy results as training both translations in the same session, however, this is only observed when participants' individual differences are taken into account.
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12:00-1:30 PM (2134)

Neurophysiological Signature of Phonotactic Rule-Learning. ENES AVCU, CHAO HAN, RYAN RHODES, and ARILD HESTVIK, *University of Delaware* (Sponsored by Arild Hestvik) – Artificial grammar learning studies have shown that learners can extract adjacent and non-adjacent dependencies with relatively short training at the behavioral level. Less is known about how these patterns are encoded at the neurophysiological level. The aim of the current study is to observe the neurophysiological correlates of implicit learning of a non-adjacent phonotactic pattern using EEG. We find that without a priori explicit learning the brain can distinguish words which follow the pattern from words that violate it. 24 participants were trained by listening and repeating grammatical words and then tested in an auditory oddball paradigm. Grammatical and ungrammatical words appeared in a 4:1 ratio. Trials with correct behavioral responses showed a significant difference in brain response between grammatical and ungrammatical, $t(23)=3.047$, $p=0.006$, $d=0.622$, $1-\beta= 0.830$. Trials with incorrect responses did not show a significant difference, indicating a correlation between neural response and behavioral response within-subject.
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12:00-1:30 PM (2135)

Syntactic Adaptation Is Influenced by both Construction-Relevant and Construction-Irrelevant Errors. AVERY MALONE and GAIL MAUNER, *University at Buffalo, State University of New York* – Syntactic adaptation is argued to be the consequence of learning to minimize errors across repeated exposures to low frequency constructions. An implicit assumption of error-driven syntactic adaptation is that the errors driving adaptation should be construction-relevant.

This assumption was supported in Fine's (2013) observation of faster reading times across trials in the construction-relevant disambiguating regions (underlined) of reduced relative clause sentences (RRC) like The kitchen staff served in the cafeteria soon got very sleepy. Across a series of experiments using more fine-grained analyses, we show that syntactic adaptation is not driven solely by construction-relevant errors. Specifically, earlier adaptation to RRC construction-irrelevant violations of syntactic expectations (i.e., seeing a PP rather than the expected NP after served) predictively cues and influences processing in the disambiguating regions of RRC sentences. Crucially, our findings suggest the need to refine our view of the mechanisms underlying syntactic adaptation.
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12:00-1:30 PM (2136)

Syntactic Adaptation to Native Versus Non-Native Speech. RODICA CONSTANTINE, *University of Nevada, Las Vegas*, SCOTT H. FRAUNDORF, *University of Pittsburgh* (Presented by Scott H. Fraundorf) – Speakers and dialects differ, prompting language comprehenders to adapt; e.g., given repeated exposure to quasi-grammatical structures, comprehenders view them as more grammatical (e.g., Luka & Choi, 2012). We examined whether participants adapt syntactic judgments differently for native vs. non-native speakers. In an exposure phase, participants listened to, retyped, and rated the grammaticality of quasi-grammatical sentences (e.g. What Emily is thankful for is that she is here) spoken by a native or non-native speaker (counterbalanced across lists). In a subsequent test phase, participants rated more sentences; some had the same structure as exposure sentences. Participants rated the native speaker as more grammatical overall, demonstrating the role of sociolinguistic identity in syntactic perception. Further, structures previously heard during exposure were rated as more grammatical, but only for the native speaker. This demonstrates that expectations from speaker identity modulate syntactic adaption, favoring accounts in which adaptation reflects environmental learning rather than transient activation.
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12:00-1:30 PM (2137)

Prosodic Phrase Boundary Processing in Native Signers of American Sign Language. NIKOLE GIOVANNONE, *University of Connecticut*, AHREN B. FITZROY, *Mount Holyoke College*, RUSSELL RICHIE, *University of Connecticut*, SANDRA WOOD, *University of Southern Maine*, KAJA JASINSKA, *University of Delaware*, MARIE COPPOLA and NICOLE LANDI, *University of Connecticut*, MARA BREEN, *Mount Holyoke College* – We investigated prosodic processing across language modality using the Closure Positive Shift (CPS), an ERP component elicited by acoustic correlates of prosodic phrasing, but also by musical phrase boundaries, semantic focus, and commas during silent reading. If the CPS is not specific to acoustic correlates of prosody, but instead indexes domain-general attention and memory allocation at phrase boundaries, we predicted that it would be observed in both spoken and signed languages. ERPs were collected from 41 native speakers of English and 16 deaf native signers of American Sign Language as they perceived (heard or viewed, respectively) globally-ambiguous sentences disambiguated with prosodic phrase boundaries. We observed a CPS from 500-800ms after phrase offset with similar scalp topography in each language group. Our results challenge the claim that the CPS is dependent on acoustic correlates of prosody, suggesting that it indexes memory and attention-associated closure processes at phrase boundaries regardless of modality.
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12:00-1:30 PM (2138)

Cross-Situational Word Learning in Chinese. MICHAEL C.W. YIP, *The Education University of Hong Kong* – This study extended previous findings on cross-situational learning of minimal word pairs by using Cantonese Chinese, a language that can separate the effects from individual lexical components of a word: initial consonant, rime and tone. Sixty native Cantonese speakers were recruited to participate in a standard cross-situational word learning task. In the cross-situational word learning task, four different types of word pairs were used: (1) a non-minimal word pair (N); (2) a consonant minimal word pair (C); (3) a rime minimal word pair (R) and (4) a tone minimal word pair (T). The results showed that participants could learn the word-referent mapping for all types of word pair but they performed better on N and T types of word pairs than the other two types of word pairs (i.e. C and R). Together with other previous evidence, these findings suggest that Cantonese language learners can learn and encode those phonetic details while they learn the word-referent co-occurrence probabilities, and the present results also suggest that the tonal information seemed to be more important than the other phonological components in word learning of Cantonese.
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12:00-1:30 PM (2139)

Item Blocking in Linguistic Category Induction. ROMAN TARABAN, *Texas Tech University* – In natural languages, linguistic gender requires coordination of multiple linguistic markers. In emergentist theories, linguistic categories are acquired through inductive processes. Participants learned eight nouns in eighteen locative phrases in an artificial language (e.g., to car = garth eef). Nouns were divided into two gender-like classes. Gender-marked and unmarked nouns were tested in two conditions: one in which noun phrases were randomly presented in a learning block; one in which a learner had to correctly choose the correct form of the locative constructions associated with a noun before proceeding to the next noun (referred to as item blocking here). Unmarked nouns with item blocking required fewer trials to the learning criterion than marked nouns. Item blocking resulted in significantly higher accuracy on generalization trials to new phrases, but noun marking did not. The findings suggest that in natural language acquisition, interactions may benefit from item blocking when nouns are unmarked.
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12:00-1:30 PM (2140)

Learning Beyond Words: Generalization of a Complex Morphological Construction in Children and Adults. NIVEEN OMAR, BRACHA NIR, and KAREN BANAI, *University of Haifa* (Sponsored by Karen Banai) – Most Semitic words are combinations of two interleaved morphemes – a consonantal root and a vowel pattern, each carrying a meaning. Words that share a morphological pattern create an environment of regularities at both the formal and the conceptual levels. Whether and how these regularities support word and morpheme learning remains under debate. We asked how well Hebrew-speakers can implicitly learn novel words and morphemes from a brief exposure to words sharing the same morphological pattern, and whether age impacts this learning. Native Hebrew-speakers – 36 adults and 24 children – participated in two learning conditions. A conceptual condition included regularities at the conceptual level, based on words that share the same general concept. A morphological condition included a common general concept encoded by the morphological pattern, creating regularities both at the conceptual and at the formal level. Word and morpheme learning were explored. Findings suggest that both words and morphemes can be implicitly learned in the two groups, with an advantage to the adults. These data imply that new morphemes can be acquired implicitly from environmental regularities and that this process continues to develop into adulthood.
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12:00-1:30 PM (2141)

Novel Word Learning: An ERP Study on Lexical Consolidation in Monolingual, Inexperienced Foreign Language Learners. YUSHUANG LIU and JANET G. VAN HELL, *The Pennsylvania State University* (Sponsored by Janet van Hell) – The Complementary Learning Systems Theory proposes that novel words are initially encoded by the hippocampal learning system; after a period of consolidation, memory representation stabilizes in the neocortical network. An ERP study testing experienced foreign language learners (Bakker et al., 2015) found that novel word forms were lexicalized after 24-hours. Testing monolinguals (inexperienced language learners), we examined word learning and consolidation, using Bakker et al.'s procedures. N400 responses to words learned on Day-1 and Day-2 were similar, indicating that words learned on Day-1 have not been lexicalized and integrated into learners' lexical network after 24 hours. However, novel words learned on Day-1 revealed a stronger reanalysis effect (LPC), while novel words learned on Day-2 showed this effect only when preceded by strongly related primes. These combined findings indicate that prior word learning experience affects novel word learning, and different encoding and consolidation strategies in monolingual and multilinguals.
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12:00-1:30 PM (2142)

Investigating Infant Sensitivity to Sound Symbolism. DAVID M. SIDHU and ANGELIKI ATHANASOPOULOU, *University of Calgary*, STEPHANIE L. ARCHER, *University of Alberta*, SUZANNE CURTIN and PENNY M. PEXMAN, *University of Calgary* (Presented by Penny M. Pexman) – Sound symbolism involves a non-arbitrary association between sound and meaning. This is demonstrated in the bouba-kiki effect where adults and children show a bias to associate round objects with nonwords like bouba and spiky objects with nonwords like kiki. We investigated the developmental origins of the bouba-kiki effect, testing 4-5 month old infants in a preferential looking paradigm. On each trial, infants saw two objects on the screen, one round and the other spiky, while listening to a label that was sound-symbolically associated with round objects (bobo or lulu) or with spiky objects (cheechee or kaykay). Infants preferred the spiky object over the round one, but were not sensitive to sound symbolic relationships. Our results suggest that sensitivity to sound symbolism is not biologically endowed but, rather, emerges with experience.
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12:00-1:30 PM (2143)

If You See Something, Say Something: Meaning Guides Visual Attention During the Description of Rich Scenes. GWENDOLYN L. REHRIG, TAYLOR HAYES, JOHN M. HENDERSON, and FERNANDA FERREIRA, *University of California, Davis* – Speakers often use language to describe the world around them. We attempted to specify how the linguistic and visual information processing systems interact during language production. An innovative approach to scene processing which precisely quantifies visual salience and meaning has demonstrated that attention in scenes is more strongly controlled by semantics than visual salience, as revealed by eye movements recorded during two offline judgment tasks (Henderson & Hayes, 2017). We applied this paradigm to investigate language production. 60 subjects saw 30 full color scenes and, while viewing each scene, either described it or suggested a set of actions a person might perform in the scene. Meaning played a greater role in guiding visual attention during language production. Moreover, visual salience did not guide attention even during fixations that preceded color terms. Speech onset was delayed and speech offset occurred early when subjects described actions, suggesting greater demands on utterance planning.
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LETTER/WORD PROCESSING II

12:00-1:30 PM (2144)

Investigating the Sources of Deaf Signers' Enhanced Peripheral Attention: ASL Experience and Deafness. EMILY A. JOHNSON and ELIZABETH SCHOTTER, *University of South Florida* (Sponsored by Elizabeth Schotter) – Native deaf signers' enhanced peripheral attention allows them to read more efficiently in English than reading-level matched controls. This enhancement could stem from brain reorganization due to auditory deprivation (deafness) or experience processing linguistic information peripherally (from ASL). To test this, we had signers identify letter signs briefly presented at near and far eccentricities. Deaf were more accurate than hearing participants, suggesting effects of deafness, and proficient hearing signers were more accurate than their less proficient

counterparts, suggesting effects of signing experience. Moreover, accuracy declined more at the furthest eccentricity for proficient hearing signers (MNEAR= 0.87, MFAR= 0.72) than for deaf signers (MNEAR= 0.92, MFAR= 0.83), suggesting that a combination of auditory deprivation (i.e., deafness) and experience processing linguistic information peripherally (i.e., signing) contribute to higher order cognitive changes that enhance peripheral visual attention and may lead to deaf signers' enhanced reading efficiency, even in a second language (i.e., English).
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12:00-1:30 PM (2145)

Lexicality Affects Efficiency of Comparison Judgments. ALBERT F. SMITH, NICOLE M. RUSSO, ARISHNA AGARWAL, and SARAH N. IMBRIGIOTTA, *Cleveland State University* – In previous research, irrelevant bigrams that flanked targets influenced lexical decision performance. For words, performance was better when flanking bigrams consisted of target-string letters (e.g., BI BIRD RD; RD BIRD BI; IB BIRD DR; DR BIRD IB) than when they did not (e.g., CE BIRD NT) and when flanking bigrams contained letters ordered as in the target (e.g., BI BIRD RD; RD BIRD BI) than switched (e.g., IB BIRD DR; DR BIRD IB); bigram order relative to the target did not affect performance. We used the same stimuli in a comparison task in which participants were to respond "same" if the flanking bigrams consisted of target-string letters (e.g., BI BIRD RD; RD BIRD BI; IB BIRD DR; DR BIRD IB, BU BUNE NE, NE BUNE BU, UB BUNE EN, EN BUNE UB) and "different" otherwise. For same trials, performance was more efficient when flanking-bigram letters were ordered as in the target than switched and when flanking-bigram letters were relatively close to their locations in the target than relatively distant. Notably, for same trials, performance was more efficient for words than for nonwords, and the letter-order effect was more pronounced for words than for nonwords. Lexicality did not affect performance for different trials.
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12:00-1:30 PM (2146)

Better Check it Twice: Proofreaders' Eye Movements Reveal Satisfaction of Search Effects. ELIZA R. BARACH and HEATHER SHERIDAN, *University at Albany, State University of New York* (Sponsored by Heather Sheridan) – Subsequent search misses (SSM) occur when the discovery of an initial search target interferes with the discovery of another target (e.g., Cain, Adamo, & Mitroff, 2013; Tuddenham, 1962). To explore the mechanisms underlying SSM errors in proofreading, we monitored participants' eye movements while they searched for typographical errors in multi-line paragraphs. We contrasted the pattern of eye movements for the same target words in a condition in which a typo was discovered earlier in the same paragraph, compared to a condition in which there was no previous typo. The discovery of the earlier typo led to a reduction in the amount of processing of the target word, as shown by reduced fixation durations and reduced refixations. Since the discovery of an earlier typo led to a less thorough subsequent search, our results provide support for the Satisfaction of Search (SOS) account of SSM errors.
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12:00-1:30 PM (2147)

Different-Script Bilinguals Develop Abstract Letter Representations in L2. MARIKO NAKAYAMA, *Tohoku University*, MASAHIRO YOSHIHARA, *Waseda University*, STEPHEN J. LUPKER, *University of Western Ontario* – Nakayama and Lupker (in press, JEP:HPP) recently reported that Japanese-English bilinguals produce facilitory, not inhibitory, masked priming effects from word orthographic neighbors in L2 English (e.g., side-TIDE), suggesting that different-script bilinguals represent/process L2 lexical forms differently from L1 English readers and same-script bilinguals (e.g., French-English bilinguals). To further investigate how different-script bilinguals represent/process L2 words, we examined whether J-E bilinguals develop abstract letter representations across upper- and lower-case alphabet letters in their L2 English. Using the masked priming paradigm, we found that repetition priming effects were of equal magnitude for cross-case similar pairs (e.g., soup-SOUP) and dissimilar pairs (e.g., edge-EDGE), although, on average, dissimilar targets were responded to significantly slower than similar targets. Our results indicate that different-script bilinguals do develop abstract letter representations in L2, suggesting that at the letter level of orthographic representation, there was no qualitative difference between different-script bilinguals and L1 English readers.
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12:00-1:30 PM (2148)

Reading Spaced and Unspaced Korean Text: Evidence From Eye Tracking During Reading. HYOSUN LEE, EUNJIN SEONG, and WONIL CHOI, *Gwangju Institute of Science and Technology* – Native Korean readers' eye movements during reading were monitored to examine how spacing between words influences natural reading of Korean. Spacing was manipulated in five conditions: 1) normal text with space, 2) text in which the space information between words was deleted, and three conditions in which spaces were replaced with other characters either 3) a symbol (ex., %), 4) one Korean character (ex. 우), or 5) random Korean characters. The results showed that total sentence reading times between the spaced and the unspaced conditions were not statistically different, but that those between the spaced and the conditions in which other characters randomly inserted in the space were statistically different. These results suggest that reading unspaced text should not be difficult in Korean, which is opposite to English reading, and implies that other factors like case markers could play a role in recognizing boundary of words.
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12:00-1:30 PM (2149)

The Role of Function Words in Text Processing by Native Speakers and Learners of Chinese and English. LIANG TAO, *Ohio University*, ALICE F. HEALY, *University of Colorado*

Boulder – The role of function words in text processing was assessed in native speakers and learners of Chinese and English. Both native English speakers in a 2nd year Chinese language class and native Chinese speakers at an American university read aloud short passages in Chinese and English, then answered comprehension questions on paper. Each passage had 8 of the highest frequently used function words (English word THE and Chinese word DE) removed. Despite the missing function words, all participants made only a small number of comprehension errors. However, when reading aloud, speakers were significantly affected by the missing function words, but only in their native language. Both native Chinese and English speakers made short pauses in the locations where words were missing, or they added the missing function words into the passages. Previous studies found that during silent reading, letters or characters from these common function words were not detected, and other eye-movement studies showed that eye fixations on these words were minimal. The present findings indicate, in contrast, that these words, even when absent from the text, were by no means disregarded by native speakers but rather were treated as essential by them.
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12:00-1:30 PM (2150)

A Re-examination of Consonant-Vowel Differences in TL Priming Effects With English Words. HUILAN YANG and STEPHEN J. LUPKER, *University of Western Ontario* (Sponsored by Stephen Lupker) – Most orthographic coding models predict no difference between vowel (cinaso-CASINO) and consonant (caniso-CASINO) transposed-letter (TL) effects. The relevant literature, however, is somewhat sparse/inconsistent. The present research provided an additional examination of this issue. Experiment 1 (following Schubert et al.'s (2018) manipulation) showed equivalent masked transposed-letter priming for consonant transpositions involving cluster (e.g., alhocol-ALCOHOL) versus singleton (lutanic-LUNATIC) consonants. Experiment 2, also using Schubert et al.'s stimuli, showed no vowel-consonant differences in masked transposed-letter priming effects. Importantly, for the first time, transposed-letter priming effects involving vowels were found in adults, a pattern replicated in Experiment 3 using the stimuli from Lupker et al.'s (2008) Experiment 1a (a non-replication of that experiment). In contrast, Experiment 4 showed a larger transposed-letter effect for consonant versus vowel nonwords in an unprimed lexical decision experiment. These findings suggest that vowel-consonant transposed-letter differences emerge later in processing rather than at the level of the orthographic code.
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12:00-1:30 PM (2151)

An Exploration of Hand Proximity Effects in Three Linguistic Tasks. GIORDANA GROSSI, *State University of New York, New Paltz*, ANNE OLMSTEAD, *University of Kansas, Pennsylvania State University*, DANIELLE LUKASZEWSKI, KATRINA STEVENS, and SARAH STOUDT, *State University of New York, New Paltz* – Effects of hand proximity have been reported in a variety of tasks employing linguistic stimuli, for example, letter identification, word categorization, and Stroop task. These effects have been interpreted as occurring during letter encoding and semantic processing. We conducted three experiments aimed at either replicating these effects or clarifying at which stage of processing they occur. Three different groups of participants performed a crowding experiment, a Stroop task, and a picture naming task. Participants performed these tasks both with their hands near to and far from the computer screen. We were not able to replicate the hand proximity effect in the Stroop task. In the crowding experiment, participants' performance showed a strong crowding effect and was influenced by flankers' visual similarity, but not hand proximity. This finding suggests that the facilitatory effect on letter recognition described in the literature occurs after the stage of feature integration.
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12:00-1:30 PM (2152)

Effects of Family Size/Frequency for Three-Character Japanese Kanji Compounds. YASUSHI HINO, MASAHIRO YOSHIHARA, and JUNYI XUE, *Waseda University* – In order to investigate the nature of morphemic processing for Japanese kanji compounds, we attempted to examine the effect of family size/frequency of the single kanji character for both the right-branching and left-branching three-character kanji compounds. When the right-branching and left-branching compounds were mixed together, a significant family size/frequency effect was observed in our lexical decision task. When the right-branching and left-branching compounds were presented in separate blocks, however, we observed no family size/frequency effect for the same kanji compounds. The implication of these results are discussed in terms of the nature of morphemic processing involved when reading Japanese kanji compounds.
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12:00-1:30 PM (2153)

Effects of Phonological Neighborhood Size and Word Frequency for Japanese Kanji and Katakana Words. YUU KUSUNOSE, *Bunkyo Gakuin University*, YASUSHI HINO, *Waseda University* – Using visual lexical decision and naming tasks, we orthogonally manipulated phonological neighborhood size and word frequency for Japanese kanji and katakana words. In our lexical decision task, although an inhibitory phonological neighborhood size effect was observed for both the high and low-frequency katakana words, for kanji words, a facilitory phonological neighborhood size effect was observed only for low-frequency words. In our naming task, on the other hand, while a facilitory phonological neighborhood size effect was observed for katakana words, no phonological neighborhood size effect was observed for kanji words. As such, the phonological neighborhood size effect varied depending on the script type and the task type. We will discuss some possible reasons why the phonological neighborhood size effect is modulated by these factors.
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12:00-1:30 PM (2154)

A Further Examination of Transposed Radical Priming Effects in Chinese Character Recognition. ZIAN CHI, XUAN PAN, and STEPHEN J. LUPKER, *University of Western Ontario* (Presented by Stephen J. Lupker) – In the hierarchical processing framework of Chinese, the radical and the character have different levels of representation. A key research question is whether radical representations are position-sensitive or position-general. In a previous study using the masked priming same-different task, we found transposed radical (TR) priming effects in response time, N170 amplitude and P2 latency. In the present research, Experiment 1 involved a masked priming same-different task with go/no-go responding (different = go, same = no-go), whereas Experiment 2 involved a masked priming lexical decision task, with ERP measurements being collected in both experiments. In Experiment 1, the results on same (no-go) trials were identical to those in the previous study, indicating that the previous results were not created by the response requirements of that task. In Experiment 2, we again found a TR priming effect in response time and in N170 amplitude, indicating that TR priming effects are not limited to low-level processing tasks. These results imply that the representations of Chinese radicals are position-general, at least if the radicals are free radicals.
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12:00-1:30 PM (2155)

Retinotopic Mapping of Parafoveal Preview? A Fixation-Related NIRS Study. ANDRE ROELKE, MARKUS HOFMANN, and RALPH RADACH, *University of Wuppertal* (Sponsored by Markus Hofmann) – Disentangling the hemodynamic responses to rapidly paced eye-fixation events is a challenge for Neuroimaging studies of reading. In this study, we utilized the rapid sampling frequency of functional Near Infrared Spectroscopy (fNIRS) to test whether predictability and frequency of the word right to the fixation leads to retinotopic effects in the left occipital cortex. We found a significant interaction of predictability and frequency, which results from reduced activation of the words of either high predictability or high frequency (not both). We discuss these fixation-related fNIRS results with respect to parafoveal preprocessing.
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12:00-1:30 PM (2156)

Independent Effects of Frequency and Plausibility on Word Skipping During Reading. AARON VELDRE, ROSLYN WONG, and SALLY ANDREWS, *The University of Sydney* – Recent eye-movement evidence suggests readers are more likely to skip a high-frequency word than a low-frequency word independently of the contextual fit of the word in the sentence. This evidence has been interpreted as strong support for a serial processing assumption in which the decision to skip a word is based on the completion of a preliminary stage of lexical processing prior to any assessment of sentential fit. The present study was designed to reconcile these findings with the plausibility preview effect: reduced first-pass reading times for words previewed by contextually plausible sentence continuations that are unrelated to the target word. Participants' eye movements were recorded as they read sentences containing a short (3-4 letters) or long (6 letters) critical target word. The parafoveal preview was either higher or lower frequency than the target word, and plausible or implausible in the sentence context. The results revealed strong, independent effects of all three factors on target skipping and early measures of target fixation duration. In contrast, the effects of frequency and plausibility interacted on later measures of target fixation duration. The implications for theories of reading are discussed.
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12:00-1:30 PM (2157)

Event-Related Potential Comparison of Lexical Decision and Relatedness Task Sensitivity and Reliability. CHRISTINA FAHEY, JOSEPH DIEN, and DONALD J. BOLGER, *University of Maryland, College Park* – There is increasing interest in the use of cognitive tasks for assessing individual differences in cognitive capabilities for the purpose of diagnosis and evaluation. Semantic priming tasks are particularly promising for examining aspects of executive function and semantic memory. In this study, we compared associative and semantic similarity relations within both lexical decision and semantic relatedness tasks. We recruited seventeen, right-handed, native English speakers with no known neurological conditions or learning disabilities. Tasks were conducted in two separate EEG sessions with 65 electrodes, 7-14 days apart, in order to evaluate test-retest reliability. Results show that the relatedness task produced stronger effects in both the behavioral and the ERP data. Intriguingly, we found significant priming effects in an N200 component in addition to the expected N400 effects. We discuss both theoretical and translational aspects of the findings.
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12:00-1:30 PM (2158)

Time and Similarity in Spoken Word Recognition. RACHAEL J. STEINER, KEVIN BROWN, and PAUL ALLOPENNA, *University of Connecticut*, KEN MCRAE, *University of Western Ontario*, ELLIOT SALTZMAN, *Boston University*, JAMES S. MAGNUSON, *University of Connecticut* (Sponsored by Ken McRae) – Theories of spoken word recognition agree that as a word is heard, multiple words are activated in parallel based on similarity to the input, and compete for recognition. Theories differ on similarity metrics (e.g., words overlapping at onset vs. meeting a global similarity threshold). Testing similarity metrics requires recognition data for many words, but there are no freely available databases; we present initial results from an effort to develop one. 134 participants each performed lexical decision on approximately 200 words and 200 nonwords (1182 monosyllabic words split into 6 lists). We assessed prior findings (e.g., effects of [onset] cohorts and [deletion, addition, or substitution] neighbors, and clustering coefficient [proportion of neighbors that are neighbors of each other]). Replication of some effects depended on whether response times were measured from word onset or offset. We will discuss implications for the temporal dynamics of spoken word recognition.
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12:00-1:30 PM (2159)

Statistical Learning of Spatial Componential Regularity Correlates With Sensitivity to a Foreign Logographic Orthography. ANDHIKA RENALDI, YU-HUEI LIAN, DAISY HUNG, and DENISE WU, *National Central University* – Previous research has shown that statistical learning (SL) supports literacy acquisition, but whether such relationship depends on characteristics of SL and specific orthographies remains unexplored. To address this issue, we developed novel SL tests in which two nonverbal shapes were presented in sequential or simultaneous pairs to measure sensitivity to temporal and spatial componential regularity that resembles characteristics of alphabetic and logographic orthographies, respectively. In the study phase, each shape always appeared in a specific position in a pair, while the other shape in the same pair was not specific. In the test phase, each shape encountered in the study phase was paired with a novel shape that was never seen before. Participants whose native language was an alphabetic one performed the temporal and spatial componential SL tests and other conventional SL tests. In addition, participants' sensitivity to Chinese orthography was measured in a lexical decision task. The results showed that sensitivity to a foreign orthography was only correlated with SL of spatial componential regularity but not with other kinds of SL, which suggest that the relationship between SL and learning to read is orthography-specific.
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12:00-1:30 PM (2160)

Morphological Regularity Eases Representational Uncertainty. SARA FINLEY, *Pacific Lutheran University* – Results from a cross-situational word learning experiment are presented. Adult, English-speaking participants were exposed to words from three categories (animal, fruit, vehicle). In the Experimental condition, the endings of the words always corresponded to a specific category (/-bu/ for animals, /-ke/ for fruits, /-go/ for vehicles). In the Control condition, the endings were assigned at random. In Part 1, participants were exposed to word-picture pairings for 18 words (six words each from the three categories), repeated six times each. In Part 2, participants were given a cross-situational word learning task in which the referential uncertainty was high. Each trial contained three pictures of objects from the categories in Part 1, paired with one audio file, with the same endings as Part 1. Distractor items were always potential targets. Participants in the Experimental condition learned the words in Part 2 (mean=0.73, SD = 0.27) better than participants in the Control condition (mean=0.36, SD=0.12), (b=0.83, SE=0.26, z= 3.14, p=0.0017). These results replicate and extend previous findings that when morphological cues are reliable, speakers can use these cues for word learning, even under high referential uncertainty.
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12:00-1:30 PM (2161)

Comparative Study of Cross-Linguistic Short-Term Literacy Intervention in Children and Adults. BRENDA LIZETH GUERRERO and ANGELIQUE M. BLACKBURN, *Texas A&M International University* (Sponsored by Roberto Heredia) – Literacy programs improve phoneme awareness and fluency, but interventions are often limited to short periods. We aimed to assess the efficacy of short-term literacy training. We assessed phonological awareness, including rhyme awareness, letter identification, letter-sound knowledge, and phoneme awareness before and after a five-day literacy intervention for illiterate Spanish-speaking adults (n=22) at the Laredo Immigration Center. Additionally, fluency tasks measured verbal fluency (semantic, letter, and phoneme tasks), word reading fluency, and non-word phonological decoding. The literacy intervention increased phonological awareness by 6.0%, semantic fluency, and phoneme fluency, but not letter fluency, reading, or phonological decoding ability (significance threshold set at $p<.05$). We are now replicating this study in an Indian orphanage to test the generalizability across languages and age groups. Improvements in phonological awareness and verbal fluency demonstrate the value of short-term programs and identifying areas of growth will help educators target these programs.
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12:00-1:30 PM (2162)

How Similar Are Braille Letters? Understanding Tactile-Letter Recognition. ANA BACIERO and PABLO GOMEZ, *DePaul University* (Sponsored by Pablo Gomez) – How do visual and tactile reading differ? What processes underlie tactile-letter recognition? To investigate these questions it is crucial to know what features of the writing system are salient. To this end, we created a similarity matrix of Braille letters that can be used as a control variable in tactile reading studies to understand the neural processes underlying tactile-letter recognition. The 26 Braille alphabet letters were tested in a same/different task in which participants felt two braille letters and were asked to classify them as the same or different letters. Response accuracy was used to create a similarity matrix whose underlying structure was assessed with hierarchical clustering. Analysis results revealed 4 major clusters varying in complexity from few dots in first two rows to many dots in all rows. Therefore, Braille letter similarity seems to be based on both the number of raised dots and the location of those raised dots. A neural model in which each dot within a braille-cell is assumed to be perceived separately was specified, resulting in a poor data fit, but enlightening the value of the similarity analysis, opening the door to future model specifications.
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12:00-1:30 PM (2163)

The Perceptual Span Across Reading Tasks: The Importance of Information to the Left of Fixation. MALLORIE LEINENGER and MEGAN FARRELL, *Denison University* – When reading, individuals process not only the word they are looking at, but also upcoming words in the perceptual span. During silent reading, the perceptual span includes roughly the fixated word and two upcoming words, but when reading aloud, prior research suggests that the perceptual span is reduced, and upcoming information is less beneficial (Ashby et al., 2012). However, it may be that the perceptual span is not reduced, but instead becomes more symmetrical (i.e., includes

more information to the left) due to the attentional demands of reading aloud. This study aimed to determine how information to the left of fixation affects silent and oral reading. Participants read 160 sentences, half silently and half aloud in 4 different window conditions: 1-word (fixated word only), 2-word (fixated word + 1 word to the right), 3-word (fixated word + 2 words to the right), and symmetrical 3-word (1 word to the left + fixated word + 1 word to the right) while their eye movements were recorded. Interestingly, reading was faster with the symmetrical 3-word window than the 2-word window across reading tasks, highlighting the importance of information to the left of fixation for efficient reading.
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TEST EFFECTS

12:00-1:30 PM (2164)

The Testing Effect Under Divided Attention: Educational Application. ZACHARY L. BUCHIN and NEIL W. MULLIGAN, *University of North Carolina at Chapel Hill* (Sponsored by Neil Mulligan) – Taking a test enhances retention, often to a greater degree than restudying (i.e. the testing effect). Understanding how these encoding effects of retrieval differ from other forms of encoding is important for applications of the testing effect. One potential difference relates to attention: Divided attention is well known to disrupt memory encoding but typically has much less impact on memory retrieval. Less is known about the relative attentional demands of the encoding effects of retrieval. Because students are often challenged by distractions while learning, it is important to examine the testing effect, and its relation to attention, with materials and methods more typical of educational settings. In three experiments, participants studied foreign language word pairs (Experiment's 1 and 2) or educational texts (Experiment 3), restudied or retrieved those materials under full attention (FA) or divided attention (DA), and then took a cued-recall test. A testing effect was found under FA and DA and the level of DA disruption was similar for both learning conditions. Consequently, the encoding effects of retrieval and restudy appear to be similarly susceptible to distraction when learning complex educational information.
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12:00-1:30 PM (2165)

Does Testing Enhance Mediation in Lion-("Tiger")-Stripes Paired-Associate Learning? DEANA VITRANO, STEPHANIE CROCCO, and JAMES H. NEELY, *University at Albany* (Sponsored by James Neely) – The Mediator Effectiveness Hypothesis (MEH) states that in paired-associate (cue–target) learning, testing enhances target recall to the cue by strengthening a cue-mediator-target associative chain. The MEH has been supported for Swahili-English translations when participants are required to report the mediators they used during study and the tests, but has not been supported for associatively unrelated but semantically related English word pairs when mediator report is not required. We did not require mediator recall during study or review and used "unrelated" cue-target pairs (lion-stripes) for which the cue's primary associate (tiger) could be used as an effective mediator due to its association to the target. After each of three study lists, the cue-target word pairs were always restudied or tested. Two days later, participants recalled both the mediator and target to the cue. Although a robust testing effect occurred and target recall was enhanced when the mediator was recalled, this enhancement was equivalent after testing and restudy, contrary to the MEH.
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12:00-1:30 PM (2166)

Unsuccessful Retrieval Attempts Do Not Enhance Novel Associative Learning. JASON ARNDT, DOROSI VALLE FLORES, JULIE GOODFRIEND, TERUMI SMITH RANDLE, INGRID XU, DANIEL MORRIS, JULIANA WU, and ALEXANDER HOGENHUIS, *Middlebury College* – Evidence is mixed regarding whether unsuccessful retrieval attempts enhance novel learning – some studies show no learning benefit (e.g., Grimaldi & Karpicke, 2012), while other studies show enhanced learning (Potts & Shanks, 2014). The inconsistency in prior results may be due to differences in the nature of the cues used for the retrieval attempts (familiar words [no benefit] vs. unusual English words or foreign language terms [benefit]) or the final memory test (cued recall [no benefit] vs. multiple choice/recognition memory [benefit]). We attempted to understand which factor produced these inconsistent results by examining whether (unsuccessfully) attempting to retrieve the English translation of Swahili words enhanced later cued recall and/or associative recognition of Swahili-English translations. We found that unsuccessful retrieval attempts impaired, rather than enhanced, both cued recall and associative recognition for Swahili-English translations, suggesting that unsuccessful retrieval attempts do not improve novel associative learning.
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12:00-1:30 PM (2167)

Do True/False Quizzes Produce a Testing Effect? OYKU UNER, EYLUL TEKIN, and HENRY L. ROEDIGER, *Washington University in St. Louis* (Sponsored by Henry Roediger) – Retrieval practice enhances long-term retention of studied information; however, it is unclear whether true/false quizzes produce a testing effect even though they are frequently used in academic settings. In the current study, students studied eight passages. One group took true/false quizzes (true/false) and another group took the same quizzes and was asked to correct the statements they marked as false (correction). A control group reread true statements from each passage (reread). For all groups, half the statements were factual, and half were relational. All students took a final short-answer test two days later. In the first experiment, feedback was not provided during learning. Neither the true/false nor the correction group performed better than the reread group. Performance was better on relational than factual questions. A second experiment that includes feedback during learning shows whether or not taking true/false quizzes produces a testing effect.
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12:00-1:30 PM (2168)

Retrieval-Induced Facilitation and Forgetting of Event-Based Narratives. ABIGAIL M. CSIK and GABRIEL A. RADVANSKY, *University of Notre Dame* (Sponsored by Kathleen Eberhard) – Retrieval practice can cause forgetting of related, but unpracticed information. However, integration of materials can eliminate retrieval-induced forgetting. The present study explored how retrieval practice of event-based narratives impairs or facilitates memory at the surface form (detailed memory), textbase (propositional memory), and event model (gist memory) levels. Participants read narratives and had retrieval practice of a subset of the narrative sentences which was directed at either the surface form (Experiment 1, N = 71) or event model level (Experiment 2, N = 89). Finally, they had a recognition test for all sentences to measure three levels of memory. Participants who had retrieval practice at the surface form level had better surface form memory for both practiced and unpracticed sentences from practiced stories, but worse memory for those sentences at the event model level ($ps < 0.05$). However, retrieval practice of the event model did not affect memory at any level. The present study indicates that there may be simultaneous facilitation and impairment at different levels of memory, which were not previously examined.
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12:00-1:30 PM (2169)

Retrieval Practice and JOLs Enhance Delayed Recall and Transfer of Learning. TRACY LINDERHOLM and JOHN DOBSON, *Georgia Southern University* – The study objectives were: (1) to expand on findings that retrieval practice can enhance performance on higher order tasks (Dobson, Linderholm & Perez, 2018); and (2) to investigate the memory-metamemory paradox (Tauber et al., 2015) by comparing long-term learning facilitated by retrieval practice versus judgments of learning (JOL). Physiology materials were learned under three conditions: (1) participants studied materials four times (S-S-S-S); (2) participants studied materials and then recalled them, repeating this sequence twice (S-R-S-R); and (3) participants studied the materials and then performed a JOL task, repeating this sequence twice (S-J-S-J). Both recall and accuracy on questions requiring transfer were collected one week later. Repeated measures ANOVA results showed the S-R-S-R and S-J-S-J conditions yielded superior recall and transfer compared to the S-S-S-S condition. This is additional evidence that retrieval practice enhances higher order thinking and also that covert retrieval, as experienced in a JOL task, yields similar outcomes.
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12:00-1:30 PM (2170)

Using Testing to Improve Concept Learning. DANIEL CORRAL, SHANA K. CARPENTER, and SAMARA CLINGAN, *Iowa State University* – Many studies have shown that testing can aid learning of the information tested. However, these studies typically involve rote memorization of simple materials (e.g., word pairs). The question of whether testing can benefit true concept learning is relatively unexplored. With this question in mind, we report a study in which subjects learned to recognize true experiments. Subjects were presented scenarios of hypothetical studies (half were true experiments and half were not). Some subjects were asked to indicate whether each scenario was a true experiment (testing condition) and were shown the correct answer after each response. Another group of subjects were not tested and were only shown the correct answer for each scenario (study condition). Additionally, some subjects were presented explanatory feedback, whereas others were given only correct-answer feedback. Subjects then completed a posttest with novel scenarios. The results revealed an interaction, as there was a benefit of testing when subjects were given correct-answer feedback, but not when they were given explanatory feedback. These findings suggest that testing can indeed aid concept learning, but point to type of feedback as a potential moderator of this benefit.
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12:00-1:30 PM (2171)

Difficult Retrieval and Evaluative Judgments Can Enhance Subsequent Learning: A Test of the Metacognitive Account of the Forward Testing Effect. SARA D. DAVIS and JASON C.K. CHAN, *Iowa State University* – Prior testing can facilitate subsequent learning, a phenomenon termed the forward testing effect (FTE). In two experiments, we examined a metacognitive account of this effect, which proposes that FTE occurs because retrieval leads to strategy optimizations during subsequent learning. One prediction of this account is that easier tests (e.g., multiple-choice relative to cued-recall) should lead to a smaller benefit on new learning. We examined the impact of prior multiple-choice versus prior cued-recall testing (relative to no prior testing) on new learning of a text passage. In Experiment 1, prior cued recall enhanced new learning more than prior multiple choice, with both demonstrating FTE. In Experiment 2, FTE was eliminated when participants provided four JOLs after each learning episode. Importantly, the elimination of the FTE effect was based on an increase in performance for the control participants. Results from both experiments support a metacognitive account of FTE.
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12:00-1:30 PM (2172)

Should Students or Instructors Create the Testing Effect and Why? A Mixed Method Approach. LACY E. KRUEGER, JENNIFER SCHROEDER, JENNIFER SENNETTE, and PHOENIX M. CARLINI, *Texas A&M University, Commerce* – The testing effect phenomenon occurs when repeated retrieval practice leads to better long-term retention of information compared to repeated re-studying of material, but students tend to prefer repeated studying over testing themselves (Karpicke, Butler, & Roediger, 2009). We aimed to assess students' preference for who should create the testing effect – instructors or students – and determine the basis of their response. Our sample consisted of 177 undergraduate students who completed an online survey. Our results indicated that few students were aware of the testing effect and could define it (14.7%; n = 26), and, more importantly, after learning about it the majority of respondents felt that instructors should be responsible for creating this effect (n = 108; 61.1%). Our qualitative analysis

revealed that participants preferred instructors to be the creators of the effect because 1) instructors are the experts and 2) teachers are the ones who create exams. Participants who believed students should produce the testing effect thought students should be proactive in their own learning. Overall, our results suggest that instructors may want to consider implementing testing in their classes to aid learning.
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12:00-1:30 PM (2173)

Self-Testing Improves Learning of Psychological Concepts. KALIF E. VAUGHN, KATHLEEN FUEGEN, PERILOU GODDARD, and DOUG KRULL, *Northern Kentucky University* – Retrieval practice has been shown to enhance memory in the laboratory under controlled conditions; however, real-world demonstrations of the testing effect are more sparse. We created websites for several different university-level psychology courses. Instructors created the testing content, and the website links were provided to students throughout the semester. Typically, a separate testing link covered material for each exam. Students were instructed to quiz themselves via the website in preparation for each exam; however, no penalty or reward was offered for using the websites. Students could either login using their university ID or they could log in anonymously. Results suggested that students who logged into the website with their ID performed better on the exams compared to those who did not log in using their ID. Additionally, more frequent logins to the websites were associated with better exam performance. Although using the websites improved learning, a surprising number of students neglected to do so. This highlights that although self-testing is beneficial, students may naturally opt for other study strategies.
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12:00-1:30 PM (2174)

Does Covert Retrieval Benefit Students' Learning in 8th Grade Science Classes? PAIGE E. NORTHERN, SARAH "UMA" TAUBER, and AMBER E. WITHERBY, *Texas Christian University* (Sponsored by Sarah "Uma" Tauber) – Recently, researchers have evaluated whether covert retrieval practice (mental retrieval) benefits learning as much as does overt retrieval practice (e.g., written responses). In some instances, overt and covert retrieval produce similar benefits, whereas in others overt retrieval is superior to covert retrieval. As such, it is unclear whether covert retrieval will benefit students' learning in actual classrooms. Our primary goal was to investigate this issue. To do so, 8th grade students learned definitions for science terms. Next, in multiple sessions they restudied some of the terms and definitions, overtly retrieved some of the definitions, and covertly retrieved the remaining definitions. Students took a final memory test three days later. Overt retrieval led to superior performance relative to covert retrieval or restudy. Thus, relative to overt retrieval, implementing overt retrieval practice in middle school classrooms may lead to improved student learning.
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12:00-1:30 PM (2175)

Does Pretesting Yield Transfer of Learning to Different Cue-Target Combinations? JARRETT T. LOVELETT, STEVEN C. PAN, DEREK STOECKENIUS, and TIMOTHY C. RICKARD, *University of California, San Diego* (Sponsored by Timothy Rickard) – In three experiments we investigated whether pretesting – a training technique in which learners take tests on previously unstudied information, and often guess answers incorrectly – yields learning enhancements that extend beyond pretested answers. Specifically, we assessed whether a benefit of pretesting (i.e., the pretesting effect) would be obtained for word triplets when subjects later had to recall words that had been presented as cues on a pretest (e.g., if [gift, rose, ?] was the pretested item, for which the correct answer was wine, then a subsequent criterial test presented [?, rose, wine], for which the correct answer was gift). In Experiments 1 and 2, we observed that pretesting did indeed generate substantial positive transfer to previously untested responses, relative to a study control, at 7-day and 5-min retention intervals. In Experiment 3, we observed a similar pattern when correct answer feedback was not provided during training and the subject's response at training completed the criterial test triplet. Together, these results diverge from the highly specific learning enhancements that have been commonly observed with the cued recall testing effect paradigm (e.g., Pan, Wong, Potter, Mejia, & Rickard, 2016).
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12:00-1:30 PM (2176)

Examining the Effects of Open-Book and Closed-Book Testing on Initial Performance, Retention, and Transfer. CAROLINE BYRD HORNBURG, WILLIAM R. AUE, and JEFFREY D. KARPICKE, *Purdue University* – Retrieval of information from memory produces better long-term retention relative to simply restudying the same material. The retrieval benefit persists regardless of whether source material is present or absent during testing, known as open and closed book testing, respectively. However, it is unknown how the combination of open book and closed book practice tests during repeated testing influences later memory performance for final tests of the same format. In a series of experiments, we examined the effectiveness of different combinations of practice formats (e.g., open closed vs. closed book) during repeated testing for college students' learning and retention. Performance on the delayed final test for questions that appeared during the practice phase (i.e., verbatim) was similar across practice format conditions. However, for questions appearing only on the final test (i.e., transfer) participants tended to do best if they received at least one closed book test during the practice phase.
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12:00-1:30 PM (2177)

Exploring how to Optimize True-or-False Testing for Learning. JORDAN BRABEC, ELIZABETH LIGON BJORK, and ROBERT A. BJORK, *University of California, Los Angeles* – Contrary to popular belief, tests can function not just as assessments but also as important learning events. Exactly how testing might affect the learning of untested information (e.g.,

information from to-be-learned material that might relate in various ways to tested information), however, remains unclear. Preliminary evidence suggests that test format might play an important role in the enhancement of such information. Competitive multiple-choice tests, for example, have been shown to be effective in this regard, whereas comparable cued-recall tests have not. The present study applies the suggested principles of "optimal" multiple-choice test construction to the true-or-false test format. We explored (a) how the learning of different types of information might be affected by true-or-false practice testing and (b) how the syntactical order of the to-be-evaluated statements might affect attention and retrieval of relevant information during evaluation. Limitations, future directions, and educational implications are discussed.
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12:00-1:30 PM (2178)

Do All-of-the-Above Multiple-Choice Practice Questions Affect Final Test Performance? AIMEE A. CALLENDER, *Wheaton College*, BAVANI PANEERSELVAM, *Auburn University* – Previous research on all-of-the-above (AOTA) test questions shown different effects on final test performance when the question was used on an intervening test. This study investigated the effect of AOTA questions (both when all-of-the-above was a correct option and when it was an incorrect option) on final test questions that did not include all-of-the-above as an answer option. Specifically, this study investigated whether correctly choosing all-of-the-above on an intervening test would result in better performance on a final test question that had the same question stem, but different answer responses. Conversely, would incorrectly choosing all-of-the-above on an intervening test affect final test performance with different answer options? Previous research by Paneerselvam has suggested that there should be a testing effect, but additional research with different control conditions was necessary to support the finding.
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12:00-1:30 PM (2179)

Disruption of the Relational and Item-Specific Processing Supports the Negative Outcomes of Multiple-Choice Testing With Additional Lures. BAVANI PANEERSELVAM, *Auburn University*, AIMEE A. CALLENDER, *Wheaton College* – Increasing the number of lures on intervening multiple-choice questions comes with costs. Such questions can either reduce the magnitude of the positive testing effect or result in the negative testing effect. However, the mechanism underlying these negative outcomes is poorly understood. The distinctiveness theory posits that practice testing enhances relational and item-specific processing resulting in the positive testing effect. Here, we examined whether the negative outcomes are due to the disruption of the relational and item-specific processing. Participants studied category – targets. Next, they either restudied, answered multiple-choice questions in a non-inclusive format (2 options vs. 6 options) (Experiment 1) or answered multiple-choice questions in an inclusive format (correct none-of-the-above vs. wrong none-of-the-above) (Experiment 2). After a brief delay, they recalled the targets on a free-recall test. Across two experiments, we found that multiple-choice questions with additional lures disrupt both relational and item-specific processing resulting in the negative outcomes.
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12:00-1:30 PM (2180)

Forward Effect of Testing on Comprehending Complex Texts. THOMAS M. BOBBITT and DANIEL R. KIMBALL, *University of Oklahoma* (Presented by Daniel R. Kimball) – Taking a test over old material can facilitate learning of new material presented after the test. This effect has already been observed in the list-learning paradigm. We hypothesized that, similarly, answering inference questions over a text would facilitate the learning of a related text at a deep level. The metacomprehension literature suggests that the ability to answer inference questions is a good indicator of how well one understands various parts of a text, and spurs constructive thinking about—and, thereby, comprehension of—the inadequately understood parts. To test our hypothesis, we created two texts. In three experiments, experimental participants took an inference test over the first text before reading the second. The experiments differed in the task given to the control participants after reading the first text: They either reread the first text before reading the second; took a multiple choice memory test; or took a modified inference test. All participants took an inference test over the second text. Results will be discussed in terms of theories seeking to explain comprehension, metacomprehension and testing effects.
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12:00-1:30 PM (2181)

Exploring the Influence of Delayed Judgments of Learning on Memory. EYLUL TEKIN and HENRY ROEDIGER, *Washington University in St. Louis* (Sponsored by Johnathan Peelle) – Delayed judgments of learning (JOLs) are assumed to elicit covert retrieval. Even though covert and overt retrieval have the same influence on paired-associate recall, the results are mixed on whether giving delayed JOLs enhances later retention. In two experiments, we investigated whether delayed JOLs enhanced recall compared to restudy, and if so, whether its effect was comparable to that of overt retrieval. Subjects studied cue-target pairs, received a practice phase, and took a final recall test in the same session. During the practice phase, subjects either 1) restudied the word pairs 2) were tested with the cue, 3) gave delayed JOLs when the cue was presented alone, or 4) gave delayed JOLs when the cue-target pair was presented. The groups did not differ on the final test; however, prior research has shown that the benefits of retrieval are often more evident on delayed tests. Thus, a second experiment will be reported with a delayed final test to further examine possible effects of delayed JOLs.
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12:00-1:30 PM (2182)

Confidence in Errors Predicts Curiosity About the Correct Answers to General Information Questions. EMILY TOWNER and JANET METCALFE, *Columbia University* (Sponsored by Janet Metcalfe) – People are more likely to learn

and remember the feedback to a high confidence error than a low confidence error. One mechanism associated with this 'hypercorrection effect' may be curiosity. We used a series of general information questions to investigate the relationship between curiosity and confidence. Participants answered 90 general information questions, rated their confidence in the answer on a scale from 0% to 100%, and were given yes/no feedback as to whether they were correct or incorrect. Crucially, they were not told the correct answer at this stage. They were then asked to rate their curiosity in finding out the correct answer on a scale from 0% to 100%. A multilevel linear regression analysis showed a positive relation between confidence and curiosity, such that as confidence in the error increased, so too did curiosity. Email: Emily Towner, emily.towner@columbia.edu
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12:00-1:30 PM (2183)

Individual Differences in Processes of Retrieval-Modulated Learning: Evidence From Eye-Movements and Pupillometry. RYO SAITO, KEIYU NIIKUNI, YUICHI WADA, and TOSHIAKI MURAMOTO, *Tohoku University* (Sponsored by Kazuhiro Ikeda) – This study examined individual differences in the processes of second reading modulated by retrieval practice. Participants read an expository text twice at their own pace in the retrieval practice paradigm (Study-Test-Study) with eye-tracking. They took a free-recall test between the first and second readings as an interim test, as well as after the second reading as a final test. We analyzed the relationships between the delta (final test – interim test) of the number of idea units and the deltas (second reading – first reading) of the eye-tracking data (mean fixation duration, fixation count, reading time, and pupil size). The results showed that the delta of the number of idea units correlated to the deltas of fixation count (ρ=.67) and reading time (ρ=.73). These results imply that participants who improved their performance on the final test spent more time on the second reading. The level of process control in second readings may play a crucial role for retrieval-modulated learning.
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RECOGNITION MEMORY I

12:00-1:30 PM (2184)

Perceptual Degradation, Attention, and Memory Encoding: Evidence From Evoked Pupillary Responses. HANAE DAVIS, ALI HASHEMI, PATRICK BENNETT, and BRUCE MILLIKEN, *McMaster University* – Perceptual degradation of studied items can enhance later memory sensitivity for those items (e.g., Besken & Mulligan, 2013; Rosner, Davis & Milliken, 2015), perhaps because processing difficulty up-regulates attention. We examined pupil size as a correlate of this effect for intact or degraded (i.e., blurry) words. In Experiment 1, no blur (NB) and low blur (LB) words were presented to one group of participants, whereas NB words and high blur (HB) words were presented to another group of participants. In Experiment 2, these three item types (NB, LB, and HB) were intermixed and presented to a single group. In both experiments, degradation had a graded effect on naming times during a study phase (NB < LB < HB). Also in both experiments, evoked pupillary response (EPR) during study did not differ for NB and LB words, but was larger for HB than NB and LB words. Correspondingly, recognition did not differ for NB and LB words, and was higher for HB words. The larger EPR to HB words was specific to old items that were correctly recognized (i.e., hits) in Experiment 1, but not in Experiment 2. This differential memory effect, and why it occurred in one experimental context but not another, are discussed.
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12:00-1:30 PM (2185)

Attention to Task-Relevant Features Improves Generalization at the Cost of Specificity. SHARON MINA NOH, *The University of Texas at Austin*, BRADLEY C. LOVE, *University College London*, ALISON R. PRESTON, *The University of Texas at Austin* (Sponsored by Alison Preston) – Acquired equivalence is the process by which an individual learns that two or more stimuli are equivalent due to their mapping onto same outcomes or responses. Two prevailing mechanisms have been proposed to explain this learning process. The feature salience account assumes that selective attention highlights the shared features of items learned to be equivalent. On the other hand, the associative mediation account suggests that acquired equivalence occurs through a process of learned associations between stimuli and is driven by memory and retrieval processes. We designed a paradigm that would directly test these competing theories. Participants learned to categorize objects varying along two continuous-valued dimensions and later had to discriminate those same objects from lure objects that varied along the same dimensions. We found that false alarm rates were higher for lures that shared category-relevant features than for lures that shared category-irrelevant features. Our results provide support for the feature salience account of acquired equivalence and demonstrate how the process of acquiring general knowledge can impair memory specificity.
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12:00-1:30 PM (2186)

Task Effects Determine Whether Recognition Memory Is Mediated by Continuous or Discrete Evidence. RYAN M. MCADOO, KYLIE N. KEY, and SCOTT D. GRONLUND, *University of Oklahoma* (Sponsored by Scott Gronlund) – Whether recognition memory is mediated by discrete or continuous processes has been of interest to researchers for decades. A seeming consensus that memory is mediated continuously (e.g., Luce, 1997; Wixted, 2007) has recently been challenged (e.g., Bröder & Schütz, 2009; Province & Rouder, 2012). McAdoo, Key, and Gronlund (2018) demonstrated that memory is mediated by both discrete and continuous processes, depending on target-filler similarity. The present paper expands this work by showing that memory tasks are mediated by different processes, using a within-subject manipulation. Similar to the memory control processes proposed by Atkinson and Shiffrin (1968), we posit that participants are able to utilize discrete and continuous evidence to suit the demands of a specific memory task. Specifically, memory was shown to be

mediated by continuous processes in a ranking task and by discrete process in a confidence rating task. We conclude by suggesting a new framework of recognition memory – one where discrete and continuous processes contribute to memory decisions, and that this is at least partially under the cognitive control of the decision maker.
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12:00-1:30 PM (2187)

The Dynamics of Recall-to-Reject in Associative Recognition. GREGORY J. KOOP and CLAYTON W. CORDELL, *Eastern Mennonite University* – Individuals often adapt decision strategies or utilize different information when task demands change. For recognition decisions, individuals may rely more heavily on recollection information and a recall-to-reject strategy in some tasks (e.g., associative recognition) than in others (e.g., single-item recognition; Malmberg, 2008). Measuring these changes unobtrusively, however, is somewhat difficult. Many examinations of the recall-to-reject strategy in difficult recognition tasks used a signal-to-respond method (e.g., Rotello & Heit, 2000), which may encourage participants to reflect more (or less) than normal (Malmberg, 2008). The present work utilizes continuous mouse tracking to explore the recall-to-reject strategy. Mouse tracking can record changes of mind in free response tasks (Resulaj et al., 2009) and provides a way to unobtrusively capture the recall-to-reject process in action. Participants' response data showed some support for the use of recall-to-reject strategies. Implications for memory models and methodological prescriptions for the use of mouse tracking will be discussed.
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12:00-1:30 PM (2188)

Criterion Shifting in Memory Recognition Is a Stable Trait. EVAN LAYHER, ANJALI DIXIT, and MICHAEL B. MILLER, *University of California, Santa Barbara* (Sponsored by Michael Miller) – Criterion shifting in memory recognition is highly variable across people. Some individuals shift their decision criteria quite readily while others do not shift at all. Despite this variability across participants, criterion shifting within participants is much more stable. We tested the within subject stability of criterion shifting across 2 separate studies that required participants to conduct memory recognition tasks on 10 different days. We manipulated criterion shifting through payoffs in Study 1 (N=39) and through target rates in Study 2 (N=39). Across the 2 studies, the average session-to-session criterion shifting correlation (r = 0.77) greatly exceeded the memory discrimination (d') correlation (r = 0.52). Overall, the high test-retest reliability of criterion shifting suggests it is a stable cognitive trait.
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12:00-1:30 PM (2189)

Beyond C and D': Exploring Materials-Based Recognition Memory Effects With Receiver Operating Characteristics. KAITLYN M. FALLOW and D. STEPHEN LINDSAY, *University of Victoria* (Sponsored by D. Stephen Lindsay) – We have observed consistent differences in recognition memory response bias between words and various types of pictures (images of paintings, faces, & assorted scenes) in a series of experiments, and more variable patterns of materials-based differences in overall performance. While we have primarily used standard signal detection measures of bias (c) and discriminability (d'), these measures have some important limitations, especially in the context of comparisons between conditions. Here we present the results of a series of receiver operating characteristic (ROC) analyses, which take advantage of the confidence ratings collected in these experiments to create a richer, less assumption-laden representation of recognition performance. These analyses enable more nuanced comparisons between stimulus types and shed light on the limitations of using c and d' with our data, suggesting that while our bias results are fairly robust, caution is warranted with respect to interpreting differences in d'.
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12:00-1:30 PM (2190)

The Unequal Variance Signal-Detection Model of Recognition Memory: A Test of the Encoding Variability Hypothesis. CHRISTOPHER J. BERRY and RORY W. SPANTON, *University of Plymouth* – Despite the unequal-variance signal detection (UVSD) model's prominence as a model of recognition, an explanation for the unequal-variance assumption has yet to be established. According to the encoding variability hypothesis, the strength variance of old items (σO) is greater than that of new items because items are incremented by variable, rather than fixed, amounts of strength during study. Conditions that increase encoding variability should therefore produce greater estimates of σO. We tested this prediction in two experiments. In Experiment 1, encoding variability was manipulated by presenting items for fixed or variable (normally distributed) durations during study. Estimates of σO from the data, however, did not differ between the fixed and variable conditions. In Experiment 2, participants studied items while performing an auditory one-back task in which distractors were presented at fixed or variable (normally distributed) intervals. Surprisingly, estimates of σO were greater in the fixed than variable condition. Thus, we found no evidence for the encoding variability hypothesis; instead, σO was linked to the mean strength of old items. Fits of the dual-process and mixture signal-detection models are also considered.
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12:00-1:30 PM (2191)

Event Boundaries and Recognition Memory for Associative Information in Narrative Text. JOEL R. QUAMME and CHRISTOPHER A. KURBY, *Grand Valley State University*, LINNÉA R. MARKS, *University of Texas at Austin* – We examined the effect of event boundaries on recognition memory for associations between details embedded in narrative text. In four experiments, subjects read stories about everyday activities that contained critical sentences describing co-occurrences of two arbitrary details (e.g., "While talking on the phone, Suzy stifles a sneeze"). Changes in time and setting were introduced at regular intervals to create event boundaries. After reading the stories, subjects had to distinguish intact old sentences from

recombined foil sentences describing details that occurred in different sentences from either same event setting, or from different settings separated by an intervening event boundary. In all experiments, there was an effect of intervening event boundary, in which false alarms were greater for foil sentences with recombined details from the same event compared to different events. The boundary effect was also concentrated entirely in reports of recollection (rather than familiarity), and rejections of recombined sentences (but not false alarms) were faster when there was an intervening boundary than when not. The results have implications for how event boundaries guide the use of recollection to make memory judgments.
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12:00-1:30 PM (2192)

Unpacking Source Monitoring: What Mouse Movements Reveal About the Underlying Cognitive Processes. LILIANE WULFF and SOPHIE SCHARF, *University of Mannheim* (Sponsored by Beatrice G. Kuhlmann) – People rely on stereotypes to guess the source of information if their source memory fails. However, not much is known about the mechanisms that underlie stereotype-biased source guessing. We therefore traced cognitive processes by tracking participants' mouse movements while performing a source-monitoring task. Participants studied everyday statements by two adult sources, each presenting half typical-old and half typical-young items. After encoding, age stereotypes were triggered by assigning ages to the sources (70 vs. 23 years). Participants then attributed recognized "old" items to the two sources. Analysis of mouse trajectories revealed that the spatial attraction to the non-chosen source was greater in incongruent trials in which the item typicality did not fit the source age (e.g., old source presenting a typical-young item) than in congruent trials. This cognitive conflict was more pronounced in individuals who guessed strongly stereotype-biased. We discuss the results with regard to dual-process models of cognition.
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12:00-1:30 PM (2193)

Pupil Dilation During Memory Encoding: The Role of Time Pressure and Depth of Processing. MARINA P. GROSS and IAN G. DOBBINS, *Washington University in Saint Louis* (Sponsored by Ian G. Dobbins) – Under Cognitive Load Theory, time pressure-induced arousal is a major contributor to pupil dilation. However, the role of time pressure on pupil dilation during encoding has not been studied. We recorded pupillometry while manipulating depth of processing (shallow vs. deep) and judgment time pressure (speeded vs. unspeeded) during encoding. Rather than directly reflecting the depth or efficacy of encoding, dilation instead was highly sensitive to time pressure as indicated by three findings. First, dilation was greater for speeded than unspeeded trials, yet later recognition was similar for both. Second, shallow processing yielded greater dilation than deep, yet recognition was lower for shallow trials. Critically, this dilation effect occurred because shallow decisions were slower than deep. When reaction times were statistically controlled, the relation between depth and dilation was eliminated. Third, increased dilation was associated with subsequent forgetting. Confirming the time-pressure interpretation, subsequent misses were also associated with slower encoding judgments. Thus, the dilation response was insensitive to differences in the quality of elaboration but highly sensitive to the degree of time pressure.
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12:00-1:30 PM (2194)

Event-Related Potential Correlates of the Self-Reference Effect in Memory. NICOLE A. PORTER, *Brandeis University*, ERIC C. FIELDS, *Brandeis University, Boston College*, ISABELLE L. MOORE and ANGELA GUTCHESS, *Brandeis University* – The self-reference effect is the tendency to remember stimuli better when they are processed in relation to the self. Here we examined event-related potential (ERP) correlates of this effect. We recorded ERPS while subjects were presented with trait adjectives (e.g., intelligent, conceited, pleasant). Self-relevance was manipulated via the task, with a cue indicating which task should be performed on each trial. In the self condition, participants were asked to judge if the adjective described themselves (yes/no); in the other condition, they were asked to judge if the adjective described Albert Einstein. Later, the participants performed a surprise recognition memory test where they judged each adjective as old or new. Whereas the previous ERP literature has often associated self-relevance with a posterior late positivity, we observed a main effect of self-relevance on a late positivity at right frontal electrodes. Interestingly, there was evidence of a subsequent memory effect on what appeared to be the same component. Thus, this frontal positivity may be a marker of encoding processes that lead to better memory for self-relevant stimuli.
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12:00-1:30 PM (2195)

Forgetting of Contextually Related Episodic Memories During Retrieval and Recognition. STEPHANIE JEANNERET, *University of Texas at Austin*, REMINGTON MALLETT, *University of Texas*, JARROD A. LEWIS-PEACOCK, *University of Texas at Austin* (Sponsored by Alison Preston) – Memories of episodic events are encoded with a memory of the context in which the events occurred. Contextual binding facilitates later retrieval of specific event details, but this can come at a cost of long-lasting forgetting of (incidentally reactivated) related memories. Context-based cued retrieval and recognition are two memory search processes that can make competing memories susceptible to forgetting. However, the factors governing whether and how memories will activate and compete during memory retrieval are not well understood. We have tested two hypotheses: (1) that events experienced closer in time will be more likely to compete with each other during context-based retrieval, and (2) that combining retrieval practice with a competitive recognition test will produce the strongest forgetting effects. Our results (N=68) provide support for the latter, but not the former. Moreover, this study presents novel insights into memory competition during retrieval and its impact on forgetting.
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12:00-1:30 PM (2196)

Familiarity, Recollection, and ROC Curves in Recognition Memory. JAMES F. JUOLA, ALEXANDRA CABALLERO-SANZ, ADRIÁN R. MUÑOZ-GARCIA, JUAN BOTELLA, and MANUEL SUERO, *Autonomous University of Madrid* – In some models of recognition memory, a test item's familiarity determines decisions based on the sensitivity (d') and decision (c) parameters of signal detection theory. Other models base recognition on discrete states such as relative certainty that an item has or has not been studied, with an intermediate state that leads to guesses. Still other, hybrid models place two criteria along a familiarity continuum defining areas for rapid decisions for high or low familiarities. For intermediate values, the decision depends on the results of search for, and recollection of, relevant episodic information. We present a study of recognition memory for lists of words using both response time (RT) and error data to construct receiver-operating characteristic (ROC) curves based on three standard methods using the same data set. Models are evaluated against group as well as individual subjects' behavior. We report substantially different ROC curves generated from the same data set based on (1) variations in target-word frequency, (2) confidence judgments, and (3) RTs. The results indicate that individual vs. group data must be used with caution in determining the appropriate theoretical interpretation of recognition memory performance.
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12:00-1:30 PM (2197)

Source Monitoring: Does Source Guessing Differ Between Recognized Old and Detected New Items? RAOUL BELL, LAURA MIETH, and AXEL BUCHNER, *Heinrich Heine University Düsseldorf* – Performance in a source-monitoring test is not only determined by source memory but also by guessing. Source guessing is not random as participants may either rely on general schematic knowledge or on their knowledge about the specific item-source contingency experienced at encoding. In previous source monitoring studies, only items that were classified as "old" had to be assigned to the sources. Here, we used a multinomial processing tree (MPT) model to examine source guessing both for recognized old items and for detected new items. In line with the literature, participants used probability matching and thus relied on the experienced encoding-phase contingency when making judgments about recognized old items. When making source attributions for detected new items, in contrast, participants discounted the intra-experimental item-source contingency, and relied on general schematic knowledge instead.
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12:00-1:30 PM (2198)

Memory for Opposing Viewpoints After Self-Selected Versus Assigned Exposure. SAMANTHA A. DEFFLER, PERRI B. DRUEN, and RANDI SHEDLOSKY-SHOEMAKER, *York College of Pennsylvania* – In a phenomenon known as selective exposure (Hart et al., 2009; Nickerson 1998; Smith, Fabrigar, & Norris, 2008), people seek out information that matches their opinions and avoid incongruent information. We previously found that selective exposure is partially overcome by a strong incentive (Druen, Deffler, Shedlosky, & Kearns, 2018), but we expected an incongruent message may be identity-threatening, which could affect memory for that content (Deffler, Leary, & Hoyle, 2016). Here, we investigate differences in recognition memory when participants selected to be exposed to an opinion-congruent versus incongruent message; we compare this to performance when participants were randomly assigned to read either message. Participants who chose to read the opinion-congruent message had better memory (d'), compared to participants who chose the opinion-incongruent message. Surprisingly, this result was flipped when participants were assigned a message. The influence of intellectual humility (Leary et al., 2017) on these results is also explored.
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12:00-1:30 PM (2199)

Isolating Visual Details in Memory via Texforms. MARK W. SCHURGIN and TIMOTHY F. BRADY, *University of California, San Diego* – Humans have remarkable episodic visual long-term memory abilities, capable of storing thousands of objects with significant detail. However, the contribution of semantic information to this memory for visual details remains relatively understudied. To investigate this issue, we utilized stimuli known as "Texforms" – spatially-constrained textures generated from objects, which contain the same mid-level feature information but obscure object identity. Thus, Texforms have similar visual features to real objects but are unidentifiable. We found participants could remember Texforms better than simpler visual textures that preserve only very low-level visual information, suggesting memory is enhanced by structured mid-level visual features typically found in objects – even in the absence of recognizable semantic information. These results demonstrate the contribution of visual information with little semantic meaning to visual long-term memory, and clarify what sources of information anchor our memory representations in the long-term.
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12:00-1:30 PM (2200)

Context Matters: The Influence of Social Relevance on Old-New Recognition and Source Memory. MEIKE KRONEISEN, *University of Koblenz-Landau* – Previous research has demonstrated that people remember negative reputational information especially well. The present study examines the influence of the context on memory for social-exchange relevant information. Faces were shown together with descriptions of cheating, trustworthy and neutral behavior. In addition, the importance of the social situation was manipulated: Participants had either to decide if they would want to work with the described person on a student project (social relevant context) or if they would want to ask this person what time it is while waiting on an airport (social irrelevant context). A multinomial model was used to measure old–new discrimination and source memory. Only in the social relevant context a source memory advantage for cheaters was found. Furthermore, old-

new recognition differed between both conditions. In the social irrelevant context, participants remembered more faces correct as old in comparison to the social relevant context.
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12:00-1:30 PM (2201)

Separation of Items From Their Context Observed via fMRI Pattern Analysis of Item-Method Directed Forgetting. YI-CHIEH CHIU, *University of Illinois at Urbana Champaign*, TRACY H. WANG, *University of Texas at Austin*, DIANE M. BECK, *University of Illinois at Urbana Champaign*, JARROD A. LEWIS-PEACOCK, *University of Texas at Austin*, LILI SAHAKYAN, *University of Illinois at Urbana Champaign* – The role of context has been investigated in list-method directed forgetting (DF) using multi-voxel pattern analysis (MVPA) of fMRI data (Manning et al., 2016). However, there has been no comparable investigation in the item-method DF. The purpose of the current study was to examine the role of context information in item-method DF using MVPA of functional imaging data. We "tagged" context information by presenting irrelevant scene images between words, which were followed either by a Forget or Remember cue. fMRI pattern classifiers identified activation patterns associated with words (item-evidence) and scenes (context-evidence). Preliminary results indicate that item-evidence dropped, whereas context-evidence increased after Forget compared to Remember cues. This selective decrease in item-evidence and increase in context-evidence may reflect the active unbinding of an item from its context. Taken together, this study provides the first demonstration of the differential processing of item and context information in item-method DF.
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12:00-1:30 PM (2202)

Semantic Auditory Distraction in Recognition Tests. MACIEJ HANCZAKOWSKI, *SWPS University*, KATARZYNA ZAWADZKA, *University of Sheffield*, C. PHILIP BEAMAN, *University of Reading*, DYLAN M. JONES, *Cardiff University* – Semantic auditory distraction refers to the impairment in free recall of visually presented words that are studied in the presence of semantically related rather than unrelated auditory distracters. The proposed theories of this effect differ in terms of whether the postulated locus of the mechanism responsible for semantic auditory distraction lies at encoding or retrieval. To address this issue, the present study assessed whether semantic auditory distraction generalizes to recognition tests. In Experiment 1, an old/new item recognition test was used to assess memory for targets accompanied by related and unrelated distracters. The results revealed no effects of semantic relatedness on recognition unless it was preceded by a free recall test. Experiment 2 followed up on these findings by supplementing the item recognition test for to-be-remembered words with a color recognition task. This experiment revealed a robust effect of semantic distraction upon item recognition but no effect upon color recognition. The results are discussed in terms of the contribution of recollective processes to recognition and the problem of density of semantic representations created at study.
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12:00-1:30 PM (2203)

Individual Differences in Pattern Separation Is Associated With Risk for Anxiety. MEGHAN DAVIS CAULFIELD, *Villanova University*, ALEXANDRA L. VOGEL and MIA R. COUTINHO, *Lafayette College*, IRENE P. KAN, *Villanova University* – Discrimination and generalization differences in posttraumatic stress disorder (PTSD) suggest that pattern separation processes may represent a basic memory component of PTSD. However, whether behavioral pattern separation is predictive of risk for anxiety is presently unknown. We investigated pattern separation prior to the onset of anxiety by comparing discrimination performance of healthy young adults with self-reported risk for anxiety. Participants completed an incidental encoding task followed by categorization of stimuli as old, new, or similar to those presented during encoding (with similarities ranging in difficulty). Results indicated that high-risk participants were better at discriminating stimuli that were highly similar to the encoded object than those at low-risk for anxiety. These data support previous research showing Veterans with PTSD performed better on the most difficult trials in a spatial pattern separation task, and further suggests that individual differences in pattern separation may contribute to risk for anxiety.
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12:00-1:30 PM (2204)

Within-List Bias and Source Memory for Unrecognized Items. ALAN HARRISON, *Louisiana State University*, JEFFREY STARNS, *University of Massachusetts, Amherst*, JASON HICKS, *Louisiana State University* (Sponsored by Jeffrey Starns) – Prior work has demonstrated that people can sometimes retrieve the correct source of a studied item despite having earlier called that item "new." This effect was significant for items called "new" under a conservative recognition decision bias and consistent with a multivariate signal detection model of item and source memory. However, Malejka and Broder (2016) demonstrated that this effect did not hold when all items from a prior recognition test were tested again for source memory. We conducted two experiments to explore the basis for the effect. After learning a list of words, each associated with either a male or female face, people had two rounds of testing. The first round encouraged with a liberal or conservative recognition response to old/new decisions based on a payoff scheme. The second round required male/female source decisions for each target item, regardless of the original recognition decision. The first experiment generated higher source performance for unrecognized items under a conservative as opposed to a liberal bias, but a second experiment showed a null effect. Results will be discussed in the context of continuous versus discrete models of item and source memory.
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12:00-1:30 PM (2205)

Neural Correlates Underlying the Effect of Value on Recognition Memory Encoding. BLAKE L. ELLIOTT (Graduate Travel Award Recipient), CHRIS BLAIS, SAMUEL M. MCCLURE, and GENE A. BREWER, *Arizona State University* (Sponsored by Gene Brewer) – The ability to prioritize and encode valuable information is an essential aspect of human memory. However, the processes underlying this effect are not yet well understood. One hypothesis is that value affects memory via top down executive control processes, where after recognizing that a stimulus is valuable, a participant would selectively engage an elaborative or effective rehearsal strategy. Alternatively, value can affect memory involuntarily through the dopamine system. Here we examined the behavioral and neurophysiological correlates of value-directed recognition memory. Participants encoded words that were assigned varying point values and were instructed that their goal was to maximize their score on a subsequent recognition test. During encoding, we examined the extent to which an early parietal P3 component thought to index dopamine driven attention allocation and a late sustained frontal positivity that has been related to elaborative rehearsal strategies predicted the subjective state of recollection. Our data indicate that the effect of value on recognition memory is primarily driven by the dopamine-driven reward valuation system as compared to more strategic selective rehearsal processes.
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12:00-1:30 PM (2206)

Self-Referential Processing of Negative Traits Impairs Memory for Subsequently Presented Items. ALEXIS BANQUER and KYUNGMI KIM, *Wesleyan University* (Sponsored by Barbara Juhasz) – Research suggests that accessing one's self-concept requires minimal mental effort, and thus self-referential processing is more effortless than other-referential processing. Is self-referential processing always effortless? Given individuals' strong desire to see themselves in a positive light, we asked whether the valence of self-referent information determines whether self-referential processing is effortless vs. effortful. During incidental encoding, participants were shown target words at the top or bottom of the screen. Crucially, each target was immediately preceded by self- or other-referential processing of a positive or negative trait word. Memory for each target and its location was subsequently tested. We found that both item and source memory were better following self-referential processing of positive than negative traits. More importantly, both item and source memory did not significantly differ between the targets preceded by self-referential processing of negative traits and those preceded by other-referential processing of either positive or negative traits. Our findings suggest that whether or not self-referential processing is effortless is critically dependent on the valence of self-referent information.
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SPATIAL COGNITION

12:00-1:30 PM (2207)

Stick-Figure Manikins and Co: A Simon Task With Multiple Simultaneous Reference Frames. PAMELA BAESS and CHRISTINA BERMEITINGER, *University of Hildesheim* – Simultaneous spatial and non-spatial reference frames were exploited in a version of a Simon task. Spatial codes could be formed based on the egocentric (i.e. with respect to the body midline of the observer) and the allocentric (i.e. with reference to the stimulus itself) reference frame. In addition, a non-spatial reference frame was introduced by manipulating the amount of stimuli simultaneously shown on the screen (i.e., 1-stimulus vs. 9-stimulus condition). Here, we present the results of two experimental series using different stimuli (stick-figure manikins or human photographs) holding a colored ball in their left or right hand. For both stimuli sets, we obtained a non-spatial reference frame indicating faster responses in the 9-stimulus condition. The non-spatial, reference frame modulated the size of the egocentric or allocentric Simon Effects: the egocentric (stick-figure manikins) or allocentric Simon Effect (human photographs) were larger in the 1-stimulus condition compared to the 9-stimulus condition.
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12:00-1:30 PM (2208)

The Effects of Spatial Properties of the Environment on Distance Judgments. LINDSAY HOUCK and JOHN PHILBECK, *The George Washington University* (Sponsored by John Philbeck) – Distance judgments represent an observer's perception of the space around them, and environmental factors can influence these judgments. Our research has found that room width affects distance perception, with wider rooms eliciting larger judgments. Here, we explored the spatial properties of the visible ground and scene boundaries that drive this effect. Experiments 1 and 2 utilized 2D rendered images and Amazon's MTurk to isolate these properties. Distance judgments revealed effects only when occluding the nearby ground and creating additional scene boundaries by placing freestanding doors near the target (judgments falling between wide and narrow room judgments). This suggests that aspects of the nearby ground and scene boundaries play a role, and additional research will isolate these features. Experiment 3 adapted our paradigm to a virtual reality environment, replicating the effects of width as in 2D images. Thus, we can use immersive virtual environments that have a wider field-of-view and more reliable cues than 2D images to test these effects. Understanding how these factors influence our perception of complex, real-world environments is imperative for greater knowledge of how we navigate and interact in our environment.
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12:00-1:30 PM (2209)

Does Boundary Extension Size Differ Across Participants in India and in the US? MARGARET P. MUNGER, KRISTI S. MULTHAUP, and MARION COMI-MORAG, *Davidson College* – Boundary extension (BE) is a small anticipation about the edges of a scene. When shown a photograph and asked to

remember it, including the background, individuals will later claim that the exact same photograph is actually a closer view. We tested college students at Madras Christian College (MCC; just outside Chennai, Tamil Nadu, India) and students at Davidson College (DC; just outside of Charlotte, North Carolina, USA). Students were tested in public spaces on campus (e.g., the student union) using iPads. Both groups showed significant BE, but the MCC students had significantly less extension for the most sensitive measure of BE, rating close-angle photos. To assess whether device and/or public space was driving the size of BE, we collected data in two additional conditions, iPads in the lab and iMacs in the lab. Data from US students showed no differences for apparatus or location (public space, lab), with significant and equivalent BE observed for all three BE patterns outlined by Intraub and Dickinson (2008). Observing less BE for the Indian than US students may be related to observations that East Asian students are more sensitive to contextual changes in scenes (Masuda & Nisbett, 2006).
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12:00-1:30 PM (2210)

Transfer of an Incompatible Spatial Mapping to the Vertical Simon Task Is Not Influenced by the Manual Response Mode. QI ZHONG and AIPING XIONG, *Purdue University*, KIM-PHUONG L. VU, *California State University, Long Beach*, ROBERT W. PROCTOR, *Purdue University* – Zhong et al. (2018) had participants perform 100 trials, responding to upper/lower stimuli mapped incompatibly to lower/upper responses. Afterward, they performed a vertical Simon task where location was irrelevant and stimulus shape was the relevant dimension. The incompatible spatial practice reduced the Simon effect, different from Vu (2007). Two experiments tested whether the difference between the studies was due to the mode of responding on the number pad: thumbs holding a keypad versus index fingers of the two hands resting on a table. The Simon effect was computed when the vertical Simon task was performed alone (Exp1) and after performance with 100 incompatibly-mapped spatial trials (Exp2). In Experiment 1, similar Simon effects were obtained across the two response modes. In Experiment 2, small transfer effects were evident, but the Simon effects were significant in both response modes. These results indicate that response modes are not critical to the Simon effect.
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12:00-1:30 PM (2211)

Strategy Use in Paper Folding: An Eye Tracking Study Using the Mental Unfolding Task. ALEKSANDRA KASZOWSKA and HEATHER BURTE, *Tufts University*, ALLYSON HUTTON, *Think3d!*, HOLLY A. TAYLOR, *Tufts University* – Spatial visualization – the ability to mentally manipulate 2- and 3- dimensional objects – has been widely assessed using the Paper Folding test (PFT; Ekstrom, French, Harman, & Dermen, 1976). The Mental Unfolding test (MUT; Burte, Taylor, & Hutton, in preparation) builds on the PFT to reveal solution strategies. In the MUT, participants view diagrams of a paper being folded and a hole punched through it and then identify the resulting hole arrangement. Sixty-four participants completed the MUT while having eye movements recorded. Afterwards, participants explained their strategies through cued retrospective think aloud. Results suggest that participants used analytic strategies (e.g., using problem features, process of elimination) in addition to spatial visualization. Strategy choice was partially related to problem complexity (i.e., number of folds, and occlusion type). These results provide insights into tradeoffs between strategy, answer accuracy, and eye movement behavior when problem solving.
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12:00-1:30 PM (2212)

Recognizing Unfamiliar Faces: When Spatial Imagery Ability Plays a Role. HEATHER M. KLEIDER-OFFUTT and MEGAN M. CAPODANNO, *Georgia State University* – Accurate eyewitness identification often hinges on a witness' ability to identify an unfamiliar person. The ability to vividly imagine past information is associated with accurate memory for scenes. Specifically, people with high spatial imagery (e.g. relational) but not object imagery (e.g. detail) more accurately recall placement of objects in complex scenes. In the current study, spatial imagery ability and WMC differences were tested as predictors of facial recognition accuracy. Participants took a series of face matching tests that are used to identify superior face recognition ability. Results suggest that participants high in spatial imagery ability were better at face recognition than those who were not. WMC had no effect. This suggests that spatial imagery ability maybe one component of face recognition and that accurate identification is a function of imagining and recalling facial features in relationship to one another.
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12:00-1:30 PM (2213)

How Do You Know if You're Lost or Not? Epistemic and Pragmatic Action During Navigation. CHRISTOPHER L. DUDAS-THOMAS, AARON L. GARDONY, and ALEKSANDRA KASZOWSKA, *Tufts University*, GEORGE L. WOLFORD, *Dartmouth College*, HOLLY A. TAYLOR, *Tufts University* (Sponsored by George Wolford) – Navigation ebbs and flows between decision making and goal-oriented action. Ineffective decisions can lead to disorientation and inefficient navigation. Navigational aids can improve decisions, but often impair spatial memory (e.g. Gardony et al., 2013). Having aids that provide information only when a person is particularly disoriented might improve navigation without diminishing spatial memory. Brunyé, et al. (2017) indexed people's relative orientation by measuring their looking around behavior and relating it to navigational efficiency. As a followup, we adapted epistemic and pragmatic actions (Kirsh & Maglio, 1994) to navigational behavior. Epistemic actions serve decision making by gaining information. Pragmatic actions aim to achieve previously-developed goals. We predicted navigational epistemic actions demarcate relative disorientation, whereas pragmatic actions index well-oriented periods. We demonstrate each action type has a variable relationship with navigational

efficiency that changes with environment experience. This classification brings us closer to navigational aids that improve navigation without compromising spatial memory.
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12:00-1:30 PM (2214)

Sources of Spatial Bias in Hemi-Image Generation. OMAR GARCIA, NAFISEH FAGHIHI, KARINA FEBRE, and JYOTSNA VAID, *Texas A&M University* (Sponsored by Jyotsna Vaid) – This study sought to examine sources of spatial bias on a hemi-image generation task developed by Shuren et al. (1995; see also Hatta & Kawakami, 1997). Specifically, we aimed to test two possible explanations of observed biases on this task: a biomechanical account and a cerebral laterality account. Even though previous research seems to suggest that handedness and/or laterality play a role in spatial cognition, hemi-image generation task results have been inconsistent and have not accounted for the role of handedness in their findings. Therefore, we predicted that 1) if biomechanical factors rooted in handedness underlie hemi-imagery effects, the hand used to draw would affect which half of the imagined object is depicted. 2) If a left side spatial bias is observed independent of hand used, it would support a (right) hemisphere attentional bias account. We tested left- and right-handers and found that handedness affected which half of the imagined object was depicted, particularly among left-handers. Findings are partially in line with Casasanto's (2009) body-specificity hypothesis.
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12:00-1:30 PM (2215)

Embodied Experience of the 'Wrong' Hand, Not World Knowledge, Supports the Mental Rotation of Hands. LILIAN (YOU) CHENG, MARY HEGARTY, and ELIZABETH R. CHRASTIL, *University of California, Santa Barbara* (Sponsored by Elizabeth Chrastil) – In mental rotation tasks, people show a remarkably different pattern of responses to hand stimuli compared to geometric 3D objects, but the specific experiences underlying these effects is unclear. Here, we contrasted two hypotheses: a) the World Knowledge Hypothesis, since the world is designed for right-handed people, and b) the Embodied Experience Hypothesis, because people have experience with their own hands. In this task, both left-handed and right-handed subjects performed a modified Shepard & Metzler task using hand stimuli. Under the World Knowledge Hypothesis, all subjects will have better performance on right hand stimuli. Under the Embodied Experience Hypothesis, right-handed subjects will have better performance on right hand stimuli than left hand stimuli and left-handed subjects will have better performance on left hand stimuli. Surprisingly, left-handed subjects had higher accuracy to right palms than to left palms, and vice versa for right-handed subjects. This result supports the hypothesis that embodied experience, not world knowledge, is important for the mental rotation of hands. However, there is an additional 'wrong-hand effect', whereby perceptual shape outline information is preferentially processed.
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12:00-1:30 PM (2216)

Real and Imagined Spatial Updating in Expert Dancers and Non-Dancers. ERICA BARHORST-CATES, SARAH CREEM-REGEHR, and JEANINE STEFANUCCI, *University of Utah* (Sponsored by Jeanine Stefanucci) – In this study, we aimed to test the effects of movement imagery and expertise on real and imagined path integration. We predicted that dance expertise would facilitate imagined spatial updating. 10 dancers completed imagery questionnaires and two versions of a triangle-completion task while blindfolded. For the real walking task, participants were led along two segments of a triangle and then turned to face the starting position. For the imagined task, participants imagined walking along two segments with an imagined turn and then physically turned to face back to start. Present results show that participants performed significantly better on the real compared to the imagined task. Those with greater vividness of movement imagery showed less of a difference between real and imagined angular error. A comparison of these results to those from a sample of non-dancers will test whether these results are specific to dance expertise.
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12:00-1:30 PM (2217)

The Later-Destination Navigation Bias in an Outdoor Environment. DALTON BURCHARDT and BEVERLY ROSKOS, *University of Alabama, Tuscaloosa* – Given two routes to a destination, equivalent in length and curvature, people are more likely to take the route that is in the direction of a second destination than the other route. This relationship has been termed the later-destination attractor bias. This bias has been tested in a small scale environment (i.e., a conference room) (Fu, Bravo, & Roskos, 2015) and in virtual small-scale (conference room) and large-scale (downtown area) environments (Fu, 2017). In both cases the location of the later destination had an impact on the route taken, but sometimes it repelled navigators rather than attracting them. Given these differing results, and given that we are interested in the paths people take in real, outdoor environments, we tested the later destination bias in such an environment. The location of the first destination was always straight ahead, but the navigator had to walk around an obstacle—a building with a wide or narrow width. The location of the second destination varied from trial to trial and the DV was the route taken around the obstacle (right or left). The later destination indeed had an impact on the path people took in a real, outdoor environment, a finding that should inform the placement of directional signs.
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12:00-1:30 PM (2218)

Effect of Spatial and Non-Spatial Environmental Changes on Human Perception of Self-Location. LUCIA A. CHEREP and JONATHAN W. KELLY, *Iowa State University*, TIMOTHY P. MCNAMARA, *Vanderbilt University* (Sponsored by Jonathan Kelly) – Place-selective cells have been identified in humans, and behavioral predictions regarding those cells warrant investigation. Rodent place cells partially remap after spatial

change (rotating objects relative to enclosure) but are unaffected by non-spatial change (single object substitution). This study evaluated human perceived self-location in response to specific modifications of a virtual environment (VE). Participants studied object locations in a learning VE with three orienting cues (two landmark objects and a stripe on the surrounding circular VE wall), then performed judgments of relative direction in which they recalled learned object locations while standing in a test VE unchanged from the learning VE, or where orienting cues were modified spatially/non-spatially. Perceived self-location was inferred from the presence/absence of a sensorimotor alignment effect (SAE). Contrary to predictions, SAE was present in all test VEs. A follow-up experiment balanced the relative saliency of environmental cues and results indicate that human perceived self-location is disrupted by spatial change, as predicted by rodent place cell remapping.
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12:00-1:30 PM (2219)

Does Imagery Type Matter? Examining Individual Differences in Imagery Ability. MEGAN M. CAPODANNO and HEATHER M. KLEIDER-OFFUTT, *Georgia State University* (Sponsored by Heather Kleider-Offutt) – Individual difference in imagery ability is associated with accurate memory for a complex scenes. However, imagery ability is theorized to be a complex cognitive construct wherein task performance differs as a function of superior ability in spatial imagery (e.g. the relationship between scene objects) or object imagery (e.g. memory for color). In addition, whether working memory capacity (WMC) is associated with imagery ability is debated. In the current study, a measure of visual imagery ability (VVIQ) is correlated with performance on objective measures of spatial imagery, object imagery and WMC. Results suggest that visual imagery performance is correlated with spatial imagery and WMC but not object imagery. This suggests that performance on imagination-based tasks may result from a superior ability to visualize relational properties of a scene rather than the details and this is bolstered by WMC.
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12:00-1:30 PM (2220)

The Relationship Between Spatial Ability and Implicit Gender-Spatial Biases. MIKAELA COWEN, ALEXA MILBRADT, KENNETH MCCLURE, and MEREDITH MINEAR, *University of Wyoming* – Implicit gender-science biases have been measured using the implicit associations test (IAT; Greenwald, McGhee, & Schwartz, 1998) with males associated with science, while females are associated with liberal arts. In the present study, we developed a novel gender-spatial IAT to test whether people also have implicit biases about gender and spatial ability in favor of male-spatial pairings over female-spatial pairings. We also tested the relationship between implicit gender-spatial associations and mental rotation performance, and whether these associations moderate the relationship between gender and mental rotation performance. 263 participants (162 female) completed the gender-spatial IAT and two mental rotation tasks. Reaction times on the gender-spatial IAT suggest that gender-spatial biases were present in our sample in favor of stronger male-spatial and female-verbal associations. Scores on the gender-spatial IAT were found to moderate the relationship between gender and mental rotation performance. Implications of this moderation will be discussed.
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12:00-1:30 PM (2221)

Gender Difference in a New Visuospatial Transformation Task. CAMERON A. RYCZEK and MURRAY R. HORNE, *California State University, East Bay* – Prior research investigated visuospatial abilities using mental rotation (MR) and visuospatial perspective taking (VPT) tasks. The aim of the study was to first, develop a new valid assessment of MR and VPT. Second, replicate the gender differences that are standard among MR tasks. Participants completed both tasks using one and two 6 X 6 checkerboards. An object was placed in one of the squares and the participants were asked to mentally rotate the board either 90o or 180o to reposition their object. The VPT task was similar except participants had to reposition the object so that their view matched a confederate's original view of the board. On each trial we measured accuracy and degree of error. On the MR task, males were significantly more accurate and made less error than females. Also, females made significantly more error than males on the VPT task with one board. This gender difference is not apparent when two boards were present. These results replicate traditional gender differences in the MR task and provides a new variation on for MR and VPT assessment and could be used to look at clinical correlates of MR and VPT. Future directions include investigating strategies used when solving the task.
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12:00-1:30 PM (2222)

Study Goal Affects Perspective Switching in Environment Learning. RUIZHI DAI, AYANNA K. THOMAS, and HOLLY A. TAYLOR, *Tufts University* (Sponsored by Holly Taylor) – Environment learning (EL) occurs when people navigate (route perspective) and/or study a map (survey perspective), in a goal-directed manner. Modern technology allows real-world learners to actively switch between these perspectives (e.g., checking a map on one's mobile device while navigating). However, few studies have examined perspective switching in EL, particularly how learning goals influence switching. The present study explored whether study goal affects perspective switching in EL. Participants had either a route (e.g. navigate the environment) or a survey (e.g. learn the layout) goal. They learned an environment from a split-screen video, half providing a survey and half a route perspective. Study and switching behavior was evaluated through eye movements when watching the video. Participants dwelled more on the route perspective regardless of the study goal. However, survey goal participants switched more often between perspectives. Our findings suggest that goals may affect EL by influencing approaches to information gathering.
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12:00-1:30 PM (2223)

The Downsized Hand in Personal Neglect. LISA S. ARDUINO, *LUMSA University and ISTC-CNR, Roma*, PIETRO CAGGIANO and LAURA MORA, *Goldsmiths University of London*, LAURA VERONELLI, *Casa di Cura del Policlinico, Milano*, ANTONELLA MARITATO, *LUMSA University, Roma*, GIANNA COCCHINI, *Goldsmiths University of London* – Personal neglect (PN) has been related to a body representation disorder, with PN patients showing difficulties in identifying differences between left and right hands. However, the metric representation of the hands has not been systematically addressed. We conducted two experiments looking at the perceived hands' width (Exp. 1) and fingers' length (Exp. 2) of 11 right-brain damaged patients (five with PN) and a group of 13 healthy controls. Exp. 1 showed that PN patients perceived their left hand significantly smaller that their right hand whilst right hand was equally distorted in both patients' groups. In Exp. 2, only one patient with PN was able to perform the task. Single case Crafwart t-test showed a trend in fingers' length underestimation for the right hand but not for the left compared to healthy controls. These findings provide further insight into the underline mechanisms of PN.
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12:00-1:30 PM (2224)

Impacting Elementary Students' Math Learning Using a Spatial Training Program. HEATHER BURTE and HOLLY A. TAYLOR, *Tufts University*, ALLYSON HUTTON, *Think3d!* – Having a college-level STEM-educated workforce may require early attention to the cognitive skills underlying STEM success, such as spatial visualization. The Think3d! program aimed to train elementary students' spatial visualization skills, using origami and paper engineering, en route to improving their mathematical reasoning. Four spatial visualization measures (Make-A-Dice, Mental Unfolding Task, Purdue Spatial Visualization test, Visualizer-Verbalizer Cognitive Strategy Questionnaire) and a grade-appropriate mathematics quiz assessed Think3d!'s effectiveness. Students completed all measures before and after either participating in Think3d! or in an active control (spelling games). Spatial and mathematical performance increased from pre- to post-test, increased with grade, and showed gender differences. Changes on the spatial measures predicted changes in math performance, indicating that spatial improvements drove math improvements. This work provides insights into how spatial training, such as the Think3d! program, can impact students' spatial and mathematical reasoning.
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PERCEPTION, MEMORY, AND ACTION

12:00-1:30 PM (2225)

Response Preparation Determines the Direction of No-Go Backward Crosstalk. MORITZ DURST and MARKUS JANCZYK, *University of Tübingen* (Sponsored by Hartmut Leuthold) – In dual-tasking, the no-go backward crosstalk effect (BCE) means that RT1 is longer when Task 2 does not require a response (no-go trial) relative to when it does require a response (go trial). Recent studies suggest that the no-go BCE results from the inhibition required to overcome an already prepared go response in Task 2. Alternatively, it was proposed that the no-go BCE results from automatic activation of response features of Task 2. The present study distinguishes both explanations with a dual-tasking paradigm in which two go and one no-go response were possible in Task 2. Response preparation was enabled in half of the blocks by presenting one go-stimulus in 90% of all go trials (instead of 50% in the other blocks). Only in these blocks, the no-go BCE was observed, suggesting that it indeed results from the inhibition of the prepared response in Task 2.
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12:00-1:30 PM (2226)

The Role of Reach Kinematics and Gaze in Signalling and Responding to Social Actions. KAITLIN E.W. LAIDLAW, SANDRA ELASHMOUNY, MELVYN A. GOODALE, and JODY C. CULHAM, *Western University* – Often, we perform actions around other people; it is important that we be able to use our behaviour to communicate whether we intend for those actions to be directed towards others or not. How is this accomplished? In this study, we examined motor and gaze behaviour as a participant picked up and moved a block with the intention either to give it to their partner (social intent) or to merely move it (non-social intent). The partner then tried to guess the underlying intention and respond appropriately by taking the block if given, or leaving it if moved. Overall, pairs adeptly (de)coded intentionality through nonverbal behaviour. Intention-based differences were largely observed in action kinematics, whereas looking frequencies to either participants' faces were surprisingly low, and related more to differences in roles (actor/partner) than movement intent. Results will be discussed in relation to the efficacy of nonverbal cues in facilitating social interaction.
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12:00-1:30 PM (2227)

Coordination of the Variability and Location of Movement Endpoint Distributions. ANDREW B. SLIFKIN, LUKE SIM, BRIAN A. TRINCKES, and YINGGE LI, *Cleveland State University* – According to theories of motor control, speed and accuracy are optimized when the amount of movement endpoint variability matches the variability permitted by the target and the endpoint distribution center is located at the target center. Here, we tested those predictions when participants made targeted hand movements to each of 16 targets with widths spanning a range of 5-80 mm. According to the results, it was only at very small target widths that both the variability produced matched the variability permitted and that distribution centers were located at the target center; as width increased, endpoint variability increasingly underestimated the variability permitted and distribution centers increasingly undershot the target centers. Further, increases in the difference between the size of the target and the amount of endpoint variability—i.e., the amount of unused target space—strongly predicted the degree of target center undershooting. Those results suggest that participants have precise knowledge of

their variability relative to the variability permitted, and such knowledge is used to minimize travel distance to the targets. The current results replicate and extend Slifkin and Eder (2017, Acta Psychologica, 174, 101-189).
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12:00-1:30 PM (2228)

Effects of Conversation on Driving Simulator Performance. JONATHAN RANN (J. Frank Yates Student Travel Award Recipient) and AMIT ALMOR, *University of South Carolina* (Sponsored by Amit Almor) – We report results from a driving simulator paradigm created to test effects of conversation on simultaneous driving performance. 64 undergraduate students took part in two experiments where they tracked moving target on computer screen using steering wheel. Overall deviation from target was continuously measured and analyzed during different conditions. Experiment 1 (E1) tested task difficulty by manipulating target speed during no-conversation, passive listening to spoken prompts, and listening then responding to heard prompts. Experiment 2 (E2) tested driving task difficulty by manipulating target speed during no-conversation, reading written prompts that were overlain on driving simulator screen, and reading then responding to the written prompts. Fast speed caused greater deficits in performance in E1 and E2, with better performance while responding compared to listening in E1, and worse while responding compared to reading in E2. Time-course analysis revealed performance changes during the first 7.5 seconds of conversation onset, especially during fast speeds. Overall results show an interaction between task difficulty and conversation on driving performance consistent with theories of multitasking performance.
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12:00-1:30 PM (2229)

Effects of Mnemonic Acronyms on Procedural Task Execution and Resilience Toward Interruptions. TARA RADOVIC and DIETRICH MANZEY, *Technische Universitaet Berlin* (Sponsored by Roland Thomaschke) – Our study examines how mnemonic acronyms affect the structure of the mental task representation and resilience towards interruptions of an 8-step procedural task with sequential constraints. The acronym "WORTKLAU", used for memorizing the task, consisted of two single words (WORT; KLAU). Each letter coded one step of the task, involving a binary decision about a certain property of a complex stimulus. While performing the task, 34 participants were interrupted between different steps with 2-back interruption tasks for 6s or 30s, after which they had to resume the procedural task at the correct step. Resumption times, sequence errors and non-sequence errors were analyzed. Results suggest that the mnemonic acronym supports a hierarchical organization of the task, as steps placed at word boundaries (T, K) were easier to recall after interruption, compared to other steps (R, L, A). Such effects were not found in steps that were not preceded by interruption task.
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12:00-1:30 PM (2230)

Research of the Effect Toward High School Baseball Players' Competitive Anxiety and Psychological Skill Using Biofeedback and Imagery Training. FANG-CHUN LIU and SHIAU-HUA LIU, *National Dong Hwa University* (Presented by Shiau-hua Liu) – Many factors affect the outcome of sport competitions. Psychological skill is one of the key to win the game. Many studies indicate biofeedback training and imagery training can effectively improve psychological skills. This study aims to investigate the effect of imagery and biofeedback training towards trait anxiety and psychological skill. Using 49 high school athletes as participants. They were divided into high anxiety, low anxiety and control group, doing six-week imagery and biofeedback training. Athletes in experimental group have 55 minutes imagery and biofeedback training once a week. The results show that: (1) After imagery and biofeedback training, trait anxiety is obviously decreased. The high and low anxiety group players reach a significant level in five aspects of overall skills (stress and adversity adjustment, motivation, enlightenment, concentration and self-confidence). (2) The sixth week of training, high and low anxiety group's galvanic skin response(GSR) values were far lower than the first week. In the sixth week of control group, GSR was higher than the first week. This shows that after six weeks of training, participants were able to regulate their tension status by using biofeedback.
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12:00-1:30 PM (2231)

Intuitive Knowledge of Children's Expertise in Block Building. CATHRYN CORTESA, AMY SHELTON, BARBARA LANDAU, ANAND MALPANI, and GREG HAGER, *Johns Hopkins University* – Motion quality, such as the fluidity with which people execute actions, can differentiate experts and novices in fields like surgery (Ershad, Rege, & Fey, 2018). We asked whether motion quality could also diagnose expertise in children's block building, complementary to overall accuracy and speed. Naïve adults viewed video clips of children building copies of model block constructions and rated the motion quality of the children's actions as they built. Critically, the video clips did not show the actual model that the children were building, i.e. there was no information about the children's actual accuracy. Crowd-based ratings of children's motion quality were significantly correlated with other measures of the child's skill on the block copying task. This finding raises important questions about how people make intuitive judgements about expertise involving action and further suggests that crowd sourcing may be one tool for evaluating children's expertise in a range of domains.
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12:00-1:30 PM (2232)

Stimulus-Response Compatibility as a Function of Stimulus Mode and Response Mode. COURTNEY GRIFFIN-OLIVER and ROBERT W. PROCTOR, *Purdue University* – Eye-movement responses produce set- and element-level compatibility effects, with the element-level effect being larger for spatial stimuli than for other types. This difference can be attributed to the high degree of dimensional overlap

between spatial stimuli and eye-movements. However, spatial information can be conveyed in multiple ways. We examined several types of spatial stimuli including physical locations (left-right peripherally-located stimuli), centrally-presented location words (LEFT and RIGHT), and centrally-presented left-right pointing arrows. Those spatial stimuli were paired with left-right eye-movement and unimanual joystick responses. A greater relative benefit was evident for eye-movements paired with physical locations compared to location words and arrows. Although the element-level mapping effects were larger for words than for arrows overall, no differences as a function of set-level compatibility with joysticks compared to eye-movements were evident. Eye-movements have a privileged relation to physical locations, but not to spatial information conveyed in other ways.
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12:00-1:30 PM (2233)

Response Time Differences and Cue Salience in Virtual Versus Augmented Reality. KYLE A. PETTIJOHN, *Naval Medical Research Unit, Dayton*, CHAD PELTIER, *Naval Submarine Research Laboratory*, ADAM T. BIGGS, *Naval Medical Research Unit, Dayton* (Sponsored by Adam Biggs) – Virtual reality (VR) and augmented reality (AR) represent a potentially game-changing arena for improving training and operations in multiple fields. However, it is unclear whether performance differs when the same task is performed in VR versus AR. The current study looked at performance during a naval shooting task with simulated shipboard motion. Participants were given 'Commence Fire' commands when hostile ships approached and 'Cease Fire' commands upon sufficiently disabling hostile craft. Response times were faster for 'Commence Fire' commands in AR compared to VR, which was likely due to more salient cues in AR when blending computer-generated information into real-world elements. There were no differences in response time to 'Cease Fire' commands, which was likely due to an extremely salient cue (thick smoke from the disabled ship). These results suggest that mixed reality systems might cause individuals to react differently due to differences in cue salience between systems.
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12:00-1:30 PM (2234)

The Partial Repetition Cost Paradigm, Reversed: No Feature Integration Effects Without Target Discrimination. GREG HUFFMAN, MATTHEW HILCHEY, BLAIRE WEIDLER, MARK MILLS, and JAY PRATT, *University of Toronto* (Presented by Jay Pratt) – There are response time costs when a stimulus and a response only partially match the prior stimulus and response. These partial repetition costs are interpreted as evidence of feature integration. Recently, we found that partial repetition costs are conspicuously absent for simple detection and localization responses (Huffman et al., 2018). Here, we follow-up on this observation to determine whether partial repetition costs depend on stimulus identity processing. Experiment 1 was a typical partial repetition cost paradigm where individuals made a precued response to a target and then discriminated a second target's color. In Experiment 2, we 'reversed' this paradigm such that participants discriminated the first target's color and then made a precued response to the second target. Experiment 1 replicated previous partial repetition costs while Experiment 2 showed no such costs. These findings call into question whether feature integration effects are perceptual in nature.
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12:00-1:30 PM (2235)

Learning a Visuomotor Rotation Enhances Mental Rotation. JIANFEI GUO and JOO-HYUN SONG, *Brown University* (Sponsored by Joo-Hyun Song) – Previous studies have demonstrated that visuomotor rotation and mental rotation share common processing constraints and neural correlates. However, it is unknown whether the training of visuomotor rotation can facilitate mental rotation. Here, we compared the response time (RT) of mental rotation before and after a visuomotor rotation training session, in which participants were trained to adapt to a rotation of real-time visual feedback of the hand movement. As controls, another two groups of subjects were required to perform direct reaching without rotation adaptation and a serial reaction time (SRT) task that induced sequential motor learning, respectively. We found that the magnitude of RT improvement of mental rotation in the visuomotor rotation training group was higher than control reaching group and SRT group. In conclusion, our findings suggest that learning a visuomotor rotation enhances mental rotation, but pure reaching movement and rotation-irrelevant movement learning processes do not.
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12:00-1:30 PM (2236)

Tactile Sensitivity During Reach-and-Grasp Action Observation. MORGAN TESKEY, DANIEL N. BUB, and MICHAEL E.J. MASSON, *University of Victoria* (Sponsored by Michael Masson) – Previous research has shown that detection of a tactile event can be modulated by the performance of a goal-directed action. The current task tested and verified the proposal that observing a reach-and-grasp action performed by another person would also influence tactile sensitivity. The nature of this influence appears to change during the course of the observed action and is specific to the side of the body that corresponds to the observed action. Our results challenge the view that the modulation of tactile perception during the course of an observed actions is due to neural substrates common to both action observation and action execution.
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12:00-1:30 PM (2237)

Explicit Knowledge of Movement Variability. LUKE SIM and ANDREW B. SLIFKIN, *Cleveland State University* (Sponsored by Andrew Slifkin) – Humans have precise "knowledge" of their movement variability (e.g., Slifkin & Eder, 2017, Acta Psychologica, 174, 101-189). It is likely that the use of knowledge of variability in the control of movement is governed by automatic, unconscious, or, implicit information processes. Here, we examine the question of whether implicit knowledge of variability is also accessible at a conscious, explicit

level of awareness, and, if so, then would explicit estimates of variability match participants' actual variability. Participants were required to perform in a cyclical aiming task where target width varied between conditions; the range of each movement endpoint distribution provided an index of actual variability. In contrast, explicit knowledge of variability was assessed by asking participants to estimate the range of their endpoint distributions, in the absence of performing the motor task. According to the results, both actual variability and the explicit estimates of variability increased as a function of target width. Both indices were equivalent at the smallest target, but with further increases in width the explicit index increasingly overestimated the actual index. Further implications of the results will be discussed.
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12:00-1:30 PM (2238)

The Effect of Valence on Magnitude Effects in Time Perception. BERT HODGES, *University of Connecticut*, JEEIN KANG, *Gordon College*, SUZANNE ROSE, *Mt. Holyoke College*, AITAO LU, *South China Normal University*, EMILY LUNDBERG, *Gordon College* – Magnitude effects are a robust finding in time perception: Temporal durations of bigger, faster, louder, brighter, heavier events are generally overestimated. A possible moderating factor is the valence of the events and the meaning of the actions involved. Two experiments found evidence suggesting that negative actions and events produce magnitude effects, while positive ones do not. In Exp. 1 (N=55) carrying increasingly heavy lemons produced longer time estimates in the context of a "job" but not "helping feed malnourished people." In Exp. 2 (N=29) magnitude effects were found in two contexts, money owed to others, and the spread of disease. Effects were negated when money was owed to the self, and there was a spread of immunizations. No effect was found for a third context, negative and positive comments on a paper. Reasons for magnitude and valence effects are unknown but are explored in terms of opportunities for realizing values.
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12:00-1:30 PM (2239)

Predictors of Pitch Reproduction Ability: Pitch Specific Relationships With Imagery and Memory. EMMA B. GREENSPON and PETER Q. PFORDRESHER, *University at Buffalo, State University of New York* (Sponsored by Peter Pfordresher) – Why are some people bad singers? Reproducing sounds with the voice requires many components, including perception, motor control, memory and imagery. Therefore, a breakdown in any of these processes could lead to poor singing. Recently, it has been shown that inaccurate singers experience degraded auditory images. However, these studies have used tasks that rely on both auditory imagery and memory, but have not offered operational definitions of these processes. As a result, it remains unclear whether poor singing results from a deficit in imagery or memory, and whether such a deficit is specific to pitch processing. In the current study, 216 participants completed tasks which measured singing ability, pitch perception, imagery (pitch and verbal) and short-term memory capacity (pitch and verbal). Hierarchical linear regression indicated that pitch imagery (not verbal) and pitch short-term memory (not verbal) were both significant unique predictors of singing ability.
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12:00-1:30 PM (2240)

The Influence of Virtual Reality Experience on Users' Depth Perception in Virtual Environments. SHUCHEN LIU and PEI SUN, *Tsinghua University* – Numerous studies have found that users typically underestimate distances in virtual environments (VE). Previous studies have shown that a simple pertinent method of interacting with the environment targeted at improving distance perception can correct distance underestimation to nearly veridical. We examined 1) whether engaging in a brief non-pertinent virtual reality experience (playing VR games) will influence distance perception in immersive VE; 2) whether different tracking modes of VR will affect distance perception in immersive VE in different ways. We found that a 3-minute pertinent virtual reality experience could improve the distance perception, however, playing VR game with 7 minutes either under room-scale mode or standing mode did not change participants' distance underestimation. Our results show that playing VR game could not bring a positive effect to participants' distance perception in immersive VE, suggesting that "pertinence" may be an essential element of methods that improves distance perception performance in virtual environments.
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12:00-1:30 PM (2241)

Expertise Effects on Affordance Perception and Action in Indoor Rock Climbing. MIRINDA WHITAKER, KRISTINA M. RAND, and GRANT POINTON, *University of Utah* – Expert rock climbers demonstrate superior cognitive abilities in predicting and remembering sequences of climbing holds (Rand, Tarampi, Whitaker, & Pointon, 2017). This difference may be explained by expert's ability to judge body-based affordances, allowing them to chunk routes into meaningful segments, aiding with memory. We directly evaluated climbing-specific affordance judgments in climbers of varying ability. Climbers viewed a series of start holds on an indoor climbing wall and judged whether or not they could move their bodies to grasp indicated holds. Participants also provided difficulty ratings and reported anticipated challenges for each move. Next, participants attempted to complete each move, and once again indicated the difficulty of the route. Preliminary analyses (N=14) revealed that skilled climbers are more likely to enact alternate hand and foot configurations in initiating movements on the climbing wall—suggesting greater creativity. We predict that more skilled climbers will show greater accuracy in their affordance judgments.
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12:00-1:30 PM (2242)

The Influence of Multiple Concurrent Action Outcomes on Response Selection. JAMES D. MILES, *California State University, Long Beach* – Anticipated outcomes of our actions influence response selection. Most extant research on this topic

focuses on individual response outcomes. However, in normal interaction with the environment, individual actions may lead to several outcomes which may be congruent or incongruent with one another. We examined whether multiple concurrent anticipated outcomes influence responses in a combined manner and whether certain outcome locations are preferred. Participants performed a Simon-type task in which finger swipes were made based on the color of targets presented at multiple positions on a display. Responses were followed by the individual targets moving compatibly or incompatibly with the finger swipe. Results indicate that concurrent response outcomes influence responses in an additive fashion and that action outcomes at certain locations (such as the center and top of the display field) are more influential than at other locations. We discuss how multiple outcomes are represented and weighted during response selection.
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12:00-1:30 PM (2243)

How Pedestrians Approach and Cross Bicycle Traffic. BENJAMIN J. CHIHAK and JAMES BORDWELL, *Coe College* – The coordination of self-movement with the movement of other objects in the environment is fundamental to human safety. One common situation where precise perception-action tuning is especially important is when navigating through traffic at busy intersections. Some work exploring gap interception as a perceptual task has found that people tend to base their movements on current perceptual variables (e.g. optical expansion, constant bearing angle, etc.) when walking to intercept moving targets. However, studies exploring the specific task of approaching and crossing through a specific gap in traffic at an intersection have shown that simple movement-coordination strategies based on a single variable fail to account for the approach patterns demonstrated by drivers (Mathieu et al., 2017) and bicyclists (Chihak et al., 2010) in virtual environments. In the current study participants were asked to walk through a gap in bicycle traffic at the intersection of a one-way bicycle path and a pedestrian walkway in a virtual environment. An analysis of participants' approaches to the intersection suggested that participants do not use a single perceptual variable to govern their intersection-crossing strategy.
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12:00-1:30 PM (2244)

The Influence of Stimulus Size and Its Potential Power on Handgrip Force. MASAYOSHI NAGAI, *Ritsumeikan University*, YOHEI YAMADA, *Aichi Gakusen University*, HIDETOSHI KANAYA, *Ritsumeikan University*, NAOAKI KAWAKAMI, *Shimane University*, YUKIKO NISHIZAKI, *Kyoto Institute of Technology* – This study investigated whether participants' handgrip force was influenced by the size and potential power of a stimulus. In Experiment 1, a small or large circle was presented. When the circle appeared, the participant squeezed a handgrip at a pre-learned level (50% of maximum handgrip force). The results show that participants exerted a stronger force in response to the large stimulus than to the small one, but only with their non-dominant hand. In Experiment 2, a picture of a wrestler or a baby was presented instead of a circle. The results show the same trend: stronger force was exerted in response to the wrestler than to the baby, but only with the non-dominant hand. In Experiment 3, participants were required to exert maximum handgrip force in response to a small or large circle, showing a longer duration to exert their handgrip force for the small stimulus than the large one. These findings imply that information regarding the potential power and size of both a stimulus and manual force is shared between perceptual/cognitive and motor production systems.
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12:00-1:30 PM (2245)

Investigating Space Perception With Affordance Judgments in Augmented Reality. GRANT POINTON, CHELSEY THOMPSON, SARAH CREEM-REGEHR, and JEANINE STEFANUCCI, *University of Utah*, MITI JOSHI, RICHARD PARIS, and BOBBY BODENHEIMER, *Vanderbilt University* (Sponsored by Sarah Creem-Regehr) – Whether or not humans perceive virtual environments similarly to the real world has been studied in desktop displays and a variety of virtual reality technologies. In this work, we use action-based measures to investigate space perception in augmented reality (AR). Our first experiment compared individuals' affordance judgments of pass-ability through an aperture and the distance that was blind walked to targets between real stimuli and virtual stimuli. Our second experiment compared judgments of step cross-ability over a real or virtual gap. There were no differences in individuals' pass-ability judgments or blind walking performance between the real world and AR. However, we found that individuals' judgments of gap cross-ability in AR were underestimated relative to judgments made in the real world. The differences found between the real world and AR could be due to factors relating to the field of view of the device, the properties of the virtual stimuli, or the space in which the perception takes place (i.e., personal space vs. action space).
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12:00-1:30 PM (2246)

Personal Reminders: Idiosyncratic Associations Boost Memory More Than Normative Ones. DI ZHANG and JONATHAN TULLIS, *University of Arizona* (Sponsored by Jonathan Tullis) – Remindings, stimulus-prompted retrievals of prior specific episodes, are theorized to underlie a wide variety of cognitive skills, from frequency judgments to generalizations across related episodes. Remindings are driven by the association between related episodes, yet prior research has narrowly relied upon normative semantic relations to prompt remindings. Here, we compared the effects of different kinds of reminders (e.g. self-generated and other-generated) on memory. Across three experiments, participants generated cues that most made them think of the target words. Later, participants studied a list of targets for an upcoming memory test. Target words were randomly assigned to be followed by the participant's self-generated cue, a prior subject's generated cue, a normatively associated cue, or an unrelated word. Self-generated reminders boosted memory for the earlier target words more than normatively-associated reminders across final

memory tests that involved recall. Reminders generated by others enhanced memory as much or more than normatively-associated reminders. Idiosyncratic and distinct relations may have a stronger impact on memory and be a more important driver of remindings than normative relations.
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12:00-1:30 PM (2247)

Bilingual Language Change Detection: The Role of Orthographic, Phonological, and Semantic Overlap in Early Stage Processing. JENNIFER M. BLUSH, ASHLEY S. BANGERT, and ANA I. SCHWARTZ, *University of Texas at El Paso* (Sponsored by Ana Schwartz) – We examined how bilinguals' ability to detect a change in language between pairs of words is influenced by overlap in lexical form versus meaning. Spanish-English bilinguals were presented with word pairs in either the visual (Experiment 1) or auditory (Experiment 2) modality and indicated whether they were in the same or different language using a mouse-tracking paradigm. For language change trials, words were either translation equivalents or unrelated in meaning and either cognates or non-cognates. In Experiment 1 mouse trajectories reflected greater uncertainty for cognate pairs relative to non-cognates. Responses to cognates presented in different languages reflected the greatest degree of uncertainty relative to other conditions. The overall pattern of movement trajectories across conditions suggests that form overlap has an initial effect, which is followed by a later influence of semantic overlap. We predict trajectories will reflect less uncertainty in Experiment 2 due to unique phonetic language cues.
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12:00-1:30 PM (2248)

Modeling Sociocognitive Identity in Online Interactions: A Group Communication Analysis Approach. NIA M.M. DOWELL, *University of Michigan* – During group interactions, members take on different roles within the discussion. Roles have distinct patterns of behavioral engagement (i.e., active or passive, leading or following), contribution characteristics (i.e., providing new information or echoing given material), and social orientation (i.e., individual or group). We present a novel approach, Group Communication Analysis(GCA), for detecting emergent roles from participants' discourse contributions and patterns of interaction. GCA makes use of automated linguistic cohesion analysis across sequences of learners' interactions in multiparty communication. GCA calculates six inter- and intrapersonal sociocognitive measures of such interactions and from these identifies distinct interaction profiles through cluster analysis. With this method, we explored three collaborative interaction datasets (participant N= 2,429), and were able to diagnostically reveal six robust profiles of learners, and show the impact of these roles on learner and group performance. More broadly, GCA provides a framework for researchers to explore the micro intra- and interpersonal patterns associated with the participants' roles and the sociocognitive processes related to successful collaboration.
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POSTER SESSION III

Friday Evening
Elite A
Viewing 4:00-7:30, Author Present 6:00-7:30 PM

ATTENTION II

6:00-7:30 PM (3001)

Neural Mechanisms of Strategic Adaptation in Attentional Flexibility. ANTHONY W. SALI, *Wake Forest University*, TOBIAS EGNER, *Duke University* – Individuals adjust their readiness to shift spatial attention according to the changing demands of the environment, but the neural mechanisms underlying this learning process are unknown. Here, participants covertly shifted attention among streams of characters, the locations of which predicted attention shift cue likelihoods, during functional magnetic resonance imaging (fMRI). Behavioral attention-shifting costs were smaller in shift-associated contexts than in hold-associated contexts, demonstrating learned modulations of flexibility. Trial-by-trial "shift prediction errors," estimated with a behavioral reinforcement learning model, scaled positively with activity within dorsal and ventral fronto-parietal regions, documenting that these regions track, and update, the likelihood of forthcoming cued shifts in spatial attention. A complementary inverted encoding model analysis revealed no preparatory changes in spatial attentional selection prior to cue onset, suggesting that learned flexibility may speed the shift process itself rather than broadening attentional selection.
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6:00-7:30 PM (3002)

A Cost-Benefit Approach to Motivated Top-Down Control in High Trait Anxiety Individuals. CRISTINA G. WILSON, *Temple University* – Individuals with trait anxiety tend to be worse at maintaining goal information and using it to direct behavior and prevent interference from competing goals, i.e., top-down control. However, anxiety differences in laboratory measures of control are not consistently found, leading to the prominent theory that trait anxious individuals can flexibly allocate resources to control when sufficiently motivated. This study uses a cost-benefit theoretical framework of control to predict the conditions when trait anxious individuals will be motivated to employ control. According to this framework, control is used when the expected benefits outweigh the costs, where the benefit is the payoff for good performance in the primary task, and the cost is the depletion of resources available for the performance of other tasks. The costs and benefits of control were independently manipulated in the Continuous Performance Task, AX. It was expected high anxiety participants would be motivated to improve control when benefits were increased and reduce control when costs were increased. However, the results show manipulating benefits and costs does not differentially influence motivation to use control, but instead impacts the effectiveness of control.
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6:00-7:30 PM (3003)

The Influence of Cognitive Training on Susceptibility to Visual Illusions. HANNA BEDNAREK, *University of Social Sciences and Humanities*, JAROSLAW ORZECHOWSKI, *Jagiellonian University*, MAGDALENA PRZEDNICZEK, *University of Social Sciences and Humanities*, JUSTYNA OLSZEWSKA, *University of Wisconsin, Oshkosh*, RADOSLAW WUJCIK, *University of Social Sciences and Humanities* – The aim of the present study was to answer the question whether there is a possibility to enhance resistance to visual – geometric illusions (metric and orientation) using cognitive trainings. Three types of short trainings were analyzed: (1) training exercises targeted at improving exogenous attention; (2) training exercises targeted at improving the executive control system (shifting, updating and inhibition); and (3) training exercises targeted at improving WM. We hypothesized that: (1) a short training of WM and executive functions will improve resistance to metric illusions (Ebbinghaus & Muller-Lyer), while a training of attention will increase resistance to orientation illusions (Poggendorff, Zöllner & Ponzo); (2) short cognitive trainings will diminish susceptibility to visual illusions in a group of field dependent participants (FD) as opposed to field independent (FI). After a WM training susceptibility to the Ponzo illusion decreased in FD individuals. A training of executive functions diminished susceptibility to the Miller-Lyer and Ponzo illusions regardless of cognitive preferences (FD and FI). Our results are discussed in the light of practical implications in various occupational situations.
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6:00-7:30 PM (3004)

Mouse-Cursor Motion Measures Help Clarify Individual Differences in Executive Functions. TAKASHI YAMAUCHI and ANTON LEONTYEV, *Texas A&M University* – Impaired executive functions (EF) are common in many mental disorders, including anxiety disorders, ADHD, and substance use disorder. The current state of behavioral tests, e.g., Attention Network task (i.e., EF tests), is problematic because (1) EF tests do not provide fine-grained sensitivity to detect individual differences in the magnitude of impairment (i.e., sensitivity problem); (2) EF test performance and self-report ratings often show little correlation (i.e., discrepancy problem). As a result, causal links between EF impairments and mental disorders are largely unknown and clinicians make diagnosis relying mostly on patients' self-report, resulting in wide spread under-, over-, and mis-diagnosis of mental illness. In a series of experiments we demonstrate that the sensitivity and discrepancy problems can be ameliorated by augmenting standard cognitive tests with mouse-cursor motion measures, and the complex interaction among motivation, action and cognition can be examined by analyzing the movement of the computer cursor pixel by pixel.
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6:00-7:30 PM (3005)

Growth of Interference in Serial Nonverbal Reactions. ALESHA BOND, MELANY LOVE, JENNIFER JOHNSON, and DAVID A. WASHBURN, *Georgia State University* – Executive attention is required to inhibit responses that are strongly associated with a prepotent stimulus (e.g., reading a color word) and instead to process a weaker cue or competing response (e.g., naming the incongruent color of a word). To examine the rise of competition that underlies Stroop-like interference on tests of executive attention, we trained undergraduate volunteers on the meanings of visuographic symbols ("lexigrams") that represented colors. Between each training block, the participants were tested on a color-sorting task that included the lexigrams in congruent or incongruent colors. Stroop interference developed across blocks, and the rate of development was examined as a function of other predictor measures of controlled attention. Rhesus monkeys were also trained on the meanings of these lexigrams. The monkeys also showed Stroop effects , as well as variability that indicated individual, as well as species, differences in executive attention.
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6:00-7:30 PM (3006)

The Need for Speed and the Flexibility of Cognitive Control Strategies. CHAD MOFFITT, *University of Utah*, JASON M. WATSON, KIMBERLY SPAHR, and ANGELICA O'TOOLE-FEHLMANN, *University of Colorado, Denver* – The current study investigated whether speed instructions and individual differences in working memory capacity (WMC) influence switching between proactive and reactive control (Braver, Gray, & Burgess, 2007), using a version of the AX-CPT task (AX-CPT-40; Redick, 2014). We predicted that when task instructions emphasized both speed and accuracy, high-spans would favor proactive control while low-spans would use reactive control. Our results supported this prediction, thus replicating previous research in this area on varieties of cognitive control (Redick, 2014). Yet, when instructions stressed that responses to probes needed to be fast, we predicted that high-spans should switch to an efficient form of control. Indeed, under this condition, high-spans' errors increased on AX trials but not BX trials, even though they were faster on BX trials. Surprisingly, low-spans also shifted strategies, resulting in a decrease in errors on BX trials and an increase in errors on AX trials. Results are interpreted in light of individual differences in control strategies where WMC may modulate reliance on consistent versus varied response mapping for these trial types in speed versus balanced speed/accuracy task instructions, respectively.
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6:00-7:30 PM (3007)

Divergent Vigilance-Decrement Response Times. JOSHUA RUBINSTEIN, *Army Research Laboratory* – Over the past 80 years, most descriptions of the vigilance decrement specify a decrease in signal detection associated with an increase (slowing) in response times. A largely ignored alternative pattern exists, primarily associated with various search tasks (e.g., industrial inspection, X-ray screening), comprising a similar decrease in signal detection, but with a decrease in response times. Subjects respond faster with increasing time-on-task. Five experiments were conducted that ruled out paced vs. un-paced and overall task-type (simple detection vs. search) as causes of these divergent response-time patterns. This research identified Response Structure (how subjects respond to the presence and absence of the critical signal) as a primary cause of this phenomenon. These results do not support traditional resource-depletion theories of the vigilance decrement. Instead, a Dynamic Resource Allocation Theory is proposed in which the attention system uses various tactics to strategically disengage from tasks that provide low payoff across time-on-task.
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6:00-7:30 PM (3008)

Are the Reports of Less Mind-Wandering in Older Age Valid? ANDRA ARNICANE, ALESSANDRA SOUZA, and KLAUS OBERAUER, *University of Zurich* (Sponsored by Vanessa Loaiza) – Notwithstanding decline of executive control with aging, older adults report less mind-wandering (MW) than younger adults. This finding challenges major MW theories which assume that MW occurs due to failures of executive control. Alternatively, it might be explained by reduced introspection ability in older age, so that attentional fluctuations and task disengagement more often go unnoticed. The present study assessed the validity of the self-reported attentional state of older adults compared to younger adults in three tasks: (1) reading with an embedded gibberish detection task; (2) a whole-report visual working memory task, and (3) a go/no-go task. These three tasks provide objective measures of inattentiveness: (1) failures to detect gibberish; (2) accuracy at chance level, and (3) increased RT variability and commission errors. We will present preliminary results relating these objective measures to attentional-state judgment across age. We will discuss what these results imply concerning the validity of older adults' MW self-reports.
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6:00-7:30 PM (3009)

Patterns of Cognitive Control and Autonomic Nervous System Activity: How the Dual Mechanisms for Control Framework Relates to Heart Rate Fluctuation. MICHELLE A. DOLLOIS, MARK J. FENSKE, and CHRIS M. FIACCONI, *University of Guelph* (Sponsored by Mark Fenske) – Effortful cognitive processing has long been associated with changes in autonomic nervous system (ANS) activity. Here, we examine effort-related changes in ANS activity through the lens of the dual mechanisms for control framework, which distinguishes between two modes of cognitive control. Proactive control requires active goal maintenance and sustained attention thus embodying aspects of cognitive effort previously shown to manifest in ANS measurements. Reactive control diverges in that does not require sustained preparation and attention. To examine the link between behavioural markers of different control modes and autonomic activity, we combined the AX-continuous performance test with measures of heart rate (HR) and breathing. Consistent with established HR patterns associated with anticipation and responding, we observed a

deceleration in HR during the cue-probe interval followed by a HR acceleration during response to the probe. This pattern of HR fluctuation will be examined in relation to behavioural markers of different control strategies.
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6:00-7:30 PM (3010)

The Impact of Working Memory and Anxiety on Sustained Attention in Mindfulness Meditation. STEPHEN LE VERN WARE, FITRIA JONG, KEVIN BENITEZ, JOHN CLAPPER, and HIDEYA KOSHINO, *California State University, San Bernardino* (Sponsored by Hideya Koshino) – This study investigated the role of working memory and anxiety on sustaining attention in a breath counting task. The breath counting task is designed to capture attentional performance using key presses in a task similar to mindfulness meditation. Following Levinson et al. (2014), participants were instructed to press "b" for breaths one to eight, "n" for breath nine, and then to start again at breath one; they were also instructed to press "m" whenever they lost count. Following 15 minutes of breath counting, two probe questions were presented to measure mind-wandering during the task. There was a significant correlation between performance measures derived from "n" and "m" presses, which also correlated with both thought probes. The low working memory/low state anxiety group showed lower sustained attention in the breath counting task than the other groups. The results suggest that individual differences in executive function and anxiety may play a role in novices sustaining attention during breath counting meditation.
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6:00-7:30 PM (3011)

Exploring Top-Down Influences on Visual Attention Event-Related Potentials. ANNE MONNIER, *Université de Montréal*, ROBERTO DELL'AQUA and MATTIA DORO, *University of Padova*, LESLEY WU, *University College London*, PIERRE JOLICOEUR, *Université de Montréal* (Sponsored by Roberto Dell'aqua) – We used event-related potentials (ERP) to improve our understanding of the underlying mechanisms of attention. The N2pc (posterior contralateral negativity) is a well-known lateralized ERP index of visuo-spatial attention. Less studied, the N2pb (posterior bilateral negativity) appears to reflect some of the functional characteristics of N2pc, but not all of them. Here we explored to what extent N2pc and N2pb might reflect similar mechanisms. We presented pop-out visual stimuli to 50 subjects. They consisted of salient colored items (0, 1, 2, or 3 targets) among differently-colored distractors. We examined the modulation of the amplitude of the 2 components according to the task (discrimination of number of targets, discrimination of spatial position, or detection (presence/absence)). Significant differences of amplitude of both components across tasks, and if stimuli were targets or distractors in some tasks, point out the influence of top-down processes on visuo-spatial attention on both components.
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6:00-7:30 PM (3013)

Individual Differences in Spared Cognitive Control and Episodic Memory Processes Dissociate Cognitive Profiles in Autism Spectrum Disorder. JEREMY HOGEVEEN, *University of New Mexico*, MARIE KRUG and MARJORIE SOLOMON, *University of California, Davis* – Myriad studies examining the cognitive profile in Autism Spectrum Disorder (ASD) have focused on isolating 'impaired' cognitive processes at the group-level in ASD relative to typical development (TYP). This approach has been fruitful, yet there have been failures in replication and a general lack of clarity regarding 'spared' (i.e. matched across ASD and TYP) versus impaired cognitive processes in ASD. Such an approach may fail to isolate meaningful variance in processes that are spared at the group-level, and elucidate how those processes contribute to clinical symptoms. Here, we examined the relationship between cognitive performance and clinical symptoms in adolescents with ASD or TYP, focusing on individual differences on tasks that were spared at the group-level. Our data suggest that spared cognitive control in ASD is associated with both a clinical benefit (less attention problems) and a clinical cost (more compulsive behaviors). Further, spared episodic memory is associated with increased restricted behaviors in ASD. These data suggest distinct cognitive profiles in ASD: one with spared maintenance at the cost of inflexibility, and the other with impaired maintenance but reduced inflexibility.
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6:00-7:30 PM (3014)

No Better Memory for Unexpected Conflict: Expectancy-Based Modulations of Interference Effects in the Picture-Word Stroop Task Do Not Affect Later Memory Performance. GIACOMO SPINELLI, STEPHEN J. LUPKER, and ALBERT N. KATZ, *University of Western Ontario* (Sponsored by Lucia Colombo) – Research suggests that, in interference tasks, conflict from the distractor dimension reinforces attention to the target dimension and, as a result, enhances encoding of target stimuli, as indexed by improved recognition memory performance for those stimuli. Attention to the target dimension, however, is also thought to depend on the expectation of conflict, with unexpected conflict between dimensions requiring greater allocation of attention to the target stimuli. Using a picture-word Stroop task, we investigated the impact of conflict expectedness on subsequent recognition memory by manipulating the proportion of congruent items and the congruency of the preceding trial in an initial study block in which participants categorized pictures. Results from the initial block suggest that conflict expectedness was successfully manipulated (i.e., larger interference effects when conflict was unexpected). However, the expectancy manipulation had no impact on the memory advantage for target stimuli appearing with an incongruent/conflicting word in the initial block. Consistent with findings from the Posner task (Ortiz-Tudela et al., 2018), our results suggest that expectation violations in interference tasks produce no memory enhancement.
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6:00-7:30 PM (3015)

Using Steering Movements to Infer How Attention Is Distributed on a Previewed Roadway. EMANUELE RIZZI, *Ohio State University* (Sponsored by Richard Jagacinski) – A perturbation technique was used to assess how subjects allocated their attention while tracking a winding roadway with a joystick that controlled lateral velocity. This technique provided a measure of both where and how much subjects attended to the upcoming roadway. When subjects could view a full 1.0 s of roadway preview, they primarily attended to a range of preview times from 0.1 s to 0.3 s into the future. This result is qualitatively consistent with predictions from optimal control theory (Miller, 1976). When preview was restricted to a narrow slit around 0.3 s or 0.6 s into the future, subjects focused attention on the available slit, but tracked more poorly than with more extended preview. These results illustrate the benefits of distributed attention for tracking a roadway and attentional flexibility in the context of action.
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6:00-7:30 PM (3016)

Effector System Prioritization in Manual-Vocal Dual Tasks as a Function of Intra- vs. Cross-Modal Stimulation. MAREIKE AMELIE HOFFMANN, *University of Würzburg*, ALEKS PIECZYKOLAN, *RWTH Aachen University*, LYNN HUESTEGGE, *University of Würzburg* (Sponsored by Lynn Huestegge) – Dual (vs. single) tasking mostly yields performance costs. These costs, which are often asymmetrical, can – under certain conditions – be interpreted as an index of task prioritization based on associated effector systems. Previous research suggested that vocal responses are prioritized over manual responses when both are triggered by the same aspect of a single auditory stimulus. However, it has remained unclear whether this prioritization still holds when different stimulus modalities are involved to independently trigger both responses. Here, we combined manual and vocal responses either triggered by the same stimulus modality (two different aspects of a stimulus) or by different stimulus modalities (auditory and visual). As a result, we observed prioritization of vocal over manual processing when both responses were triggered within the same stimulus modality. However, equal task processing priorities emerged when responses were triggered by two different stimulus modalities, independent of the S-R modality assignment. The results provide first evidence for a flexible, effector system-based task prioritization scheme in dual-task control which can – to some extent – be modulated by associated stimulus modalities.
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6:00-7:30 PM (3017)

Visuospatial Working Memory, Auditory Discrimination, and Attention. ZACH SHIPSTEAD, *Flagler College*, JESSIE MARTIN, *Georgia Institute of Technology*, ASHLEY NESPODZANY, *Arizona State University* – The present study examined the degree to which tests of visuospatial storage capacity and tests of sensory discrimination tap into the same underlying processes. Although visuospatial memory is often conceived of as an item-based system, sensory discrimination tasks only require test-takers to remember one item at a time. We found that there is a high degree of shared variance between storage and discrimination, and that this was a cross-modality factor (visual and auditory). We further examined the degree to which this common variance could be explained by attention control and sustained attention. These attention factors accounted for roughly 60% of the variance in memory. This indicates that tests of visuospatial memory capacity reflect more than modality-specific memory, and furthermore to the degree that they measure storage, it is likely a flexible resource, rather than a slot-based system.
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6:00-7:30 PM (3018)

Cognitive Control of Skilled Action. WAYNE DAVID CHRISTENSEN, *University of Warwick* (Sponsored by Cynthia Siew) – Skilled action is often thought to be largely automatic. However, many skill domains have extremely large contingency spaces and many skills, such as mountain biking and jazz improvisation, are performed in complex, dynamic conditions. This suggests that cognitive control may continue to play a role in advanced stages of acquisition in such skills. I present a theory of such control which synthesizes recent work in sensorimotor adaptation, sequence learning, motor planning, causal cognition and cognitive problem solving. Action planning and execution are governed by a control model based in working memory that incorporates explicit representation of the causal structure of the action and the context. This control model permits fine-grained intentional control of action features, including during execution, and interfaces with higher levels of strategic decision making. I defend the theory against evidence purporting to show skilled actions are automatic and show that it explains results across a number of research areas.
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ATTENTION: FEATURES AND OBJECTS

6:00-7:30 PM (3019)

Attentional Updating After Eye Movements — But Not Shifts of Covert Attention — Induces Illusory Conjunctions. EMMA WU DOWD and JULIE D. GOLOMB, *The Ohio State University* – Spatial attention is thought to be the "glue" that binds features together—but attention is dynamic, constantly moving across multiple goals and locations. How do dynamic shifts of attention, with or without eye movements, impact the binding of multiple features into integrated objects? Across a series of experiments manipulating dynamic spatial attention, participants were briefly presented with an array of four colored and oriented bars, and instructed to reproduce both the color and orientation (i.e., joint continuous-report) of a target item. Feature errors across the two dimensions could be correlated (and thus bound together) or independent (and unbound). We found that rapid shifts of covert spatial attention resulted in correlated errors, preserving object integrity. In contrast, attentional updating after an eye movement produced more unbound errors—specifically, illusory conjunctions. These

findings suggest that our perception of visual stability across saccades is susceptible to systematic errors of object-feature binding.
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6:00-7:30 PM (3020)

Exploring the Influence of Feature Autocorrelation on Attentional Sampling. CHLOE CALLAHAN-FLINTOFT (Graduate Travel Award Recipient) and BRAD WYBLE, *Pennsylvania State University* (Sponsored by Brad Wyble) – Does visual attention track and utilize feature statistics across time? In two experiments participants monitored two disks of continuously changing color that were either temporally auto-correlated or changing colors pseudo-randomly. A cue (white circle) flashed around one of the disks. The disks continued to change color for another 800ms. Participants reported the disk's color at the time of the cue using a continuous scale. Experiment 1 compared disks changing coherently along a color wheel versus randomly and found participants selected an earlier color in the random condition (32ms vs. 159ms). Experiment 2 found this selection latency reduction only when random color changes occurred after the cue, which means that an object's post attention autocorrelation matters more than its recent history. These results suggest that the statistics of a feature affects attentional selection such that autocorrelation maintain attentional engagement beyond the moment of the cue, resulting in a later selection.
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6:00-7:30 PM (3021)

A Right-Gaze Bias for Self-Identified Avatar Faces. FUMIHITO IMAI, *Hokkaido University*, CHIHO SATO and KEIKO TAGAI, *Shiseido Global Innovation Center*, JUN KAWAHARA, *Hokkaido University* – When participants observe a mirror image of their own face, they demonstrate a gaze bias toward the right side of their mirror image. The present study investigated whether such a right-side bias occurs when viewing a two-dimensional (2D) cartoon face that represents the viewer. Twenty participants viewed each of five unfamiliar 2D cartoon faces for 5 seconds and chose one for ostensible use in a computer game. Next, each of these faces and five novel control faces was presented for 5 seconds while participants' eye-movements were recorded. The results indicated a significant right-side gaze bias for only the chosen face. No such bias was observed for the unchosen or novel control faces. These results suggest that the right-gaze bias reflects the process of self-identification with an unfamiliar 2D cartoon face.
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6:00-7:30 PM (3022)

Tool Use Moves the Peri-Personal Space From Hand to Tool. RYOTA TAKAYAMA, *Tobii Technology K.K.*, AYAKO SANEYOSHI, *Teikyo University*, CHIKASHI MICHIMATA, *Sophia University* (Presented by Ayako Saneyoshi) (Sponsored by Chikashi Michimata) – We investigated whether the tool use would change the area of peri-personal space. In the training session, participants practiced a mini hockey game with a stick tool. After training, they performed a visual detection task. They were asked to judge whether the target was presented on the left or right side of the display. During the task they held the stick tool horizontally on the front of the display. Results indicated that performance of the detection task was improved when the target was presented near the tip of the stick tool. On the other hand, performance of the detection task was worsened when the target was presented near the hand that held the tool. These results suggested that the peri-personal space was projected from their hand to the tip of the tool by the tool training.
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6:00-7:30 PM (3023)

Adaptive Attention: Survival Processing Effects in Change Detection. LISA D. BLALOCK, *University of West Florida*, LISA A. VANWORMER, *Unaffiliated*, ANNA NGUYEN, *University of West Florida* – The Survival Processing Effect (Nairne, Thompson, & Pandeirada, 2007) has been extensively debated in the realm of memory, however, little research has been done in the realm of attention. Using a basic change detection task, we examined the effects of survival processing on task performance. Participants rated objects for either pleasantness or survival-relevance prior to the change detection task. Our results show a survival processing advantage only when the target is a high-arousal object, even if that target object has low survival-relevance. However, results also show that when the target is a low-arousal object, participants performed better when they previously rated that object for pleasantness than for survival relevance. When participants were not primed in either rating condition prior to the change detection task, the survival relevance of the target had no effect. Our results suggest that survival processing plays a secondary role in the automatic attention allocated to objects.
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6:00-7:30 PM (3024)

The Right Frame of Mind: Overcoming Functional Fixedness in Problem Solving. DAWN R. WEATHERFORD, *Texas A&M University, San Antonio*, LEMIRA ESPARZA, *University of Texas, San Antonio*, KHIRA S. WARFORD, *Texas A&M University, San Antonio*, LAURA J. TEDDER and OLIVIA HITCHCOCK, *Arkansas State University* – Functional fixedness blocks mental access to atypical object uses and hinders creativity. We investigated how focusing attention towards object parts or functions affects problem solving. Further, we tested how prompting may hinder or promote mindset transfer. First, participants received either parts-based (e.g., listing material properties), functions-based (e.g., listing possible uses), or control training. Then, participants were prompted either directly (i.e.., explicit instructions to use training before every question) or indirectly (i.e., mild suggestion about training's usefulness) before viewing five insight problems. Training interacted with prompting to affect response latency such that strong prompting produced longer response latencies than mild prompting, but only for parts-based and function-based training groups. However, both parts-based and functions-based training increased accuracy compared to control, but with no differences between them and

no impact of prompt. These findings extend previous theories regarding the influence of spreading activation and controlled processes on creativity.
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6:00-7:30 PM (3025)

Top-Down Influences on Apparent Motion Using the Ternus Illusion. MENGZHU FU and MICHAEL D. DODD, *University of Nebraska, Lincoln* (Sponsored by Michael Dodd) – It has been repeatedly demonstrated that the perception of apparent motion can be strongly influenced by the extent to which the elements in a display lend to perceptual grouping. For example, within the Ternus illusion, the percept of element (single item moving) vs. group (multiple items moving) motion is strongly influenced by the degree to which the individual stimuli cohere, with more group motion being observed as perceptual grouping increases (e.g. Kramer & Yantis, 1997). In the present study, we examine the influence of both context (e.g. background texture) and multisensory integration (auditory tones either consistent or inconsistent with the display) on the perception of apparent motion using Ternus display. Both context and tones impact performance but not in an identical manner to each other or previous manipulations. The results provide new insights and directions into top-down influences on perception.
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6:00-7:30 PM (3026)

Priming of Unattended Objects Is Unaffected by Extraneous Parts. RACHEL FLOOD HEATON and JOHN E. HUMMEL, *University of Illinois at Urbana-Champaign* (Sponsored by John Hummel) – Biederman (1985) showed that recognition of attended objects is unperturbed by the addition of extraneous parts, consistent with the proposal that we recognize objects as parts in specific spatial relations. However, unattended objects are represented more holistically than attended objects (Stankiewicz et al., 1997; Stankiewicz & Hummel, 2002; Thoma et al., 2004, 2006). We investigated the recognition of unattended objects with extraneous parts and showed that visual priming is unaffected both when an extraneous part extends beyond the bounding envelope of the original object image (Experiment 1) and when it does not (Experiment 2). These results suggest that, although holistic, even the visual representation of unattended objects is robust to the addition of extraneous parts, at least when those parts do not result in a visual form suggesting a different object category.
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6:00-7:30 PM (3027)

Task-Irrelevant Semantic Properties of Real-World Objects and Scene Influence Visual Attention. JOSEPH C. NAH, *The George Washington University*, GEORGE L. MALCOLM, *University of East Anglia*, SARAH SHOMSTEIN, *The George Washington University* (Sponsored by Sarah Shomstein) – According to recent evidence, semantic information biases attentional allocation independent of task-relevancy. These findings are drawn from paradigms examining the influence of semantic relationships between two, maximum three, real-world objects. Since objects never appear without a scene, it is critical to understand how a scene's semantic properties guide attention. Here, we investigate the influence of task-irrelevant semantic properties of scenes on attentional allocation and the degree to which semantic relationships between a scene and objects interact. Participants were presented with a scene followed by two objects on either side of fixation. Two Gabor wavelets appeared, one on fixation and one on an object, along with a distractor. Participants matched the wavelets' orientations. The scene-object and object-object relationship was manipulated and did not predict target location. Results suggest that semantic relationships between scenes and objects continuously influence attentional selection and this influence is directly predicted by the strength of semantic relationships.
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6:00-7:30 PM (3028)

Context Modulates Integration Effects – Selectively When It Is Task Relevant. BLAIRE J. WEIDLER, *Towson University*, MATTHEW D. HILCHEY, *University of Toronto*, RICHARD A. ABRAMS, *Washington University in St. Louis*, JAY PRATT, *University of Toronto* – Properties of a stimulus and the response to it become integrated to form a common representation in memory. Responses to subsequent stimuli are affected by properties shared with that representation, leading to so-called integration effects. This research examined the extent to which these integration effects depend upon the environmental context in which they are generated. Across three experiments, participants indicated the color or shape of a stimulus in an irrelevant city or forest scene, and robust integration effects were found that did not depend on context. In a fourth experiment, the target stimulus was to be categorized as either a city or forest. In that case, the context did modify the integration effects. Thus, environmental context can influence integration effects, but only when the context is conceptually related to the task.
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6:00-7:30 PM (3029)

Context Does Not Modulate Location-Response Integration Effects. MATTHEW D. HILCHEY and BLAIRE J. WEIDLER, *University of Toronto*, JASON RAJSIC, *Vanderbilt University*, JAY PRATT, *University of Toronto* – Properties of a stimulus, including its location and the response to it, become integrated to form a common representation in memory. Responses to subsequent stimuli are affected by whether there are shared properties between them and the representation, leading to so-called integration effects. The goal of this research was to examine how sensitive these integration effects can be to variation in the environment. Participants manually discriminated serially-presented target stimuli that randomly repeated or changed location. Across four experiments, we varied whether the target was accompanied by distractor stimuli or placeholders, thereby introducing variation between the scenes in which the effects were generated and measured. Across all experiments, the integration effects were robust against large changes to the visual environment, including removing all distractors

and placeholders. The results indicate that location-response integration effects can effectively run blind to the environment. This finding implies effects that are unique to action pathways.
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6:00-7:30 PM (3030)

Working Memory Representations Can Persist Outside the Focus of Attention. NICOLE HAKIM, *University of Chicago*, TOBIAS FELDMANN-WÜSTEFELD, *University of Southampton*, EDWARD AWH and EDWARD K. VOGEL, *University of Chicago* (Sponsored by Edward Vogel) – Attention and working memory (WM) are deeply intertwined constructs, and many models propose WM representations must be maintained inside the focus of attention. Recently, others and we have illustrated that specific aspects of attention and WM are independent. We took advantage of these findings by interrupting participants with task–relevant and task–irrelevant information. This allowed us to remove spatial attention from WM representations to examine the fate of WM representations outside the focus of spatial attention. We found that when participants were expecting task-relevant interruption, lateralized WM representations persisted throughout the delay period, even though attention was shifted away from these lateralized WM representations. However, when new task-relevant information was presented, both attention and WM shifted to the new information. These neural results suggest that WM representations can persist outside the focus of attention. Additionally, attention and WM mechanisms are distinct, but work together to respond to varying task demands.
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6:00-7:30 PM (3031)

Uncanny Eyes and Pupils: The Other-Race Effect on the Facial Uncanny Valley. AYAKO H. SANEYOSHI, *Teikyo University*, HIKARU SUZUKI, TAKATO OYAMA, and MATIA OKUBO, *Senshu University*, BRUNO LAENG, *Oslo University* – The term uncanny valley refers to the sense of discomfort experienced when people look at realistic virtual humans. The present study examined the other-race effect on the 'uncanny valley' feeling using computer-generated European and Asian faces with changing the eye size. European and Asian university students were asked to rate the unpleasantness of the faces, while their pupil diameter was concurrently measured. Both European and Asian raters evaluated faces of the same ethnicity as more unpleasant than those of the different, especially when the eyes were extremely large in size. However, irrespective of raters' ethnicity, pupils dilated most for the Asian faces with extremely large eyes. For European participants, we found that pupils dilated to European faces with extremely small eyes. These results suggest differences between subjective impressions and automatic subconscious evaluations (i.e., pupil dilation) across ethnic groups in terms of the shape of their "uncanny valleys."
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6:00-7:30 PM (3032)

Feature-Specificity in Visual Statistical Summary Processing. HARUN YORUK and AYSECAN BODUROGLU, *Bogazici University* – Viewers can rapidly and efficiently summarize the statistical properties of displays. To data only a few studies have directly investigated the mechanisms extracting these early perceptual, statistical summary representations. Previously Haberman, Brady and Alvarez (2015) demonstrated that high-level (e.g. face) and low-level (e.g. orientation) visual properties were independently summarized by domain-specific mechanisms. In a series of experiments, we investigated whether different basic visual properties were summarized independently. Participants viewed a set of lines that varied in size and orientation, and reported the average of one of the features. The relevant feature was either the same throughout or mixed within a block. Our analyses consistently demonstrated that averaging errors for these two features were unrelated, and similar between blocked and mixed trials. This suggests that, in addition to there being different summary mechanisms for high- and low-level domains, basic visual features may be averaged by independent feature-specific summary mechanisms.
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CONSCIOUSNESS

6:00-7:30 PM (3033)

Exploring Human Inner Experience by "Track Your Thoughts": An Experience Sampling. XINQI GUO and KAREN DOBKINS, *University of California, San Diego* (Sponsored by John Wixted) – With a growing interest in the subjective "inner experience", the current study explored the content and characteristics of attention-related inner experience. To this end, we employed experience sampling method (ESM) to prompt 139 undergraduate participants at random times, asking them to report their real-time experience associated with attention on various phenomenological perspectives, over 6 consecutive days. By looking at the 3 attention statuses: focusing on current tasks/present environment (at-present), attending to things that are unrelated to the present environment (mind-wandering), and nothing in mind (zoned-out), our results suggest that our attention is distributed into each status for 55%, 53% and 22%, respectively. Analysis revealed that attention is an important predictor for inner experience on 4 dimensions: when at-present, the inner experiences are more deliberate, less extreme in subjective reaction, and clearer, and better momentary feeling, compared to mind-wandering. To exam if the introspective nature of ESM alters well-being, an additional 232 undergraduate participants who did not go through ESM were recruited as controls, and the results indicate ESM is associated with elevated well-being.
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6:00-7:30 PM (3034)

The Effects of Motivation on Mind Wandering in Younger and Older Adults. JESSICA L. NICOSIA and DAVID A. BALOTA, *Washington University in St. Louis* (Sponsored by David Balota) – Despite declines in attentional control that accompany healthy aging, there is evidence that older adults paradoxically report less mind-wandering (MW), compared to younger adults. One account is that older adults are more motivated, compared to younger adults. In an attempt to test this possibility, we included a performance-based motivational

incentive. Younger and older adults initially performed 15-minutes of the Sustained Attention to Response Task (SART). In the motivation condition, participants were then told that they would receive an additional 30 minutes of SART but could leave after 15 minutes if their performance was high, thereby inducing a motivated state. The control condition was identical but did not include instructions about the possibility of leaving early. As expected, younger adults reported more MW than older adults in the control condition. In addition, in the motivation condition, compared to the control condition, older reduced post-error slowing, and younger adults produced increased performance-based thoughts. However, motivation did not modulate the size of the age-related change in self-reported MW.
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6:00-7:30 PM (3035)

Time Course of Mind Wandering. MEERA ZUKOSKY and RANXIAO FRANCES WANG, *University of Illinois at Urbana-Champaign* (Sponsored by Ranxiao Frances Wang) – It's a common assumption that a focus-mind wandering episode comprises a focusing state followed by a mind wandering state. Accordingly, probability of being in a focus state (p(focus)) should be high early in an episode and decrease overtime. We investigated the time course of mind wandering in a basic breath meditation task by probing participants at various intervals during a focus-mind wandering episode. Contrary to predictions of the standard model, there's no significant decrease in p(focus) during a focus-mind wandering episode. Simulations matching parameters of each participant suggest that the lack of this negative trend was not due to statistical power. Instead, people may have multiple focus-mind wandering sub-events before they are able to catch themselves mind wandering. Based on this new assumption, a novel method is developed to estimate the number of sub-events during a focus-mind wandering episode. Theoretical and methodological implications on mind wandering research will be discussed.
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6:00-7:30 PM (3036)

Rapid Recruitment of Unconscious Lexical Processing in the Acquisition of Novel Category Exemplars. REED MORGAN, KARYA ANYA OZMEN, SOPHIA MARTIN, and RICHARD L. ABRAMS, *Loyola Marymount University* – The brain systems that contribute to language processing unconsciously seem to be specialized for recognizing overlearned lexical information that has a high probability of appearing given the local context. Empirically, this means that robust findings of unconscious priming require repeated practice with long-familiar words. Here we decoupled familiarity and practice by examining unconscious category priming from extremely obscure English-language words that participants learned and then practiced. In a first session, participants were introduced to obscure names of fish and flowers. One day later, participants gained further practice with those words, then did a category priming task in which the visible targets were common fish and flower names and the briefly-flashed masked primes were either the newly-learned obscure names, or the common names. Significant priming was obtained from the common names as expected ($p < .001$), but also the newly-learned obscure names ($p = .008$) under display conditions that rendered the primes consciously imperceptible. This finding suggests recruitment of unconscious lexical processing systems occurs early on in the acquisition and mastery of new English-language words by English speakers.
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6:00-7:30 PM (3037)

Influence of Reward on Masked Priming of Free Choices. SEEMA PRASAD and RAMESH MISHRA, *University of Hyderabad* (Sponsored by Ramesh Mishra) – Reward has been shown to play a crucial role in mediating attention. But its role in modulating subliminal processing remains unexplored. Can the unconscious influence of a stimulus be controlled by the value attached to it? We examined this in two experiments using a backward masking paradigm with free and forced choice trials. Masked primes were presented on each trial before the target phase. High or low reward points were attached to the target stimuli. Numbers (1, 2 and 0) were used as primes/targets in Experiment 1 and arrows (left, right, double headed) in Experiment 2. A control block without reward was administered to all the participants. In both the experiments, results showed positive priming effects for low reward trials and negative priming effects for high reward trials indicating that high reward lead to self-inhibition of the primes resulting in negative compatibility effects. These findings shed new light on the extent of top-down control on unconscious priming.
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6:00-7:30 PM (3038)

Mind Wandering Outside the Box: Do Off-Task Thoughts Foster Creativity? LENA STEINDORF, HOLLY HAMMERTON, and JAN RUMMEL, *Heidelberg University* (Sponsored by Jan Rummel) – Sometimes you need to step away from a problem to solve it. Concerning creativity problems, a study by Baird et al. (2012) supported the idea of mind-wandering states contributing to a creative-incubation process. However, a similar study (Smeekens & Kane, 2016) found no such relation. We tried to resolve this discrepancy by focusing on mind-wandering-assessment aspects, which differed between the two studies. Our participants worked on verbal and figural creativity tasks. In one condition, participant's thoughts were probed during an incubation interval, possibly interrupting and/or making aware creative thought-processes, thereby diminishing incubation benefits. Indeed, participants in this condition retrospectively reported less creativity-task-related thoughts compared to two no-probe-incubation conditions (i.e., no-interruption and trivia-interruption). However, neither did we find differences in creativity-performance changes between a no-incubation and the three incubation conditions, nor any performance differences between incubation conditions, raising the question whether it is possible to situationally increase creativity via mind-wandering manipulations.
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6:00-7:30 PM (3039)

What Does "Mind Wandering" Mean? PAUL SELI, *Duke University*, MICHAEL J. KANE, *University of North Carolina, Greensboro*, JONATHAN SMALLWOOD, *University of York*, DANIEL L. SCHACTER, *Harvard University*, DAVID MAILLET, *University of Toronto*, JONATHAN W. SCHOOLER, *University of California, Santa Barbara*, DANIEL SMILEK, *University of Waterloo* – In recent years, there has been a tremendous increase in the number of studies examining mind wandering, and research on the topic has spread widely across various domains of psychological research. As research on the topic of mind wandering has accelerated, the defining features of this conscious state have expanded, and researchers have begun to define mind wandering in conceptually and operationally different ways between – and sometimes even within – studies. Yet, despite clear differences in the definitions adopted, 'mind wandering' is often discussed in broad terms, and inferences drawn by researchers are rarely constrained to their specific operational definitions. This practice produces a lack of clarity in our understanding of mind wandering, and it can lead to seemingly paradoxical findings and illusory inconsistencies in the literature. To minimize these problems, we propose that researchers adopt a family-resemblances approach to the investigation of mind wandering, which entails (a) treating mind wandering as a heterogeneous construct and (b) more clearly measuring and describing the specific aspects of the variety of mind wandering that researchers are attempting to investigate.
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6:00-7:30 PM (3040)

Working Memory Capacity and Dissociations of Emotional Valence and Intensity on Subjective and Objective Reports of Mind Wandering. AUDREY V.B. HOOD, *Montana State University*, JONATHAN B. BANKS, *Nova Southeastern University*, KEITH A. HUTCHISON, *Montana State University* – The current study examined the impact of affect valence and intensity on subjective and objective reports of mind wandering. Participants first completed the Automated Operation Span and Automated Reading Span. Affect valence (positive or negative) and intensity (intense or mild) were then manipulated through a writing task. Lastly, participants completed a sustained attention task (SART) with thought probes to measure mind wandering. Examining SART reaction time (RT) variability, working memory capacity (WMC) interacted with affect intensity, with high spans showing less RT variability in the mild intensity condition only. This suggests intense emotions reduce the relationship between WMC and mind wandering. In contrast, on self-reported thought probes, WMC interacted with affect valence, with high spans reporting more TUTs than low spans, but only under negative affect. Overall, affect valence might impact subjective reports of mind wandering, whereas intensity impacts objective measures of mind wandering.
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6:00-7:30 PM (3041)

Can Unconscious Intentions Be More Effective Than Conscious Intentions? Test of the Role of Metacognition in Hypnotic Response. BENCE PALFI, *University of Sussex*, BEN PARRIS, *University of Bournemouth*, ZOLTAN DIENES, *University of Sussex* (Sponsored by Toshihiko Matsuka) – Theories of hypnotic responding can be assigned to two classes based on their reliance on metacognition. Several theories assume that hypnosis can provide us with abilities (e.g., analgesia) we cannot possess non-hypnotically. In contrast, the cold control class of theories postulate that hypnotic responses are intended and the accompanying feeling of involuntariness is only a consequence of strategically not being aware of the intention. We compared the performance of highly suggestible participants in reducing the Stroop interference effect in a posthypnotic suggestion (word blindness: that words will appear as a meaningless foreign script) and in a volitional condition (imagining the words as meaningless characters). The Stroop interference was smaller in the posthypnotic suggestion condition than in the volition condition. These data dispute cold control theories by implying that the unique hypnotic nature of a response has a greater effect than a simple change in monitoring by higher order thoughts of intentions. Rather, an unconscious intention may be more effective in implementing strategic behavior than a conscious one undermining the well-established belief about the superiority of conscious cognitive control processes.
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6:00-7:30 PM (3042)

Altering Consciousness: Acute Mindfulness Exposure Decreases Verbatim Trace Reliance. LARRY DOUGLAS FORT and KERRI GOODWIN, *Towson University* (Sponsored by Kerri Goodwin) – Operating out of a fuzzy trace framework, researchers measured the effect of acute mindfulness exposure on memory within a systems based approach to consciousness, expecting the mindfulness condition to have more false recognitions and fewer correct recognitions. Participants were randomly assigned to control and experimental groups, both receiving randomized word lists and completing written recall after the presentation of each list followed by a recognition task. The experimental group received a 15 minute breathing based mindfulness audio, while the control received a time matched control lecture. Data supports the notion of mindfulness leading to less reliance on verbatim traces of memory via a significant decrease in correct recognitions after both mindfulness and lecture conditions; however, without a significant increase in gist errors, suggesting two observed transitional states of consciousness.
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6:00-7:30 PM (3043)

Non-Contingent Affective Outcomes Influence Feelings of Control. SOPHIE G. PAOLIZZI, CORY A. POTTS, and RICHARD A. CARLSON, *Pennsylvania State University* (Presented by Cory A. Potts) (Sponsored by Richard Carlson) – Judgments of agency reflect individuals' sense of ownership and control of their actions. Recent research demonstrates

several links between transient emotionality and control. In a series of three experiments, we asked participants to perform a simple aiming task, in which difficulty could be varied by manipulating target size. Previous work in our lab established that this manipulation affects feeling of control (FoC) judgments. We asked whether non-contingent affective stimuli (positive, neutral, or negative words) would also affect FoC judgments. These stimuli appeared as outcomes indicating successful performance of the aiming task, but valence of the words was not contingent on performance. We found that participants felt more control when they saw positive words, compared to negative words. Neutral words led to intermediate FoC judgments. This effect did not interact with task difficulty (target size), which independently affected FoC. We discuss possible relations between this effect of valence and other work on affect and control.
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6:00-7:30 PM (3044)

How Do the Contents of a Wandering Mind Unfold Over Time? An Automated Computational Linguistic Approach. CAITLIN MILLS and GABRIEL KING SMITH, *University of British Columbia*, NIA DOWELL, *University of Michigan*, SARVENAZ GHATTAN and KALINA CHRISTOFF, *University of British Columbia* – Think-aloud protocols (i.e. asking people to speak or type their ongoing thoughts during an activity) are commonly employed to understand how people think, solve problems, or update their mental models. An area that has been less explored with this protocol, however, is how thoughts unfold over time during mind-wandering. In order to explore the content of such thoughts and how they unfold, we utilized a think-aloud protocol to investigate the temporal changes in content from one thought to the next in the absence of a deliberate task. We extracted two sets of features: 1) a set of human-coded content ratings for each individual thought in a 'thought stream' and 2) an automated linguistic measure of cohesion in adjacent thoughts. Human-coded features indicated that adjacent thoughts were related in content around half of the time (M= 49.3%; SD= 16.9%). With respect to ratings of temporal orientation, 35.7% (SD= 16.3%) of thoughts pertained to the present, 29.7% (SD= 17.3%) were about the past, 27.5% (SD= 16.2%) involved no element of time, and 10.9% (SD= 7.2%) related to the past. A computational linguistic measure of cohesion reliably predicted the hand-coded content overlap feature as well as future-related thoughts, p's < .01.
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DECISION MAKING AND JUDGMENT

6:00-7:30 PM (3045)

Modeling the Role of Affect in the Iowa Gambling Task. WILLIAM HAYES and DOUGLAS WEDELL, *University of South Carolina* (Sponsored by Douglas Wedell) – The Iowa gambling task (IGT) requires participants to integrate previously experienced outcomes in order to make choices that will be advantageous in the long run. Many theories, such as the somatic marker hypothesis, suggest that affective signals mediate the link between previous outcomes and current choices in the IGT and are crucial for optimal performance. However, there is scant research investigating how affective reactions to each deck mediate choice on a trial-by-trial basis. In our study, participants completed a computerized 100-trial version of the IGT. After selecting a card on each trial and receiving the win-loss feedback, participants rated their affective evaluations of the four decks using a valence-by-arousal grid. Choice on each trial was modeled as a function of both immediate and accumulated affect. Results indicated that affect mediated choice for 69% of participants, with the combination of these two types of affect predicting the best performance. Choices were used to model each participant's valence ratings with key parameters being the shape and steepness of the utility function and the decay in learning. Task performance across participants was significantly related to each of these three parameters.
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6:00-7:30 PM (3046)

Does Time Pressure Increase Myopic Choice? BREANNA CRANE (J. Frank Yates Student Travel Award Recipient) and JENNIFER TRUEBLOOD, *Vanderbilt University* (Sponsored by Jennifer Trueblood) – Intertemporal choice studies how people trade-off smaller rewards offered sooner and larger rewards offered later. A common hypothesis is that myopic behavior occurs through a quick, intuitive system per the dual process theory while patient behavior occurs through a slow, deliberative system. Thus, we should see increased preference for immediate rewards compared to delayed rewards when individuals must make quick decisions. This study explored the effects of time pressure on intertemporal choice and whether decisions become more myopic under time pressure. Counter to predictions from dual process theory, we do not see decreased patience under time pressure. Rather, we find that for shorter time delays, participants are less willing to delay rewards, but over longer time delays, are more willing to wait for rewards. Through simulations of a variant of the Diffusion Decision Model, our pattern of results can be explained by a reduction in response caution under time pressure.
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6:00-7:30 PM (3047)

A Psychometric Approach to Decision-Making Thresholds Across Legal Standards and Societal Domains. LAUREN HARTSOUGH, *Vanderbilt University*, MATTHEW GINTHER, *United States Court of Federal Claims*, RENÉ MAROIS, *Vanderbilt University* (Sponsored by René Marois) – A fundamental question in decision-making is what constitutes enough evidence to make a choice between options. The United States legal system instructs individuals on the decision thresholds they must apply. For civil trials, a preponderance of the evidence (PoE) is required while criminal trials require the more stringent threshold of beyond a reasonable doubt (BRD). It is unclear, however, how these thresholds are applied by laypeople and how they compare to subjects' intuitive decisions in both legal and non-legal domains. Here we applied psychometric function analyses to assess and compare decision thresholds across instruction-type in both legal and non-legal contexts. We found that individuals' intuitive responses were

less stringent than both legal standards, and that PoE was interpreted less stringently than BRD. Thresholds were also more stringent for legal versus non-legal contexts. This study demonstrates the usefulness of using a psychometric approach to compare complex decision thresholds across societal domains.
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6:00-7:30 PM (3048)

Friend or Foe? The Adaptability of Frame Selection and Frame-Based Inferences. LIM M. LEONG and CRAIG R.M. MCKENZIE, *University of California, San Diego* (Sponsored by Craig McKenzie) – Prior research examining attribute framing from the perspective of a communicative interaction has shown that speakers can convey implicit reference point information to listeners through their frame selection. While this frame selection and frame-based inference strategy is well adapted to the typical cooperative environment, it is less clear whether speakers and listeners can appropriately adjust their behaviors in an uncooperative environment. In our experiment, we manipulated whether the speakers' and listeners' goals are aligned to test whether speakers can render their frame selection uninformative and whether listeners can discount the usually accurate inferences they draw. First, we replicate previous findings in the Cooperation condition. More importantly, in the Competition condition, we found that speakers no longer consistently chose frames based on reference points, and that listeners no longer made systematically different frame-based inferences. These results have implications for applying framing as interventions to change people's behaviors in the real world.
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6:00-7:30 PM (3049)

The Effect of Human Development Achievements on Prosocial Behavior. MING-HUI LI, *University of Chinese Academy of Sciences*, LI-LIN RAO, *Chinese Academy of Sciences* (Sponsored by Li-Lin Rao) – There is a broad consensus that people adopt a faster life-history strategy by focusing on short-term outcomes in harsh, unpredictable environments. Given that contributing to prosocial behavior is typically costly and is likely to have little or no immediate benefit, prosocial behavior is less likely to occur in harsh environments. To examine the relationship between harsh environments and prosocial behavior, here, we present results from two independent sets of data: the nationwide survey in China from 31 provinces (N = 22,652) and World Value Survey data from 57 countries (N = 79,619). Prosocial behavior was measured using the Dictator Game in the Chinese survey and two items related to prosocial behavior in the World Value Survey. Mixed-effects regression analyses revealed that residents living in provinces or countries with a lower Human Development Index (HDI) showed a greater level of prosocial behavior. We also found that residents' prosocial behavior increased as they grew older. In addition, the effect of age on prosocial behavior increased as HDI increased. These findings contradict life-history theory and shed light on the effects of living in a harsh environment and the origin of prosocial behavior.
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6:00-7:30 PM (3050)

Assessing the NWS Hazard Simplification Project: Do the Newly Reformatted Weather Warnings Promote Better Decisions About Taking Protective Action? MARK A. CASTEEL, *Pennsylvania State University, York* – The National Weather Service's (NWS) hazard simplification project is designed to both simplify and make more effective the warning messages distributed by the NWS. Much of the impetus for change was based on feedback from meteorologists and emergency managers about confusing aspects of the warnings. Therefore, beginning in fall 2017, the NWS implemented a simplified reformatting process such that all messages use a consistent format of "What", "Where", "When", "Additional Details" and "Precautionary/Preparedness Actions." The research reported here represents an empirical investigation of the effectiveness of these new reformatted warnings. Unlike the earlier input from meteorologists and emergency managers, the research reported here collected quantitative data from members of the general public, who would be most likely to encounter such messages on social media platforms. Participants read a series of flood and blizzard warnings, in both the older (legacy) and newer (reformatted) versions. Participants then made decisions assessing perceived risk, information search behavior, and likelihood of taking protective action. Implications of the results will be discussed, and potential next steps will be offered.
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6:00-7:30 PM (3051)

Students Choosing Courses: Real-Life Academic Decision Making. KATHLEEN M. GALOTTI and VALERIE A. UMSCHEID, *Carleton College* – We examine how high school and college students make an important real-life decision and whether they differ in their decision-making processes when they chose academic courses for the upcoming year. Current high school and college students from around the United States completed an online survey administered by Qualtrics Panel. Each participant listed their course choices and the criteria they used to make their decision, and also responded to a modified version of the Reactions to Decision (RTD) Instrument that measured their affective reactions to the decision-making process. College students tended to list more options and criteria when describing their decision than did high school students. High school students rated the future importance of their decision higher and their independence in the decision-making process lower than did college students. College students reported using information specific to courses, such as instructor, time scheduled, and the requirements a course met more so than did high school students as criteria when choosing courses. High school and college students who list more criteria tend to be less certain and comfortable with the decision-making process than their peers.
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6:00-7:30 PM (3052)

How Does Information on Ranks Affect Performance Outside the Lab? A Field Experiment in a Chess Tournament. URI ZAK, YAAKOV KAREEV and JUDITH AVRAHAMI, *The Hebrew University of Jerusalem* (Sponsored by Yaakov Kareev)

– We report a field experiment examining the effect of ranking-information on performance in a competitive situation—a chess tournament conducted at the most popular online platform in Israel. Participants were 48 experienced chess players with official Elo chess ranks. Unlike ordinary tournaments, in which players' ranks are known, here ranking-information was manipulated: the participants were either informed or not of each other's rank. Participants were paired into dyads and played 4 games in total—2 in each information condition. Two measures of performance were considered: games' outcomes and a computerized scoring of game play in terms of mistakes. As expected, the higher-rated players in the dyads won more games and made fewer mistakes than their lower-rated opponents. As for the effect of ranking-information, the interaction between information and the player's relative rank was significant: the higher-rated players made more mistakes when rankings were displayed than when they were not, whereas the lower-rated players performed equally well in both conditions. A similar (marginally significant) effect was evident in games outcomes: higher-rated players won fewer games when rankings were displayed than when they were not.
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6:00-7:30 PM (3053)

Studying Everyday Mistakes. BALAZS ACZEL, MARTON KOVACS, and BARNABAS SZASZI, *Eotvos Lorand University* – People make mistakes in their everyday life and these mistakes greatly influence their well-being. Nevertheless, we know very little about people's evaluation of mistakes and the type of mistakes people make. In this study, we developed a methodology to explore what behaviors people regard as mistakes in their everyday life and the general, systematic patterns of mistakes in people's behavior. We collected a great number of stories in which people agreed that the described behavior was a mistake. The stories were separated into (1) the general situation in which the behavior occurred; (2) the act or the lack of the act; (3) the negative or potentially negative outcome. After cleaning and filtering of the raw stories, a questionnaire was created which can survey the frequency with which a person commits a typical mistake in a situation. We hope to provide a new tool to the field for the exploration of the origin of everyday mistakes and the individual differences in committing types of mistakes.
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6:00-7:30 PM (3054)

Biasing Risky Preferences by Exploiting the Dynamics of Eye Gaze. LI-LIN RAO and HONG-ZHI LIU, *Chinese Academy of Sciences* – Risky decisions are ubiquitous in daily life and are central to human behavior. Extant research primarily focused on investigating the underlying process of decision making under risk. However, little attention has been devoted to exploring the temporal dynamics of risky choice and whether risky choice can be influenced by gaze direction. In the current study, we used both endogenous and exogenous paradigms to manipulate individuals' gaze while they decided between two risky alternatives and examined whether risky decisions could be biased toward a randomly determined target. We found that an endogenous gaze-contingent manipulation was effective for biasing the participants' risky decisions toward randomly set targets. We also found that the exogenous manipulation of gaze time on the predetermined target dimension affected the individuals' choice only when they performed the manipulation task first. Our findings demonstrate that manipulating individuals' gaze while they make a decision can affect their risky decisions. Risky decisions are constrained and coupled to the immediate environment through the interplay between individuals, their sensorimotor systems, and the environment.
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6:00-7:30 PM (3055)

Influence of Cognitive Resource Allocation on the Attraction Effect in Multi-Alternative Decision Making: An Experimental Study Using a Dual-Task Paradigm. TAKASHI TSUZUKI, *Rikkyo University*, YUJI TAKEDA, *AIST*, ITSUKI CHIBA, *Rikkyo University* – The attraction effect in multi-alternative decision making reflects the context-dependent violation of axioms in rational choice. In our previous study investigating the relationship between cognitive resources and attraction effect in detail, we used a task-irrelevant probe technique and measured the electroencephalographic responses to the probes. We found that the mean N1 amplitudes of the ERPs elicited by the auditory probes were significantly smaller when participants chose the competitor than when they chose the target. In this study, to confirm the a priori assumption of the previous experiment, we performed an additional experiment without measuring ERPs to examine the competition between a visual choice task and an auditory oddball task. The attraction effect was significantly greater when participants performed an auditory oddball task (i.e., detecting an auditory target) concurrently with a visual choice task, than when participants ignored auditory stimuli, which indicated competition between visual and auditory processing. This finding supports the assumption that intuitive comparisons among alternatives executed by System 1 are critical for the occurrence of the attraction effect.
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6:00-7:30 PM (3056)

The Impact of Neuroimaging and Expert Testimony on Capital Sentencing Decisions. RACHEL SERAFINSKI and GARRETT BERMAN, *Roger Williams University* (Sponsored by Garrett Berman) – The use of neuroimaging has become more prevalent by experts in the courtroom to help explain physiological underpinnings of criminal behavior. Little empirical research has been conducted to investigate the impact of neuroimaging on juror's decision-making. The present study examined the effects of expert testimony and imaging as mitigating evidence in the sentencing phase of a first-degree murder case. Using a 3(presence of a clinical expert vs. neuroscience expert vs. both) x 2(presence vs. absence of a brain image) +1(control) factorial design mock-jurors found expert testimony more important to their sentencing decision when paired with a brain image showing damage to the defendant's brain. Participants exposed to both experts found their testimonies more important than participants exposed to

a neurologist or psychologist individually. This study will add to our understanding of how jurors perceive neuroimaging as it becomes more frequently used in the courts.
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6:00-7:30 PM (3057)

Resilience and Skilled Decision Making: Toward General Decision Making Profiles. MADHURI RAMASUBRAMANIAN, JINHYO CHO, and JINAN N. ALLAN, *University of Oklahoma*, ROCIO GARCIA-RETAMERO, *Universidad de Granada*, ADAM FELTZ, VINCENT T. YBARRA, and EDWARD T. COKELY, *University of Oklahoma* (Sponsored by Edward Cokely) – Previous research has established that numeracy is the strongest single predictor of decision making skill (Cokely et al., 2012), which in turn is related to important life outcomes across various domains. Resilience (i.e., the ability to adapt or bounce back from adverse events) has also been linked to increased coping with stress and healthy life adjustment (Windle et al., 2011). Consistent with Skilled Decision Theory (Cokely et al., 2018), the current study explores some of the earliest research demonstrating the relationship between resilience, numeracy, and skilled decision making. 309 participants completed a battery of measurements that included the Berlin Numeracy Test Components, The Resilience Scale for Adults and other measures of decision making skill. The results are reported using a Confirmatory Factor Analytic and Structural Equation Modeling approach. Discussion will focus on implications for intervention and training, as well as brief general Decision Making Profile inventories.
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6:00-7:30 PM (3058)

Forward Reference With Double Dissociation Evidence: Testing the Discounting Calculation Assumption in Intertemporal Choice. YANG-YANG ZHANG, *Shaanxi Normal University*, SHU LI, *Institute of Psychology, CAS*, ZHU-YUAN LIANG, *Institute of Psychology, CAS* (Presented by Zhu-Yuan Liang) – Current intertemporal choice models disagree on whether making intertemporal decision is based on discounting and calculation process. Previous work using outcome-based or processing-based testing strategies suffers the fallacy of reverse inference. Here, we developed a new paradigm with forward inference and double dissociation logic to examine the difference of eye-movement patterns between free choices and instructed choices in which met discounting calculation assumption. We found that the computation difficulty (easy vs. hard) and outcome magnitude (small vs. large) affects differently to the instructed choices and free choices, respectively. More importantly, we found double dissociation of eye-movement patterns in both choices. The computation difficulty increased the complexity level of information processing only in the instructed choices, whereas the outcome magnitude resulted more attention allocation only in the free choices. Overall, our findings suggest that intertemporal choice might not be based on discounting and calculation process, but rather on attention processing.
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6:00-7:30 PM (3059)

Einstein in Thousand Islands: Numerical Clues' Direct Influence on Anchoring. KIMIHIKO YAMAGISHI and TAKUTO NISHIMURA, *Tokyo Institute of Technology* – Circa Tversky and Kahneman (1974), anchoring and adjustment have served as an omnipresent explanation for numerical judgments. However, literature shows divergent accounts as to HOW anchoring numbers affect subsequent responses. Mussweiler and Strack (1997) argued that a number must maintain semantic relevance to judgmental topic to affect the outcome. Wong and Kwong (2000), in contrast, claimed that the very presence of mere numbers would suffice to produce an effect. We contrasted these different accounts by comparing anchor information in numerical scales (e.g., Einstein) or ratio scales (e.g, Thousand Islands). Results were mixed, yet partially consistent with Wong and Kwong's account in that merely presented numbers mildly affected the judgment.
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6:00-7:30 PM (3060)

A Numerical Distance Effect in the Probability Weighting Function. KUNINORI NAKAMURA, *Seijo University* – Probability weighting function (Kahneman & Tversky, 1979; Tversky & Kahneman, 1992) assumes inverse-S shape curve that entails overestimation for low probabilities and underestimation for high probabilities. Existing studies found this tendency from parameter estimations of participants' judgments for risky decisions based on both probability values and magnitudes of outcomes. However, how participants felt about probability values themselves have not been explored. To address this problem, this study employed a research paradigm of numerical distance effect (Moyer & Landauer, 1967) and tried to describe the shape of probability weighting function using reaction time data. To accomplish this, we asked participants to make pairwise comparisons between two probability values and measured reaction times for the comparisons. Results indicated overestimations for the low probabilities and underestimations for high probabilities.
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6:00-7:30 PM (3061)

Two Eyewitnesses Are More Persuasive Than One Except When They Remember a Suspect's Feature. CRYSTAL R. SLANE and CHAD S. DODSON, *University of Virginia* (Sponsored by Michael Kubovy) – Are jurors more likely to convict a suspect who has been identified by multiple eyewitnesses than by a single one? Participants saw a lineup of faces with one face highlighted as having been identified by either one or two highly confident eyewitnesses. Participants estimated the likely guilt of the suspect. Two eyewitnesses were not more persuasive than one when the single and multiple eyewitnesses had provided a featural justification about their identification (e.g., "I remember his eyes"). But,

guilt judgments were reliably higher in the two eyewitness than in the single eyewitness condition when eyewitnesses provided either a confidence statement only or a confidence statement and a recognition justification (e.g., "I recognize him"). Furthermore, two eyewitnesses who mention different features are less persuasive than two eyewitnesses who mention the same feature. The results are consistent with our perceived diagnosticity account.
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6:00-7:30 PM (3062)

Dollars and Cents: How Currency Affects Decision Making. TYLER CULLY and JEFFREY STEVENS, *University of Nebraska, Lincoln* (Presented by Jeffrey Stevens) – Similarity judgments provide an alternative to discounting as a model of intertemporal choice. Similarity judgments for reward amounts have been shown to depend on both the numerical difference and ratio of the amount values. We predicted that presenting reward amounts as dollars versus cents would influence similarity judgments and therefore intertemporal choices because, though ratios are the same, the numerical difference is greater for cents compared to dollars. In a study with 140 participants, amounts presented as dollars were judged as more similar as cents and also resulted in more choices for the smaller, sooner option. This suggests that the presentation of currency shapes similarity judgments, which, in turn, influences intertemporal choice. However, amount similarity judgments correlated with intertemporal choices only for participants in the dollars condition. These findings point toward possible framings for intertemporal choices that can nudge people into making more patient or impulsive choices.
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6:00-7:30 PM (3063)

Guilty Until Proven Innocent: Innocent Evidence May Not Be as Influential as Once Thought. BLAKE NESMITH, THOMAS HANCOCK, and KELLY JENT, *University of Central Oklahoma* (Sponsored by Thomas Hancock) – The present study allowed participants to choose six items of evidence in any order they desired to assess how items of evidence are evaluated in a mock trial. Each item of evidence had four additional sub-items suggesting either guilt or innocence for the defendant, and participants rated each sub-item on a 10-point Likert scale to indicate level of guilt. After all six items had been viewed participants made a final rating of guilt and rated their confidence. As expected, guilty sub-items were rated higher in guilt than innocent sub-items, however, confidence ratings were stronger for guilty sub-items compared to innocent sub-items. These findings suggest guilty items were given more weight than innocent items, regardless if it was the first piece of evidence viewed or the last, suggesting guilty evidence possibly has a privileged status compared to evidence of innocence. Implications on court proceedings are discussed, with future directions.
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6:00-7:30 PM (3064)

The Popularity Contest of Twitter: How Decisions About Interacting With Tweets Are Made. THOMAS M. HERR and ALEXANDRA K. FRAZER, *Muhlenberg College* – It is important to understand why and how certain Tweets are shared and disseminated across vast audiences while others are consumed by niche audiences in the era of social media. To better understand these differences, this study manipulated the amount and presence of descriptive information for Tweets and Tweet political affiliation, and measured liking for and willingness to share Tweets, perceived credibility of Tweets, and participant political affiliation. These variables were chosen based on prior research by Boerman & Kruikemeier (2016), Chang et al. (2015), and others, which showed that these factors influenced message interaction. Results indicated that while presence of popularity information was influential in judgements about Tweets, level of popularity did not seem to matter. Findings also showed that source credibility played a role in deciding to interact with Tweets, and people with differing political affiliation interact with tweets differently. Implications for message persuasiveness will be discussed.
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6:00-7:30 PM (3065)

Communicating Warnings: Does Color-Coding Help? GALA GULACSIK, SUSAN JOSLYN, and JOHN ROBINSON, *University of Washington* (Sponsored by Susan Joslyn) – Currently, risk for severe weather is communicated using "Watches" and "Warnings," although their effectiveness is debated. Indeed, research suggests that explicit numeric probabilities improve people's understanding of risk as well as the quality of their decisions (Joslyn, et al., 2007). In many applied contexts however color-coding is promoted as a simpler approach despite a lack of research supporting this claim. This experimental study compared the effect of these three forecast formats on understanding of event likelihood, trust in the forecast, and decision quality. Participants experienced forty virtual storms with the potential to produce tornadoes. For each storm, participants made a series of decisions about taking shelter. On average, the numeric probability forecasts elicited better decisions, higher trust, and greater understanding of likelihood than the color-coded and watch & warning forecasts. Those using the color-coded forecasts overestimated likelihood, tended to mistake likelihood for severity and made more cautious decisions.
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6:00-7:30 PM (3066)

Detection of False Social Media Postings Following Extreme Events: A Signal Detection Framework. RICHARD JOHN and MENGTIAN ZHAO, *University of Southern California* – We report 3 experiments in which over 1000 US participants were presented with a series of actual Tweets posted within 48 hours following soft target terrorist attacks in the US or Western Europe. In each experiment, respondents provided a binary judgement of the authenticity of information for 20 separate Tweets. Base rates for false tweets following attacks on soft targets in Western Europe were manipulated in Experiment

I (25%, 50% or 75%). Tweets following attacks on soft targets in the US were used in Experiments 2 and 3, and respondents were incentivized using one of three payoffs varying in the relative cost of false positives (true posts judged to be false) and false negatives (false posts judged to be true) . ROC analysis showed that respondents performed only slightly better than chance (AUC statistic ranges from 0.49 to 0.56 across three experiments). Furthermore, participants were relatively insensitive to manipulation of base-rates and relative error penalties. Accuracy was positively related to self-identification as politically liberal and a psychometric measure of skepticism.
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6:00-7:30 PM (3067)

When Rational Agents Do Not Produce Rational Behavior. JAVIER CORREDOR, *Universidad Nacional de Colombia* – A core assumption of standard economic theory is that agents have perfect rationality. This assumption has been questioned by research in psychology and economics. This poster presents a series of multi-agent simulations showing that, under many parameters, emergent systems do not behave rationally even when actors process information with perfect rationality. In this case, simulations depict a market in which both buyers and sellers know the supply and demand functions, and update price beliefs according to several iterative algorithms (e.g., Bayesian updating). Results show additionally that systems separate more from equilibrium prices when bounded rationality assumptions (e.g., gain/loss asymmetry) are incorporated in the agents' processing system. Overall, this study highlights the importance of differentiating micro and macro level properties of emergent systems in the study of economic behavior. In this study, these two levels converge only when rational actors are able to access simultaneously the price beliefs of all agents.
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6:00-7:30 PM (3068)

Asymmetry in Similarity Formation and its Implication for Emotion and Choice: An Approach of Similarity Theory Extended to Open Sets of Features. ANDRZEJ FALKOWSKI, *University of Social Sciences and Humanities*, MARIA SIDORUK-BLACH, *University of Economics and Innovation*, JUSTYNA M. OLSZEWSKA, *University of Wisconsin, Oshkosh*, MAGDALENA JABLONSKA, *University of Social Sciences and Humanities* (Presented by Justyna M. Olszewska) – The current work shows empirical verification of the similarity theory extended to the open sets of features (Falkowski et al., 2018). According to the theory, increase in similarity between two objects results from deleting distinct features or adding common features, however, with different effects. 180 participants evaluated, at three different levels (cognitive, emotional and behavioral), cities that differed in terms of the number of positive and negative features. The results revealed that when similarity was greater than 0.5, deleting distinct features was more effective and resulted in a stronger effect on the object evaluation than adding positive features of the same value. In case of similarity less than 0.5 opposite results were obtained, that is adding positive features had a stronger effect on the object evaluation than deleting negative features of the same value. These findings reflect a positive-negative asymmetry which is consistent with the similarity theory extended to open sets. In addition, our results show that the ratio-difference principle explains the positive-negative asymmetry framed within the similarity theory extended to open sets of feature.
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6:00-7:30 PM (3069)

Retrospective Evaluation of Multiple Experiences: The Role of Source Memory. MARTON F. KOCSIS and SIMON FARRELL, *The University of Western Australia* (Sponsored by Simon Farrell) – Recent evidence suggests a key role for memory during retrospective evaluation of hedonic experiences. However retrospective evaluation studies typically rely on evaluations of individual isolated experiences. To examine the potential role of source memory during retrospective evaluation of multiple experiences within memory, we post-cued participants to evaluate one of a pair interleaved affective word-lists where the overall valence of the target and non-target word-list was manipulated independently (Study 1). While we found some evidence for memory-based evaluation, there was no effect of non-target valence on ratings, suggesting that source memory errors did not influence evaluation. In a follow-up study, we used three interleaved lists and in addition assessed memory for the list to- be-evaluated (Study 2). We found no effect of non-target list valence and evidence against memory-based evaluation, suggesting target list ratings occurred online during list presentation. Implications for online evaluation of hedonic experiences and memory for interleaved sequences are discussed.
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6:00-7:30 PM (3072)

How Differently Do Students and Their Instructor Perceive Class Time? ERIN MADISON, ERIKA K. FULTON, CAITLYN WHITFIELD, and GARIMA SINGH, *Idaho State University* – Faculty adjust courses based on aggregate semester student evaluations, which are susceptible to memory biases. Informally, faculty may adjust courses based on daily impressions, but without knowing the accuracy of those impressions. According to the theory that metacognitive monitoring directly affects control (Nelson & Narens, 1990), an instructor can better modify a course with accurate assessments of students' perceptions of class time. We administered a survey to the students and instructor for two sections of Introduction to Psychology, after each class throughout the semester. The survey assessed preparedness, attention, engagement, stress, mood, fatigue, and perceptions of content quantity, clarity, and difficulty. The instructor was the same in both sections and could not see students' responses until final grades were submitted. Student and instructor perceptions differed significantly and were rarely correlated over time. Although only one instructor in two courses was examined, results suggest that instructors may benefit from class specific assessments of how accurately they perceive their students class' experience, which can improve metacognitive awareness, course design, and instruction.
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6:00-7:30 PM (3073)

African Americans Hiring African Americans: The Effects of Skin Tone on Hiring Preferences. JANET L. HORACE and BEVERLY ROSKOS, *University of Alabama, Tuscaloosa* – The color tone of an individual's skin, even among African Americans, can evoke bias. For instance, research has shown that African Americans with darker skin tones can be perceived as "more" African American than those with lighter skin tones, and those with darker skin tones are more likely to experience discrimination (Stepanova & Strube, 2009). The current study manipulated within-subjects the color tone of hypothetical African American applicants for a job. Participants explicitly rated the applicants on hireability and ranked the candidates in terms of their preferences in hiring. The participants then performed an implicit measure of bias using a lexical decision task (LDT) in which light- and dark-skinned African American faces were paired with positive or negative words, or non-words. For both Caucasian and African American participants, the stronger the association between light-skinned faces and positive words, the more willing they were to hire the light-skinned candidates. Oddly, a stronger association between darker-skinned faces and negative words was also associated with a higher likelihood of hiring.
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6:00-7:30 PM (3074)

Bayesian Modeling of Bodily Self-Consciousness and the Sense of Self During Full-Body Illusion. CHIHARU TOI and AKIRA ISHIGUCHI, *Ochanomizu University* (Sponsored by Akira Ishiguchi) – Our sense of self is essentials for the cognition and action in daily lives. But the multisensory body illusion studies have suggested that such a sense can be easily deceived by multisensory illusory information. Those studies indicated that our body-related sense of self (bodily self- consciousness: BSC) consists of three factors: (1) the multisensory integration, (2) the plausibility of the bodies, and (3) the first-person perspective. But the relation among these three factors are little known. Thus, in this study, we focused on this relation and conducted full-body illusion experiments and demonstration simulation, aimed to construct the Bayesian causal inference model of the BSC. We predicted that, as the same as the result of the rubber-hand illusion study using Bayesian inference (Samad, Chung, & Shams, 2015), our BSC itself is also explained by the Bayesian causal inference model that the spatial and temporal signals are integrated and form the sense of self. Our results partly confirmed the predictions.
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CONCEPTS AND CATEGORIES

6:00-7:30 PM (3075)

Preschoolers Think Strangers Will Share the Same Knowledge as Other Group Members, but Will Not Behave Like Them. MEGAN N. NORRIS and ROBYN L. KONDRAD, *Appalachian State University* (Sponsored by Lisa Emery) – Children learn a lot from other people, but they are selective learners: children consider an individual's past behavior to decide whether to trust them later. The current study explores whether children consider a group's past behavior when deciding whether to trust a new group member. Four-and 5-year-olds learned that one group always labeled familiar objects correctly or always acted nicely, and the other group always did the opposite. For half the children, groups were labeled as either red or blue. Next, children were introduced to a new red and blue group member with whom they had no direct experience. Children expected the stranger to be knowledgeable like her group when the group was labeled. They never expected the stranger to be nice like her group, even when group membership was obvious. Children use group membership to make inferences about strangers' epistemic and social characteristics in different ways.
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6:00-7:30 PM (3076)

Modeling Identification Bias of Facial Features and Emotional Expression. CLAY KILLINGSWORTH, *University of Central Florida*, HEATHER KLEIDER-OFFUTT and ASHLEY MEACHAM, *Georgia State University*, SARAH WILLIAMS and COREY BOHIL, *University of Central Florida* – Research shows a biased association between Afrocentric featured faces and threat. In a speeded identification task, participants identified 4 Black faces varying along two dimensions: typicality of facial features (Afrocentric, non-Afrocentric) and emotional expression (neutral, threatening). Computational modeling utilizing general recognition theory indicated violations of perceptual separability on both the emotion and typicality dimensions. There was much more variability in perceived emotional expression for Afrocentric (relative to non-Afrocentric) faces. Faces were perceived as more Afrocentric when their expression was threatening (even for the non-Afrocentric/threatening face). For the neutral expression faces, level of typicality had no effect on mean perceived emotion. For the threatening expression faces there was a clear mean shift toward higher perceived threat for the stereotypical face. Modeling indicated that male participants attended more strongly to emotional expression while females attended more to typicality. Black participants attended more to typicality than to emotional expression.
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6:00-7:30 PM (3077)

The Latent Dimensionality of Category Relevance Shift Learning. OSUNG SEO and MICHAEL L. KALISH, *Syracuse University* (Sponsored by Michael Kalish) – In a non-stationary environment, category labels can change over time. In the laboratory, this change can be sudden, requiring participants who have mastered one categorical distinction to learn a category shift. Category shift learning is of interest because different kinds of shifts are differentially difficult to learn. This differential difficulty is taken to be due to a number of separate mechanisms, processes like learned dimensional attention, learned associative strengths, and the re-mapping of category labels. We ask here whether these mechanisms are all part of a single category-learning system, in the sense of being controlled or automatic processes. We replicate Krushke's (1996) relevance shift category learning paradigm and include an additional cognitive load task. The results suggest that the performances

for all four types of the dimensional relevance shifts (reversal, relevant, irrelevant, & compound) are affected with varying magnitude when cognitive load is present. State-trace analysis, however, reveals that no more than a single process is needed to account for the differential effects of cognitive load on relevance shift learning.
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6:00-7:30 PM (3078)

Explaining Without Information: The Role of Label Entrenchment. BABAK HEMMATIAN (J. Frank Yates Student Travel Award Recipient) and STEVEN SLOMAN, *Brown University* (Sponsored by Steven Sloman) – Categorical explanation involves using a category label to explain an associated property. In 4 experiments, we show that label entrenchment, the degree to which a label is accepted and used by one's community, influences the judged quality of a categorical explanation whether or not the explanation offers substantive information. In Experiments 1 and 2, explanations using unentrenched labels are seen as less comprehensive and less natural, independent of causal or featural information, even when the label is merely a name for the explanandum. Experiments 3 and 4 replicate the effect with unentrenched labels coined by groups of expert discoverers and rule out several explanations for it including familiarity and communicative principles. We argue that this reliance on entrenchment arose because the community often has useful information about categories. The common use of labels as conduits for this communal knowledge results in reliance on community cues even when they are uninformative.
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6:00-7:30 PM (3079)

Ecological Thinking in Preschoolers: Evidence From Free Play and Semantic Organization. JOHN D. COLEY and LIZZIE GEORGE, *Northeastern University*, SARENA SABINE, *Bowdoin College*, GABRIELLA ACOSTA LANE, *Northeastern University*, IMAC M. ZAMBRANA, *University of Oslo* – In light of current environmental threats, knowledge about how individuals think and behave ecologically and how to potentially shape these processes is increasingly important. The goal of this exploratory study was to examine how different instructional approaches may shape ecological thinking and play. Preschoolers were presented with three dioramas (forest, savannah, arctic) and related sets of movable toy animals and plants which were either presented to cue taxonomic, ecological, or no relations. Children were then videotaped playing freely with the toys and dioramas; videotapes will be transcribed and coded for frequency and type of ecologically relevant actions and language. Subsequently, children placed realistic color drawings of the same species on a grid to indicate which "things go together," yielding a measure of perceived relatedness. Analyses will examine effects of cueing condition on relevant actions and language during free play with dioramas, grid configurations, and relations among these measures. Results will advance our knowledge about what factors influence exploration of ecological information, how preschoolers understand ecosystems, and how we might engender more ecologically informed citizens.
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6:00-7:30 PM (3080)

Species Reintroduction and the Role of Trust in Disease Risk Perception. TYLER DAVIS and MOLLY IRELAND, *Texas Tech University*, MICAH GOLDWATER, *University of Sydney*, NICHOLAS GAYLORD, *Independent Researcher*, BRIAN GLASS, *State of Oregon*, DARRELL WORTHY, *Texas A&M University* – Introduction or reintroduction of a species to a geographical area poses a number of risks, including emergence of novel diseases. The current study examined how perceptions of disease risk vary across different (re)introduction scenarios, and tested associations between risk perceptions and trust in science. Participants read one of four (re)introduction scenarios: Reintroduction of an extinct canid, reintroduction of a canid to its original range, translocation of a canid to a novel range, and introduction of a genetically modified canid. Participants perceived the genetically modified canid as most risky for humans and pets, but not wild animals. Participants' beliefs that scientists understood the introduction risks partially mediated the effect of scenario on risk perception, indicating that public trust in science plays a key role in perceptions of disease risk from animals. Further, results suggest a bias whereby humans and pets are perceived as uniquely susceptible to risks associated with new technologies.
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6:00-7:30 PM (3081)

Thematic Similarity in Abstract vs. Concrete Pairs: Role of Salience and Processing Style. KATJA WIEMER and JANE NEAL, *Northern Illinois University* – Semantic knowledge is organized in the brain both thematically and taxonomically, and thematic relations have been argued to play a more central role for abstract concepts. We tested this in two experiments. In the first experiment, using a similarity rating task, we found that thematic processing was equally common in concrete and abstract pairs, and more common in abstract pairs only for unrelated pairs. Abstractness effects were observed however in the types of features and relations used in the task. The second experiment used only pairs that were both thematically and taxonomically related, either equally strongly or with one relation more salient. Thematic justifications were more frequent for concrete pairs overall. Further, the use of thematic information was influenced by its salience for abstract, but not concrete pairs, perhaps suggesting more flexible processing for abstract concepts. Additionally, using individual difference measures we found that a participant's use of thematic information in this task was not accounted for by lower meta-cognitive monitoring or miserly processing, suggesting that it is due to the relative strength of thematically organized representations.
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6:00-7:30 PM (3082)

Individual Differences in the Ability to Combine Concepts. YOED N. KENETT and SHARON L. THOMPSON-SCHILL**, *University of Pennsylvania* – The generative capacity of language entails flexibly combining concepts with each other. Conceptual combinations can occur either by using an attribute of one concept to describe another (attributive combination) or by forming some relation between two concepts to create a new one (relational combination). Prior research has addressed whether common or distinct processes support these two putatively different types of combinations, but only examining group differences. Here we conduct an individual difference study to examine how these two types of processes are related to individual differences in creativity, intelligence, and personality traits. We find that attributive combinations are positively related individual differences in novelty, potentially related to the ability to construct and reconstruct concepts. Relational combinations, in contrast, are negatively related to individual differences in fluid and crystallized intelligence, potentially related to lower functional fixedness on the concepts.
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6:00-7:30 PM (3083)

Investigating Modifications to the DIVergent Autoencoder (DIVA) Model of Human Category Learning. MATT WETZEL and KENNETH J. KURTZ, *Binghamton University, State University of New York* (Sponsored by Kenneth Kurtz) – The divergent autoencoder (DIVA; Kurtz, 2007, 2015) is a connectionist model of human category learning that provides a theoretical alternative to traditional accounts based on similarity to reference points. In order to advance the explanatory power of the model, we propose and evaluate several enhancements influenced by recent progress in the machine learning literature. These include: (1) adding a final output layer to the neural net architecture that generates task-specific responses; (2) employing the rectified linear activation rule; and (3) introducing additional recoding and/or prediction layers that allow multiple parallel paths to feature reconstruction for each category. We report differences from the baseline model in fitting benchmarks of human category learning.
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6:00-7:30 PM (3084)

Category Generalization in Partial XOR Category Structure: Knowledge-Partitioning Account. LEE-XIENG YANG, *National Chengchi University* – The partial XOR category structure is the full XOR category structure leaving one of the quadrants undefined. For the items in that quadrant, Conaway and Kurtz (2016) showed that a certain amount of participants classified them as the farther category (i.e., XOR group), favoring the DIVA model over the exemplar models. In this study, the role of the dimensional correlation within a category in inducing the XOR response pattern was examined. In Experiment 1, the correlation between two stimulus dimensions was high within each category. In Experiment 2, this correlation was high within one category and zero within another category. The results showed more XOR group in Experiment 2 than Experiment 1, suggesting that the dimensional correlation within a category is not necessary for inducing the XOR response pattern. This might challenge the prediction of the DIVA model. A process model following the idea of knowledge partitioning is proposed, which can account for the individual response patterns (including the XOR group) in this study via partitioning the category space by one dimension and applying different rules for categorization in different partitioned areas.
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6:00-7:30 PM (3085)

Changes in Categorization Strategy Choices: Are There Individual Differences in Knowledge Restructuring Among Younger and Older Adults? RESHMA GOURAVAJHALA, *Washington University in St. Louis*, CHRISTOPHER N. WAHLHEIM, *University of North Carolina at Greensboro*, MARK A. MCDANIEL, *Washington University in St. Louis* (Sponsored by Mark McDaniel) – Categorization is a fundamental ability that allows individuals to group novel stimuli based on shared characteristics. Past research has focused on individual differences in strategy preferences (rule-abstraction vs. memorization) within and across age groups. We extend this research to examine an unanswered question: are strategy preferences stable during training, or do some people switch strategies (termed "knowledge restructuring"; Kalish et al., 2005)? Younger and older adults learned to categorize abstract shapes (which followed a disjunctive rule) in a blocked feedback learning paradigm, and then were tested. All participants completed block-specific strategy probes, as well as the more commonly used global strategy questionnaire, which were then used to characterize their strategy preferences. By utilizing the novel block-specific probes, we found evidence of individual differences not only in strategy preferences, but also in knowledge restructuring for all participants. Critically, these findings were then reflected in better alignment with participants' transfer performance.
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6:00-7:30 PM (3086)

Learning and Generalization of Within-Category Representations in Rule-Based Tasks. DAVID B. SMITH, ROSE DENG, ANNA B. DRISCOLL, and RENEE SAVOIE, *University of Maine, Orono*, SEBASTIEN HELIE, *Purdue University*, SHAWN W. ELL, *University of Maine, Orono* (Sponsored by Shawn Ell) – Rule-based category learning tasks have been argued to be limited in supporting the acquisition of within-category representations (e.g., correlational structure of the categories) – representations that support knowledge generalization. Recent data, however, suggests that this limitation may be a byproduct of using one-dimensional rule-based tasks. We report the results of two experiments further investigating this issue using an exclusive-or rule-based task where successful performance depends upon utilizing two stimulus dimensions. Participants were trained using classification or inference training and were tested using inference. Across the two experiments, greater learning during training was associated with greater performance during test for both classification and inference training. Test phase performance was sensitive to a mismatch between the within-category correlation and

the overall correlation between stimulus dimensions, but was insensitive to the nature of the inference task (production or forced-choice). These data suggest that within-category representations depend on upon the information necessary for learning
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6:00-7:30 PM (3087)

Three-Case Comparison: The Roles of Learning Mode and Comparison Type in the Acquisition of Relational and Feature-Based Categories. JOHN D. PATTERSON, *Binghamton University*, JAN ANDREWS, *Vassar College*, KEN KURTZ, *Binghamton University* – Recent relational category learning research showed that comparison opportunities provided in the observational learning mode during training led to superior category mastery and transfer, relative to opportunities provided in the classification mode – irrespective of the type of comparison (same- or different-category pairs). Though mode exerted an effect, the comparison types did not differ. Here, we cross mode (classification, observational) with comparison type (same-category [AAA], different-category [ABC]), but under a more informationally-rich, three-exemplar format. In Experiment 1, we target relational categories. We find the observational advantage extends to AAA comparison, but not to ABC. Further, we find a novel advantage for AAA over ABC comparison in the observational mode. In Experiment 2, we use feature-based categories. We find the opposite pattern: an observational benefit for ABC comparison, but not AAA and, further, an ABC over AAA comparison advantage under both modes. We conclude with implications for comparison and category learning research.
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6:00-7:30 PM (3088)

Assessing the Psychological Naturalness of Family Resemblance Category Structure Using a Sort Reconstruction Task. JOHN CLAPPER, *California State University, San Bernardino*, ROSE DE KOCK, *University of California, Davis*, SAVANNAH GARTHWAITE and JESSE VENTURA, *California State University, San Bernardino* – It is often assumed that natural categories are based on overall similarity or family resemblance, but in laboratory experiments people prefer to sort objects based on simple one-dimensional rules rather than overall similarity. This raises the question of whether people actually fail to recognize family resemblance structure, or whether they simply regard one-dimensional categories as better or more appropriate for laboratory sorting tasks. To answer that question, we modified the standard task by presenting objects already sorted into categories and assessing participants' ability to later reconstruct that sort. This reduces interpretive issues and provides a more direct measure of participants' ability to recognize a particular category structure. People were about twice as good at reconstructing one-dimensional as family resemblance sorts, implying a real difference in learnability, but they were also significantly better at reconstructing family resemblance than random sorts. Implications are discussed for structural models of psychologically natural categories.
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6:00-7:30 PM (3089)

Comparison of Learning Strategies of Adults vs. Elderly in a Dual Category Learning Task. ANETT RAGO, KRISZTIAN BORBELY, and ESZTER DORA SZABO, *Eotvos Lorand University,* MATE VARGA, *Gravi Talent GmbH* – We designed a supervised category learning experiment where the information-integration task remained hidden by a verbalizable rule-based task, a one-dimensional rule learning for two categories related to the background of the figures. The I-I task was related to the figures organized according to a family resemblance structure. The learning phase taught the verbal rule, while in the test phase the background was not available so the acquisition of the hidden rule was tested by presenting new exemplars. Hits and response times were registered. Adults' hit rates highly differed as they applied different explicit strategies in the test phase. However, their response time performance varied according to the prototipicality of the exemplars. Elderly (60+ y) participants were slower in general. They acquired the verbal rule in contrast with the parallel I-I task; here neither hit rates nor response times reflected the family resemblance structure. Individual strategies of the participants were represented in clusters. In general, we could activate the two learning systems in parallel in case of adults. Individual strategies reflect the different focus of elderly people for the I-I task parameters.
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6:00-7:30 PM (3090)

Implicit and Explicit Category Learning: Independence or Competition? BARBARA A. CHURCH and GERARDO E. VALDEZ, *Georgia State University*, JOSEPH BOOMER, *University at Buffalo*, J. DAVID SMITH, *Georgia State University* – Evidence suggests that category learning can occur at either implicit or explicit levels (e.g., Ashby & Maddox, 2011; Smith et al., 2014). However, Zeithamova, Dagmar, & Maddox (2006) found that these levels may interfere with one other. The nature of this interference is unclear. Three experiments explore further how explicit and implicit learning levels interact. We asked whether implicit/explicit category learning can occur simultaneously, given separate, redundant cues. Participants categorized boxes varying along three dimensions—one dimension instantiating an explicit category rule and two dimensions contributing probabilistic category information. Even over hundreds of trials of direct exposure to the probabilistic information, the presence of the categorical rule suppressed learning about the task's probabilistic dimensions. However, participants who saw no variation along the rule dimension were able to learn these probabilistic aspects of the categories. We consider the results from the perspective of the mechanisms that might suppress implicit category learning.
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6:00-7:30 PM (3091)

Fluency or Congruency? The Role of Metacognitive Monitoring on Attribute Ratings. EMALIE HENDEL, and JOËL DICKINSON, *Laurentian University*, ANNIE ROY-CHARLAND, *Université de Moncton* (Sponsored by Annie Roy-Charland) – Processing fluency is a metacognitive cue which

can influence cognitive processes as well as various judgments, such as that of familiarity and of likeability. Similarly, the incongruence of novel information with an activated schema can also impact cognitive processing. Since both, respectively, produce similar effects in cognitive tasks, this study will serve to unveil whether a violation of schematic information or the lack of a semantically-related prime has a greater influence on cognitive processing in a reading task. Furthermore, directed forgetting will be employed to enhance implicit priming, thus heightening processing fluency. Additionally, this study will explore the need for explicit awareness in research pertaining to processing fluency and schemas. Importantly, should information which is congruent with a previously encountered, semantically-related prime be more easily processed, it would suggest that one must only encounter semantically-related information to activate and add to a stereotype. This finding would have social implications, as it would indicate that stereotypes are constantly being activated and added to when there is no direct link between them and a previously encountered piece of information.
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6:00-7:30 PM (3092)

Essentialist Thinking About Outgroups Predicts Own-Race Bias. JESSICA S. LEFFERS and JOHN D. COLEY, *Northeastern University* (Sponsored by John Coley) – The underlying mechanisms of the Own-Race Bias (ORB), whereby people are more accurate at recognizing faces from within their own racial group, remain largely unknown. One novel mechanism may be racial essentialism, the belief that a shared underlying essence determines category membership. Essentialism may relate to the ORB because it results in assumptions of increased group homogeneity and shared features, which may lead people to ignore individual facial features. We studied how racial essentialism about outgroups relates to lower sensitivity for faces in those groups. Participants rated faces for attractiveness, completed essentialism questionnaires, and a surprise recognition task with new and old faces. While we replicated the ORB, only White participants significantly showed the ORB in Study 1, $t(24)=3.406$, $p=.002$, and Study 2, $t(37)=3.275$, $p=.002$. Across both studies ($N=106$), the ORB was related to essentialism in that, the bias was only present among groups who held higher essentialist beliefs about outgroups than ingroups, $X2\ (1)=4.747$, $p=.029$. Critically, these findings suggest that higher level cognitive processes (essentialism) can have downstream consequences on seemingly perceptual phenomena (facial recognition).
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6:00-7:30 PM (3093)

Variance Discrimination of Sequential Visual Stimuli: Transfer of Practice Effect on Variance Discrimination Across Features. MIDORI TOKITA, *Mejiro University*, YI YANG and AKIRA ISHIGUCHI, *Ochanomizu University* – It has been demonstrated that we have an ability to perceive variances of surrounding objects and/or events. In simultaneous presented visual stimuli, however, there is a possibility that the perceptual features such as textures and/or configurations of a stimuli set may be confounded with the perceived variance of the set. In order to eliminate these perceptual factors, we presented the stimuli sequentially. Two trains of stimuli, a standard and a comparison trains, were presented on a computer monitor. In addition, we used two perceptual features (size and orientation) to examine the transfer effect of variance perceptions between these features. Observers were asked to judge which train had larger variance in size or orientation. First, we tested how and whether the performance of variance discrimination of the sequential set may differ from that in the simultaneous presentation. Second, we tested whether the practice of the variance discrimination of one perceptual feature may affect the performance of the other.
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6:00-7:30 PM (3094)

Lack of Control and Creativity. MICHELE MAIELLO, *University of Padova*, BARBARA TRECCANI, *Università of Padova*, REMO JOB, *University of Trento*, CLAUDIO MULATTI, *University of Padova* (Presented by Claudio Mulatti) – The sense of lack of control has been shown to foster illusory pattern perception, superstition, conspiracy and religious beliefs. The aim of this study was to assess whether the feeling of lacking control in a given situation can also promote creative thinking. We manipulated the former via a recollection task (participants were asked to recall an incident in which they felt control vs. loss of control) and measured the latter with tasks related to divergent thinking (e.g. production of associative and dissociative combinations). Results showed higher scores in all creativity tasks for the group recalling loss-of-control events than the group recalling in-control events. Effects of lack of control have been accounted for as resulting from compensatory attempts to re-gain control. Our findings suggest this compensatory process takes advantage of intuitive thinking.
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EMOTION AND COGNITION II

6:00-7:30 PM (3095)

The Role of Emotion Regulation in Attentional Bias. LORANEL M. GRAHAM, *Our Lady of the Lake University* – Attentional bias is the tendency to seek out and focus on certain information in the environment (Posner & Petersen, 1990), and is linked to disorders such as PTSD and anxiety (Bar-Haim, Y. 2010). Emotional regulation is also implicated in eating and anxiety disorders (Harrison, Sullivan, Tchanturia, & Treasure, 2010). This study examined the role of emotion regulation in attentional bias. Participants completed the Difficulties in Emotion Regulation Scale (Gratz & Roemer, 2004) and were classified as either poor or good regulators. To measure attentional bias, participants completed an emotional dot probe task measuring reaction time to probes replacing either a neutral word or a threat word. An independent sample t-test showed a significant difference in attentional bias, $t(35) = -2.71$, $p<.05$. Poor regulators scored significantly lower ($M = -11.34$, $SD = 20.86$) than good regulators ($M = 4.62$, $SD = 14.62$). One-sample t-tests indicated poor regulators showed

significant attentional avoidance, t(17) = -2.31, p<.05, while good regulators showed no attentional bias, t(18)= 1.38, p=.19. The hypothesis that emotion regulation affects attentional bias was partially supported as poor regulators showed significant attentional avoidance.
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6:00-7:30 PM (3096)

Naturally Occurring Affect Predicts Verbal and Spatial Working Memory Performance. ANDREW CHUNG and KAREN M. ARNELL, *Brock University* – Some research has shown that induced positive affect improves verbal working memory and impairs spatial working memory, while negative affect improves spatial working memory and impairs verbal working memory. However, other research suggests a non-specific influence of affect on working memory performance where fear impairs, and positive affect improves, both verbal and spatial working memory. The present study investigated whether individual differences in naturally occurring affect could predict verbal and spatial working memory performance across six working memory tasks. Valence uniquely predicted working memory performance over and above arousal and the interaction of valence and arousal which were not significant predictors. Positive affect was associated with better WM performance, while negative affect was associated with worse working memory performance. This pattern held across both verbal and spatial working memory tasks, but was observed more strongly with 2-back working memory tasks than with complex span working memory tasks. These findings provide evidence that naturally occurring affect demonstrates a modality independent effect on working memory.
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6:00-7:30 PM (3097)

Investigating the Effects of Brief Mindfulness Training on Students' Emotion Regulation and Learning. NABILA JAMAL-OROZCO, GABRIELLE RAE RUSSO, ALEXANDRIA NICOLE WEAVER, TIMOTHY NOKES-MALACH, and BRIAN GALLA, *University of Pittsburgh* (Sponsored by Benjamin Rottman) – Mindfulness is typically described as a state of mind in which one focuses attention on the present moment with a nonjudgmental awareness (Kabat-Zinn, 1994). Prior work has found that mindfulness meditation can enhance students' ability to regulate their emotions (Arch & Craske, 2006). This work suggests that mindfulness may be particularly helpful for students learning in challenging situations that trigger negative emotions or thoughts. We hypothesized that a brief mindfulness induction would improve students' emotion regulation and learning outcomes from a stressful mathematics learning scenario. We tested this hypothesis in two laboratory experiments. In the first experiment, we found that a mindfulness induction influenced student learning, but not their emotion regulation of stress appraisals. We then conducted a follow-up experiment to examine other potential aspects of emotion regulation such as, the mitigation of rumination. The results are discussed with regards to their implications for theories of mindfulness, emotion regulation, and learning.
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6:00-7:30 PM (3098)

Understanding You Through Me: Neural Simulation of Others' Emotional Body Language. SIQI LIU, ALISON HARRIS, and CATHERINE L. REED, *Claremont McKenna College* – Simulation theory posits that we infer others' mental states from their actions by simulating the action and mapping it onto representations of our own intentions or emotions. Emotional action conveys more meaning about the actor and their environment than neutral movement, but whether this added context corresponds with higher levels of action simulation has not yet been explored. Participants (n=38) viewed four types of point-light displays (PLDs) of coherent versus scrambled human figures performing emotional versus emotionally-neutral movement while EEG data was collected. Emotional movement elicited greater mu power suppression when compared to neutral movement, indicating that sensorimotor simulation processes are sensitive to emotional content. We also found Beta enhancement (associated with motor inhibition) in response to coherent neutral movement compared to scrambled neutral movement. Future research is needed to explore the potentially different sensorimotor processes that underlie Mu and Beta power changes during the observation of others' movements.
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6:00-7:30 PM (3099)

Differential Correlational Patterns of Seven Discrete Positive Emotions Dispositions and Three Cognitive Styles. ALICE CHIRICO, *Catholic University of Milan*, PIETRO CIPRESSO and ANDREA GAGGIOLI, *Catholic University and Auxologico - Milan* (Sponsored by Pietro Cipresso) – Research on cognition and emotion has recently focused on the relationship between discrete emotional personality traits and cognitive processes. Here, we investigated the relationship between seven positive emotional dispositions (Joy; Compassion; Contentment; Pride; Love; Amusement; Awe) and three cognitive styles (Creating, Planning and Knowing) in an Italian sample of 470 participants composed of 384 females (mean age = 25.27; S.D. = 5.625) and 84 males (mean age = 26.2 S.D. = 6.180). Results showed that the Creating style correlated positively with all emotional dispositions. Planning was positively associated with Pride and negatively with Love. Finally, the Knowing style showed a positive correlation with Pride, Compassion and Awe. These results were discussed in light of the functionalist approach on positive emotions.
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6:00-7:30 PM (3100)

Manipulation of Imagery Modulate Affective Priming. DALIT MILSHTEIN and AVISHAI HENIK, *Ben-Gurion University of the Negev* (Sponsored by Avishai Henik) – We used a variation of the evaluative priming task in which participants indicated whether a target stimulus was positive or negative. Participants were exposed to sentences describing positive, neutral, or negative situations (4 seconds per sentence). In the first session, they had to imagine themselves in the situation described while reading a sentence, and then after reading (limited to 300 ms or unlimited time, by group). This was

followed by a picture that participants were asked to evaluate as positive or negative. The group with unlimited time for imagining after reading showed a congruity effect, whereas the limited time group showed a non-significant congruity effect. In the second session, participants were not exposed to sentences but were asked to retrieve the imagined situations. They were then asked to evaluate positive and negative pictures, similar to the first session. Results indicated a congruity effect regardless of the post-sentence imagining time. Nevertheless, the significant difference between the groups was maintained: The limited time group took half the time of the unlimited group for imagining (although no restriction was given) while the target response time was longer.
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6:00-7:30 PM (3101)

Using Audio-Visual Emotional Stroop Tasks to Examine Taboo and Reprimand Effects. RACHEL B. FERNANDES, *University at Albany, State University of New York*, SAMANTHA E. TUFT, *Cleveland State University*, SARA INCERA, *Eastern Kentucky University*, CONOR T. MCLENNAN, *Cleveland State University* (Sponsored by Conor McLennan) – Participants respond less efficiently to emotionally arousing taboo words than neutral words in an emotional Stroop task, and this taboo effect has been found to be more pronounced in participants' native language (Tuft, Incera, & McLennan, 2016). Two versions of an emotional Stroop task were completed using computer mouse tracking, one with taboo words and one with reprimands. Native and non-native speakers of English performed both tasks. Stimuli were simultaneously presented visually and auditorily. Participants indicated the font color. All participants had more deviated mouse movements and responded significantly more slowly to taboo words compared to neutral words. Participants had significantly faster responses for reprimands compared to neutral phrases. Group differences were not statistically significant. It is possible that the non-native participants behaved more like native speakers, given their early age of second language acquisition. Therefore, participants with later ages of acquisition should be included in future research studies.
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6:00-7:30 PM (3102)

The Emotion Label 'Horrible' Facilitates Categorical Perception of Blended Facial Expressions of Fear and Disgust. HYEONBO YANG, JUNGSOO LEE, and DONGHOON LEE, *Pusan National University* (Sponsored by Donghoon Lee) – Categorical perception (CP) refers to continuous similar things are perceived as different categories based on apparent boundary. According to the psychological constructionist view, people show CP for emotional faces because they have labels like "anger," "sadness," and "fear," which provide conceptual knowledge of emotions to structural information of facial movements (Barrett, 2006a, 2006b). However, it is difficult to ascertain the contribution of emotion labels in people's accustomed perception of emotional faces. In the present experiment, we examined CP effects between prototypical facial expressions and blended facial expressions (e.g., 'fear' – 'fear + disgust') with or without emotion labels using a XAB discrimination task. Compared to the without label condition, CP only occurred to participants who were provided emotion labels 'fearful' and 'horrible' for prototypical and blended facial expressions. The current results support the claim of psychological constructionists that language plays an important role in the process of constructing emotion.
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6:00-7:30 PM (3103)

Emotion Word Processing and Previous Exposure to Violent Media: An Eye-Tracking Study. MAXWELL R. HELFRICH and KRISTEN M. TOOLEY, *Texas State University* – This study examines the correlation between reading behavior (measured via eye-tracking) and participants' previous exposure to violent media. Participants read 34 sentences, half of which contained a non-violent, neutral critical word and half contained a violent, negatively-valenced critical word. Critical words were counterbalanced across participants, and matched for frequency, length, lexical decision time, and orthographic neighborhood size. Consistent with previous findings, reading time measures were significantly decreased for the violent words relative to the neutral words. By-participant average difference scores between the total reading time of the neutral and violent words were then correlated with each participant's self-reported monthly total hours of violent media consumption, revealing a significant positive correlation. As violent media exposure increased, the reading time difference between violent and neutral words increased. This study is the first to demonstrate this relationship, and suggests that increased exposure to violent media may facilitate processing of negatively-valenced words/concepts.
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6:00-7:30 PM (3104)

Shifting Norms: Experimental Context Influences Ratings of Emotional Valence for Positive, Neutral, and Negative Words. GEOFFREY B. MADDOX and CAROLINE BOYD-ROGERS, *Rhodes College*, JASON CRUTCHER, *University of Connecticut*, KATHERINE WHITE, *Rhodes College* (Sponsored by Katherine White) – Experiments designed to examine the intersection of emotion and cognition typically utilize stimuli from databases that have normed valence ratings. However, perceived valence of items may depend on the experimental context, i.e., which emotional valence categories (positive, negative, neutral) are included in the experiment. Thus, the current study investigated whether valence ratings of negative, positive, and neutral words differ depending on the emotional contexts in which they are encountered. Participants rated a total of 120 emotional and neutral words that were divided across single valence and mixed-valence lists. The order in which lists were rated was also manipulated. Results indicated that the average valence rating of positive, negative, and neutral words differed as a function of emotional list context and list context order. These results have implications for the use of normed emotional words in studies of memory, attention, and language.
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6:00-7:30 PM (3105)

Literally or Prosodically? Alexithymia Leads to Poor Emotion Recognition in Incongruent Discourse. A. REYYAN BILGE and BUSRA TELLI, *Istanbul Sehir University* – Alexithymia is the difficulty to identify and describe one's own emotions as well as those of others (Sifneos, 1973). Previous studies examined the relationship between language and alexithymia with literal meaning of emotion-based discourses. However, the influence of extra-linguistic dimension needs to be investigated. The current research used prosody as the primary cue to examine emotion perception. Undergraduates from Istanbul Sehir University were first pre-screened with Toronto Alexithymia Scale (TAS). Sixty students (30 high-alexithymia; 30 low-alexithymia) listened to different emotional-based daily life events spoken in both congruent and incongruent emotional prosody. All participants were expected to choose correct emotions for the congruent events. As expected, people who scored high on TAS were more incorrect on incongruent events. Further, they chose the specific emotion which was conveyed by prosody of the event than low alexithymics. In other words, high alexithmics chose prosody over literal meaning when there was emotional incongruity.
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6:00-7:30 PM (3106)

Camera Angle in Film Narration: Patterns in Narrative Structure and Viewers' Perception. CATALINA IRICINSCHI, *The University of the Arts* – Camera semantics in filmmaking (Baranowski & Hecht, 2018) manipulate the viewers' sense of 'being there' and the empathic response that narratives elicit. Eye-level shots using a horizontal lens axis take most of a film duration (90% on average) and map onto our natural encoding of visual environments. Although the alternatives - views from above (with bird's eye view as the extreme version) and views from below (with worm's eye view at the extreme) - take a significantly lower amount of screen time, they alter the viewer's emotional response and relationship with the narrative (e.g., Chandler, 2001; Salt, 1992). Moreover, the high-angle shots tend to occur during opening establishing shots as well as climactic and attention-eliciting moments in the film thus altering the viewers' perspective. Research in eye tracking during film viewing indicates that the most 'attractive' screen elements for the viewers' eyes are human faces and high contrast areas. Analyses of a database of Western- and Eastern-produced films indicate that these focal points (faces, etc.) are mostly absent in high-angle shots. Further data addressing participants' empathic responses to and recognition of high-angle film shots are currently being collected.
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6:00-7:30 PM (3107)

Affective Forecasting: A Selective Relationship With Working Memory for Emotion. COLLEEN C. FRANK and ALEXANDRU D. IORDAN, *University of Michigan, Ann Arbor*, JOSEPH A. MIKELS, *Depaul University*, PATRICIA A. REUTER-LORENZ, *University of Michigan, Ann Arbor* (Sponsored by Patricia Reuter-Lorenz) – Affective forecasting (AF), the ability to predict one's future feelings, is important for making everyday decisions. We hypothesized that AF may be related to affective working memory (AWM)/affect maintenance, the ability to work with feeling states and hold them in mind over a delay, which has been found to be dissociable from maintenance of non-affective information. Using two independent samples, we show for the first time that affect maintenance and AF are positively correlated (Study 1a), while there is no relationship between non-affective maintenance and AF (Study 1b). Furthermore, we replicated these findings using a within-subjects design, showing that maintenance of affective information predicts AF performance, whereas maintenance of non-affective information does not (Study 2). These novel results add credence to the idea that AWM/affect maintenance is an elemental capacity supporting affective processing and provide additional support for the distinction between affective and non-affective maintenance.
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6:00-7:30 PM (3108)

Measures of the Emotional State of Being Moved. LINFENG HAN, DAN ZHANG, and PEI SUN, *Tsinghua University* – We explored the emotional state of being moved, which is a typical mixed emotion frequently occurring in daily life. In study 1, using six video clips which had been previously tested as emotion-eliciting materials and through an open questionnaire survey, a factor analysis and an item analysis, we developed an 8-item scale which assesses the being moved in four dimensions: positive affect, negative affect, interpersonal closeness and pursuit of morality. The scale achieves excellent reliability and validity in diverse contexts. In study 2, we used an RPG game To the Moon as the emotion-eliciting material. A stronger power density in the left frontal hemisphere was found (alpha band) using electroencephalogram, indicating that being moved is an approach-related affect instead of an avoidance-related one. Our results provided insights how to define and measure the emotional state of being moved.
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6:00-7:30 PM (3109)

The IAT Congruency Effect Differs Between Affective and Non-Affective Content: An ERP Experiment. URI BERGER, *Yale University*, DAVID ANAKI, *Bar Ilan University* – The implicit association test (IAT) is a paradigm used to detect automatic associations between mental representations of concepts by measuring the difference in latency to congruent and incongruent associations. The present study examined whether the IAT reflects associations between conceptual categories or also associations between affective categories. We compared between a cognitive IAT (animate and size categories) and an affective IAT (group-affiliation and disgust categories) using event-related potentials (ERP). The findings revealed for both IATs an N400 congruency effect in posterior locations, but an N400 congruency effect in anterior regions for the affective IAT only. Both IATs elicited an LPP effect though it was stronger in the affective IAT, due to the arousal nature of the affective images. These results undermine the notion

that despite the inability to discern behaviorally affective and cognitive associations in the IAT, neural evidence shows that the IAT could represent both types of representations.
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6:00-7:30 PM (3110)

Do Westerners Think More Abstractly Than East Asians? AMRITPAL SINGH, QI WANG, and DANIEL CASASANTO, *Cornell University* (Sponsored by Daniel Casasanto) – How do minds differ across cultures? A century ago, this question generated controversy when Western scholars claimed some non-Westerners were incapable of abstract thought. Surprisingly, a related claim has been advanced in the 21st century: East Asians tend to think less abstractly than Westerners, as indexed by tests of formal logic. Yet, formal logic is only one type of abstract thinking. More generally, thinking abstractly involves discerning relationships and "seeing the big picture." These habits of thinking are more common among East Asians than Westerners, as measured by tests of field dependence. Here we tested for cross-cultural differences in a validated measure of abstract thinking (Vallacher & Wegner, 1989). Participants chose either abstract or concrete definitions of events. Across six independent national samples (total N=1,798), Chinese participants tended to construe events more abstractly, and US participants more concretely, challenging the generalization that Westerners have a greater propensity for abstract thought.
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6:00-7:30 PM (3111)

Gender Difference in Social Brain Connectivity in Autism Spectrum Disorder. JUNG WON KIM, JOSE OMAR MAXIMO, and RAJESH KANA, *University of Alabama at Birmingham* – Neuroimaging studies have shown gender difference in brain connectivity in Autism Spectrum Disorder (ASD), suggesting a potential role of gender in the development of ASD. In particular, task-dependent function of the social brain has shown more prominent gender difference in ASD. The current study aims to investigate gender difference in social brain connectivity using resting-state fMRI in ASD. Resting-state fMRI data from the Autism Brain Imaging Data Exchange (ABIDE) II were obtained for 34 participants with ASD (18M: 16F), matched for FSIQ, age, and social scores. Eleven regions of interest (ROIs) were selected from a "Social Brain" mask (developed from NeuroSynth). ROI-to-ROI functional connectivity analysis and seed-to-seed connectivity analysis were performed via AFNI. ROI-to-ROI analysis revealed significant difference in connectivity between MPFC and Precuneus ($p < 0.05$, uncorrected). Seed-to-voxel analysis revealed a significant gender difference in connectivity of MPFC, RIFG, or RFG with the rest of the brain ($p < 0.05$; $k = 100$). Preliminary results suggest no pronounced gender difference in resting-state social brain connectivity in ASD, although limited by a smaller sample size and a wider age range in our subjects.
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6:00-7:30 PM (3112)

Evidence for Shared and Unique Pathways of Stress on Cognition as a Function of Race and Ethnicity in Young Adults. SARAH K. LETANG, IAN M. MCDONOUGH, and PATRICIA A. PARMELEE, *The University of Alabama* (Presented by Ian M. McDonough) – Allostatic load (the wear and tear of stress) negatively impacts health. The weathering hypothesis suggests that racial and ethnic minorities experience more stress that results in greater allostatic load and greater health disparities. However, limited research has investigated these issues on cognition in young adults. Using cross-sectional data, we tested whether stress and cognition operated through shared or unique pathways in a tri-ethnic sample of young adults. Using mediation, we found shared pathways between stress and visual episodic memory, working memory, and executive function in Blacks and non-Hispanic Whites. Using moderation, we found a unique pathway of stress on verbal episodic memory in Blacks and on visual episodic memory in Hispanics compared with Whites. These results support the weathering hypothesis, but only in Blacks. Inconsistent with the hypothesis, Blacks might be differentially vulnerable to the effects of stress on verbal memory and Hispanics exhibit better visual memory under high stress.
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6:00-7:30 PM (3113)

Harm Avoidant Individuals Exhibit Enhanced Learning With Punishment, but Not Reward, in a Probabilistic Category Learning Task. TODD ALLEN, *University of Northern Colorado*, DANIEL P. MILLER, *Carthage College* – Behaviorally inhibited (BI) individuals are anxiety vulnerable and exhibit enhanced avoidance and associative learning in situations involving uncertainty. In the current study, we investigated whether this pattern of enhanced learning would be evident in a probabilistic category learning task. This task involves uncertainty in that an item is only in a particular category 80% of the time. Therefore, 20% of the time a correct categorization is an incorrect response. Reward learning took place on trials in which a correct response resulted in a gain in points while an incorrect response resulted in no points gain. Punishment learning took place on trials where an incorrect response resulted in a loss of points while a correct response resulted in no point loss. One hundred participants completed the harm avoidance (HA) scale of the Tridimensional Personality Questionnaire (TPQ) and the probabilistic category learning task. HA individuals had better performance on punishment, but not reward, trials than non-avoidant individuals. This finding extends prior findings of enhanced learning with BI to a more cognitive task and supports a learning diathesis model of anxiety disorders.
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6:00-7:30 PM (3114)

Effects of Encoding by Rating of Arousal for Emotional Words: Comparing With Phonological and Self-Referent Processing. TETSUYA FUJITA, *Hosei University*, MIZUKI KATO, *Tama University* – Fujita & Kato (2017) suggested that the rating of emotional arousal to emotional pictures had the

effects of encoding on memory performance equivalent to self-referent processing and superior to physical processing. In the present study, we investigated that whether the rating of emotional arousal to emotional words has the effects of encoding similarly to using emotional pictures. And studied that how the rating of emotional arousal by emotional words has the effect of encoding relative to self-referent processing and phonological processing condition. We presented the emotional words and asked for rating of arousal, phonological processing, or self-referent processing, then tested free recall performance for participants. Results showed that the memory for recall after the rating of emotional arousal condition was higher than phonological condition. On the other hand, there was not significant difference between the ratings of arousal to self-referent processing condition. Thus, we found that rating of emotional arousal for emotional words had the effects of encoding on memory performance superior to phonological processing and equaling to self-referent processing as well as using emotional pictures.
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DISCOURSE PROCESSES AND LANGUAGE PRODUCTION

6:00-7:30 PM (3115)

Reading Goals Modulate Effects of Individual Differences. EUNJIN SEONG, HYOSUN LEE, and WONIL CHOI, *Gwangju Institute of Science and Technology*, PETER C. GORDON, *University of North Carolina, Chapel Hill* (Sponsored by Peter Gordon) – This study was designed to examine how individual differences in executive control, vocabulary knowledge and working memory affect patterns of eye movements during natural reading and skimming. Participants were asked to read passages and to answer comprehension questions while their eye movements were recorded. In addition, individual differences were assessed with several tasks to measure language and cognitive abilities. During natural reading, only the measure of vocabulary knowledge showed a significant effect such that participants with high vocabulary score showed high comprehension accuracy. However, during skimming there was an interaction effect on comprehension accuracy between executive control and working memory such that readers with higher scores of executive control showed higher accuracy rates only for the readers with lower working memory scores. These results suggest that different abilities should be mainly used according to reading goals.
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6:00-7:30 PM (3116)

Ums, Uhs, and Ellipses in Online Conversations. J. TREVOR D'ARCEY, SHEREEN ORABY, and JEAN E. FOX TREE, *University of California, Santa Cruz* – We tested whether ums, uhs, and ellipses predict sarcasm in online debates. In Study 1 we investigated relative frequency of ums and uhs in spoken and written contexts. Both were generally more common in spoken contexts than in written ones. In Study 2 we tested whether internet forum posts that began with um or uh were classified as more sarcastic by Amazon Mechanical Turk workers. We found that both words predicted the presence of sarcasm at a significantly higher rate than the baseline rate for the corpus. In Study 3 we used more reliable MTurk workers to annotate posts with fillers or ellipses in the middle. We found that people were significantly more likely to rate posts as sarcastic when they included um, uh, or ellipses compared to the corpus in general. We propose that signaling delay in writing invites readers to consider non-literal interpretations.
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6:00-7:30 PM (3117)

Examining the Ubiquity of the Moses Illusion: How Is It Influenced by Picture Primes? MARISSA SCOTTO, *City College, City University of New York*, NATALIE A. KACINIK, *Brooklyn College and Graduate Center, City University of New York* – Comprehending language is a vital process that is usually accomplished with minimal effort and without flaw. However, the Moses Illusion is the tendency to overlook distortions in statements (Erickson & Mattson, 1981). In the classic example of "How many animals of each kind did Moses bring on the ark?" most people fail to notice it was Noah, not Moses, who was involved in that biblical story. Factors like prior learning, unlimited response time, reading questions aloud, and knowledge that questions may be distorted, do not alleviate the rate of illusion. This study investigated the replicability of the basic effect and the influence of pictorial primes chosen to reflect the correct term, distorted term, or a shared feature(s). The type of picture was found to facilitate or reduce the likelihood of the illusion. These results have implications regarding how visual information is activated and integrated during memory retrieval and sentence comprehension.
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6:00-7:30 PM (3118)

How Effective Are Bulleted Lists in Conveying Information About the Safe and Effective Use of Nonprescription Drugs? MICHAEL P. RYAN and PAULA COSTA, *University of Texas at San Antonio* – Nonprescription drug labels make extensive use of bulleted lists to link specified conditions with action headings ("Stop use and ask a doctor if . . .") or classification headings ("signs of allergic reaction"). This study focuses on the degree to which bulleted lists create such links. After studying the bulleted conditions associated with each standardized heading on an aspirin label, 93 undergraduates attempted to classify individually presented bullet items with label headings. Bulleted items associated with "Directions," "Other information," "Uses," "Signs of stomach bleeding," and "Stop use and ask a doctor if" were well linked to their headings. However, bulleted items associated with "Ask a doctor before use if," "[risk factors for] stomach bleeding," and "ask a doctor/pharmacist before use if" were not well linked with their headings. An error analysis indicated that risk factors associated with the use of aspirin were often misconstrued as injunctions not to use aspirin.
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6:00-7:30 PM (3119)

Text Comprehension: The Reading-Time Consistency Effect. MURRAY SINGER, JACKIE SPEAR, and MARIA RODRIGO-TAMARIT, *University of Manitoba* – Reading time is greater for sentences inconsistent versus consistent with their antecedent text. New experiments (n's > 70) inspected category and trait story-inconsistencies (cf. O'Brien, Plewes et al., JEP:LMC, 1990; Singer, JML, 2006). Exp. 1 replicated the consistency effect. In Exp. 2, readers judged the consistency of each sentence against all preceding text. Accuracy was greater for consistent than inconsistent target sentences, and detecting real or spurious inconsistencies imposed a reading time penalty of about 0.5 sec. Exps. 1 and 2 suggest that: (a) The relatively low correct-detection rate for Exp.-2 inconsistent targets (53%) diagnoses moderate but far from perfect validation. (b) The average reading time of a sentence represents a mixture of detecting and not detecting inconsistencies, regardless of actual inconsistency. Greater mean reading time for inconsistent targets results, sensibly, from their higher proportion of inconsistency detection. In Exp. 3, subjects were explicitly asked if the target sentences of the same stories were consistent with their stories. Accuracy was considerably greater than in Exp. 2, signifying different decision criteria for consistency judgments in reading versus answering tasks.
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6:00-7:30 PM (3120)

Revision of Vaccine Misconceptions: From Refutation to Transfer. JASMINE KIM, REESE BUTTERFUSS, and PANAYIOTA (PANI) KENDEOU, *University of Minnesota* – Misconceptions about vaccination safety remain prevalent and can have serious consequences. Fortunately, research has shown that refutation texts, or texts that explicitly state and refute a misconception, are effective at reducing the impact of such misconceptions. Whether or not readers' revised knowledge as a result of reading a refutation text actually transfers to a new situation remains less clear. In this study, we examined the extent to which readers' revised knowledge from reading a refutation text transfers to a subsequent transfer text that is designed to re-activate the misconception. Participants read pairs of refutation and transfer texts that addressed common misconceptions about vaccines. Refutation texts were read before or after a transfer text. Reading time and post-test data were collected. The findings show that reading a refutation text prior to reading a transfer text reduces disruption from the misconception, suggesting that transfer of the revised knowledge does occur.
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6:00-7:30 PM (3121)

Text Availability in Comprehension and Integration of Multiple Texts. CECILE A. PERRET, AARON D. LIKENS, and DANIELLE S. MCNAMARA, *Arizona State University* (Sponsored by Danielle McNamara) – Learning new information often requires accessing information from more than one source (or text), connecting ideas within one source (inferencing), and across sources (intertextual integration). When retrieving information, sometimes the sources are available and sometimes they are not. This study investigated the effects of text availability on multiple text comprehension. Participants (n = 150) read four related texts with the texts available or unavailable as they answered 12 open-ended questions. Question response accuracy was strongly correlated with prior domain knowledge and intertextual integration (i.e., references to multiple texts within the responses). However, text availability did not influence the accuracy of students' responses to comprehension questions. At the same time, text availability reduced intertextual integration. These results imply that students were more likely to access a single text when the texts were available. Future research will further investigate the extent to which intertextual integration and prior knowledge interactively affect comprehension.
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6:00-7:30 PM (3122)

Effects of Online and Offline Explanation Strategies in the Comprehension of Scientific Texts. KATHRYN S. MCCARTHY, *Georgia State University*, SCOTT R. HINZE, *Middle Georgia State University*, MATTHEW T. MCCRUDDEN, *Victoria University of Wellington*, DANIELLE S. MCNAMARA, *Arizona State University* – Active engagement with text enhances not only retention, but also understanding of content. Research has demonstrated that both online and offline explanation strategies can increase comprehension, but there has been little work exploring these approaches in tandem. Participants (n = 57) read scientific texts and were assigned to a 2(online: think-aloud, self-explanation) x 2(offline: recall, elaborative retrieval) design. After a two-day delay, they completed comprehension tests. An ANCOVA controlling for reading skill indicated a significant effect of online prompt such that those who self-explained had higher comprehension scores than those who thought-aloud, $F(1,52) = 5.20$, $p < .05$, $\eta p2 = .09$. However, there was no effect of offline prompt, nor an interaction. We will also discuss performance as a function of item type as well as linguistic analyses of the open-ended data to further explore how these prompts impact processing and comprehension.
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6:00-7:30 PM (3123)

Taboo Congruency Sequence and Carryover Effects Influence Speech Production. KATHERINE WHITE, SABINE LOHMAR, CASEY GLICK, and MEGAN DANIELLE EVANS, *Rhodes College*, LISE ABRAMS, *Pomona College* – Research has demonstrated a role for cognitive control in the regulation of emotional distraction during speech production. The present study investigated whether control adjustments occur between trials by testing for (a) congruency sequence effects (CSEs) and (b) carryover effects on consecutive trials of a picture-word interference task. Two experiments varied the distractor's congruency (congruent = identical to the target, incongruent = different from the target) and emotion (taboo, neutral), as well as the location of the incongruent-taboo trial as first or second. Experiment 1 found a taboo CSE, as naming incongruent-taboo trials was faster if the previous neutral trial was incongruent compared to congruent. However, emotion modified the benefit of a previous incongruent trial, with incongruent-taboo

trials named faster if the previous incongruent trial was taboo compared to neutral. Experiment 2 found taboo carryover effects that sped naming of the subsequent trial: Incongruent-taboo trials had the largest carryover on congruent-neutral trials and smallest carryover on incongruent-taboo trials. These findings help define a role for trial-to-trial adjustments in controlling emotional interference when producing language.
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6:00-7:30 PM (3124)

Can You Fix What You Can't See? The Role of Visual Feedback in Detecting and Correcting Typing Errors. SVETLANA PINET and NAZBANOU NOZARI, *Johns Hopkins University* – We frequently detect and correct our errors in oral and written communications. It has been proposed that both internal monitoring mechanisms and external feedback are involved in these processes, however, the contribution of each channel to detection and correction remains unclear. We address this question by manipulating visual feedback in two experiments during word typing. Experiment 1 shows that visual feedback helps the correction but not detection of typing errors. Experiment 2 replicates this finding, and further shows that providing positional information (i.e., asterisks as in typing a password) improves corrections, but not to the level of full visual feedback where both letter identity and position are visible. In summary, the results suggest that the external visual feedback is critical to correction (but not detection) of typing errors and that information about both position and letter identity are used during the correction process.
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6:00-7:30 PM (3125)

Differences of Proficiency in Undergraduate Writing Based on Vocabulary Knowledge and Prompt Type. LISA S. KEMP and JANET L. MCDONALD, *Louisiana State University* (Sponsored by Janet McDonald) – Researchers continue to explore literacy variables that influence undergraduate writing proficiency. Previous research has shown that highly proficient ESL learners produce more lexically complex but not more cohesive writing compared to lower proficiency learners (Crossley & McNamara, 2012). We examined whether this was also true for native speaking undergraduate writers using vocabulary knowledge as an index of proficiency. Undergraduates were asked to write for twenty minutes based on a narrative prompt (tell a short story based on a photo) or an expository prompt (describe your perfect study space). Texts were transcribed and analyzed for lexical complexity and cohesion using TAALES and TAACO (Kyle & Crossley, 2015; Crossley, Kyle & McNamara, 2016). Participants with high vocabulary knowledge exhibited greater lexical complexity but not greater global cohesion compared to the low vocabulary group. The expository prompt resulted in compositions with more lexical complexity and more cohesion than the narrative prompt.
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6:00-7:30 PM (3126)

The Impact of Prime Duration on the Masked Initial Segment Priming Effect. MASAHIRO YOSHIHARA, JUNYI XUE, and YASUSHI HINO, *Waseda University* (Sponsored by Yasushi Hino) – In a naming task, a priming effect has been reported when the prime-target pairs share the initial phonological segment. Using Japanese Kanji words, we examined whether the priming effect is modulated by prime duration (50-, 200-, 1000-, and 2000-ms). We found a significant priming effect at the 50-, 1000-, and 2000-ms SOA when the shared initial mora between the prime and target corresponded to the whole sound of their initial Kanji characters (e.g., a prime, 可決 /ka-ke.tu/, and a target, 過信 /ka-si.N/). When the shared initial mora was not the whole sound of their initial Kanji characters (e.g., a prime, 格差 /ka.ku-sa/, and the target, 過信 /ka-si.N/), on the other hand, a significant priming effect was observed only at the 2000-ms SOA. These results suggest that when naming Kanji words, responses are prepared based on different-sized unit depending on the prime duration.
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6:00-7:30 PM (3127)

Allegedly Phonological Processes in Sequential Processing of Lexical, Grammatical, and Phonological Information. FABIEN MATHY, *Université Côte D'Azur*, FANNY MEUNIER and TOBIAS SCHEER, *CNRS, Université Côte D'Azur* – Phonologists are unable to determine whether phonological computation is or is not involved in the production of a given alternation (such as between k and s in opaque […k] - opa[s] ity). The competition of phonological theories is therefore impossible since the analysis of phenomena wildly diverges according to conceptual inclinations. We adapted the experimental setup by Sahin et al. (2009) to measure reaction time by a vocal key when participants produced words. Results showed that an additional task assigned to participants (grammatical encoding) increased reaction time latency. The same held true when grammatical encoding was augmented by a phonological task. Further investigation of individual words indicated that production routines were not only construction-specific, but also lexically specific. Bayesian analysis inferred cases where phonological computation was absent even though the phonological construction it belonged to as a whole supposedly involved phonology. We conclude that phonological processes are really performed online, although not for all words: only unknown or infrequent items enjoy this privilege.
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6:00-7:30 PM (3128)

Variation in Back-Vowel Fronting: The Role of Gender, Racial, and Rural Identities. WENDY HERD, JOY CARIÑO, MEREDITH HILLIARD, EMILY COGGINS, and JESSICA SHERMAN, *Mississippi State University* – While tense back-vowel fronting is primarily associated with the speech of young women throughout most of the United States, it has been documented in the speech of both men and women from a wide range of ages in the South. However, most of the work documenting back-vowel fronting has been limited to White speakers and has not explored variation related to ethnicity or

rurality with the exception of Fridland and Bartlett (2006) who found that both White and Black speakers in Memphis exhibited back-vowel fronting. The present study uses isolated productions of beat, boot, book, boat, and bought by 73 participants from Mississippi to explore the role of gender, racial, and rural identities in back-vowel fronting. Gender and racial identities – but not rurality – proved significant, and a significant gender identity by racial identity interaction was found. These results indicate that White speakers from Mississippi front tense back vowels more than Black speakers and that White women are currently leading back-vowel fronting in this region. This suggests back-vowel fronting as a socioindexical acoustic cue could affect the perception of femininity, Southernness, and racial identity during speech perception.
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6:00-7:30 PM (3129)

Investigating the Relation Between Phonological Short-Term Memory and Word Production. AUTUMN HORNE and RANDI MARTIN, *Rice University* (Sponsored by Randi Martin) – Some have argued for a close connection between phonological short-term memory (STM) and language production mechanisms (e.g., Acheson & MacDonald, 2009; Allen & Hulme, 2006). In contrast, neuropsychological researchers have argued for a closer connection between semantic than phonological STM in language production (e.g., Martin & Freedman, 2001), though recent work suggests a contribution of both to narrative production (Martin & Schnur, 2017). The present study aimed to replicate and extend the findings of Allen and Hulme (2006) by testing undergraduate subjects on naming to definition, picture naming, articulation rate, and phonological and semantic STM tasks. Naming to definition accuracy was related to phonological STM capacity (replicating Allen & Hulme) and also to semantic STM capacity. However, there was no relation between picture naming measures and either STM capacity, suggesting that the correlation with naming to definition resulted from its demands on comprehension. Moreover, articulation rate had no relation to STM measures. Thus, any overlap between phonological STM and language production appears not to arise at the level of single word phonological retrieval or articulation.
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6:00-7:30 PM (3130)

The Shortening of Repeated Words Does Not Depend on Speakers Receiving Auditory Feedback. CASSANDRA L. JACOBS, *University of California, Davis*, TORREY LOUCKS, *University of Alberta, Edmonton*, DUANE G. WATSON, *Vanderbilt University*, GARY S. DELL, *University of Illinois at Urbana-Champaign* – When speakers repeat a word, it tends to be shortened. By at least one account, shortening, or repetition reduction, occurs because of auditory feedback (Jacobs, Yiu, Watson, & Dell, 2015). In our experiments, participants described pairs of simple events manipulating the relationship between two utterances (the prime and target) while suppressing auditory feedback. Prime event descriptions contained either a to-be-repeated referent, e.g. "The cow shrinks" or an unrelated one, e.g. "The mouse shrinks." Target event utterances would be, "The cow flashes." In Experiment 1, participants performed this task under 90 dB speech noise, masking auditory input. Experiment 2 was identical, except participants whispered the prime, suppressing feedback from air and bone conduction. Both experiments showed that despite having no input to auditory memory, speakers shortened repeated words. These results suggest that processing of the prime changes feedforward processes during target production, causing repetition reduction.
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6:00-7:30 PM (3131)

Structural Repetition in Question Answering: A Replication and Extension of Levelt and Kelter (1982). KATHERINE CHIA and MICHAEL KASCHAK, *Florida State University* – We report an effort to replicate and extend Levelt and Kelter's (1982) Experiment 3. In this study, experimenters phoned businesses and asked, At what time does your shop close? or What time does your shop close? Participants were more likely to produce prepositional responses (At 7 o'clock) to questions containing a preposition than to questions that did not. Across three experiments, we replicated Levelt and Kelter's method, and included a number of other communicative contexts (asking questions by phone, in person, or by text message, and asking people both known and unknown to the experimenter). Our efforts produced mixed results. Across experiments, and within each communicative context, we found the predicted pattern of results (more prepositional responses following prepositional questions). Although this pattern was not statistically reliable in our individual experiments, it was significant in an analysis conducted across all of our experiments.
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6:00-7:30 PM (3132)

Talker Adjustment to Perceived Communication Errors: A Closer Look at Intervocalic Flaps. TIFANI M. BIRO, ANNE J. OLMSTEAD, NAVIN VISWANATHAN, and DIANNA E. KOESTERER, *University of Kansas* (Sponsored by Navin Viswanathan) – Before unstressed syllables, intervocalic /t/ is realized as a voiced flap rather than an unvoiced stop, causing words like petal and pedal to sound similar. Flapped /t/ may become more distinct compared to /d/ during clear speech. Yet, previous studies using sentence corpora with few flapped utterances or simple word list readings have reported mixed results on how these sounds change during clear speech. The current study focused on investigating differences among intervocalic flapped productions during conversational and clear speech. A computer program provided artificial feedback on subjects' speech, such that when subjects said a word (e.g., petal) the computer would either interpret the word correctly (i.e., it guesses petal) or incorrectly (it guesses pedal, kettle or ???). Produced word length, closure duration, and vowel length were measured. Preliminary results suggest subjects produced durationally longer words, vowels, and closure durations only in response to apparent misinterpretations.
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6:00-7:30 PM (3133)

Re-examining the Onset Phoneme Preparation Effect in Mandarin Chinese Word Production. JENN-YEU CHEN, *National Taiwan Normal University* – A form preparation experiment with direct word reading and involving 48 participants was conducted to re-examine the phoneme preparation effect in Mandarin Chinese word production. Twelve different phonemes were included in a set that formed either a homogeneous or a heterogeneous block. The overall effect was 12 ms and significant, but the effects varied across phoneme types. The effects for /x/, /q/, /t/, /k/, /p/, /n/ were 39, 34, 17, 15, 13, and 13 ms, respectively. The effects for /h/, /b/, /m/, /j/, /zh/, /d/ were -9, -1, 4, 5, 5, and 6 ms, respectively. Articulatory artifacts are implicated in these results. Further research is needed to better deal with the articulatory confounds before a clear conclusion can be reached regarding the role of the phoneme in Mandarin Chinese word production.
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6:00-7:30 PM (3134)

Biasing and Unbiasing Verbs Through Language Production. AMANDA C. KELLEY and GARY DELL, *University of Illinois at Urbana-Champaign* (Sponsored by Gary Dell) – A verb is "biased" when it tends to occur in one syntactic structure. Verb biases can be learned naturally or in the lab, but what type of learning underpins this process is not clear. In the following studies, participants learned novel verb biases and then learned the opposite bias. Implicit learning cannot adjust to the reversal quickly, while explicit learning can. Participants were presented with sentences containing either dative or transitive verbs; a subset of biased verbs appeared in only one structure. When participants were allowed to produce any structure, biased dative verbs were more likely to match their trained structure in the first block than in the second in both studies; no such effect was seen for transitives. This suggests that implicit learning supported successful dative verb bias learning. By contrast, the transitive active-passive alternation may not be influenced by specific verbs, but rather by some other factor.
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6:00-7:30 PM (3135)

Orthographic Representation in Flux: A Large-Scale Analysis of Spelling Errors of Finnish Nominal Compounds. AKI-JUHANI KYRÖLÄINEN, *McMaster University*, FILIP GINTER and RAYMOND BERTRAM, *University of Turku*, VICTOR KUPERMAN, *McMaster University* (Sponsored by Raymond Bertram) – Exposure to substandard forms including spelling errors has been shown to influence spelling and reading proficiency (Kuperman & Bertram, 2013). In Finnish, the norm is that constituents of a compound are spelled together (similar to English bathroom). In practice, however, insertion of spaces is quite typical (Ristilä, 2013). This tendency has been claimed to follow the English spelling, and is even referred to as the English disease. Here, we examine the evolution of spelling errors over time in Finnish compounds and present a large scale analysis of factors that influence error rates. We focused on biconstituent compounds, n = 22,368. Their frequency along with spelling errors were extracted from the 1.8 billion-token Suomi24 corpus (2001-2015) (Lagus, Pantzar, Ruckenstein & Ylisiurua, M. 2016). We identify semantic and formal factors predicting whether a given Finnish compound is spelled with an error, and demonstrate a link between preferences in the spelling of English and Finnish compounds.
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6:00-7:30 PM (3136)

How Does Syntactic Format and Conventionality Affect Metaphor Production? FARIA SANA, *Athabasca University*, JUANA PARK, CLAIRE BURRY, CHRISTINA L. GAGNE, and THOMAS L. SPALDING, *University of Alberta* – People use metaphors on a regular basis that vary in syntactic format (e.g., he has gasoline temperor his temper is gasoline). When do they use one format over another? Research suggests that people tend to truncate multi-word expressions over time as they become more established (e.g., a person who is ice skating becomes an ice skater). Given that metaphors vary in conventionality from being novel (e.g., ideas are diamonds) to more established or conventional (arms are steel), people should have a tendency to truncate the latter—we examined this hypothesis. Participants read short stories that contained metaphors varying in conventionality that were presented either in a short format (e.g., megaphone sister) or in long format (e.g., sister in a megaphone). After each story, participants responded to two questions, one of which required them to reproduce the metaphor from the corresponding story. Results show that participants were less likely to correctly produce a more conventional metaphor that was encountered in a long than in a short format, and when produced incorrectly, they truncated more conventional than more novel metaphors. These findings suggest that the syntactic format and conventionality affect metaphor production.
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6:00-7:30 PM (3137)

The Role of Short-Term Memory, Working Memory, and Inhibition in Verb-Related Morphosyntactic Production. ELVIRA MASOURA and EFPRAXIA CHATZIADAMOU, *Aristotle University of Thessaloniki*, IFIGENIA DOSI, *Democritus University of Thrace*, VALANTIS FYNDANIS, *Long Island University, Brooklyn* – Recent evidence shows that verbal working memory affects morphosyntactic production even in structures that do not involve or favor similarity-based interference, and interacts with the production of morphosyntactic categories such as subject-verb agreement, time reference/tense, and aspect (Fyndanis, et al, 2018). The present study aims at investigating the relationship between morphosyntactic production and verbal/visuospatial working memory, verbal/visuospatial short-term memory, verbal/visual inhibition. The study also addresses whether morphosyntactic production and any of the cognitive functions above interact with educational level. Eighty healthy older Greek-speaking participants varying in educational level were administered a sentence completion task testing subject-verb agreement, time reference/tense and aspect as well as tasks tapping into the cognitive functions above. Data analysis is in progress. References Fyndanis, V., Arcara, G., Christidou, P., & Caplan,

D. (2018). Morphosyntactic production and verbal working memory: Evidence from Greek aphasia and healthy aging. Journal of Speech, Language and Hearing Research, 61, 1171–1187.
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SPEECH PERCEPTION

6:00-7:30 PM (3138)

Foreign-Directed Speech in Interactive Conversational Settings. KRISTIN MELLO, *Gordon College*, KATHRIN ROTHERMICH, *East Carolina University*, SUSAN C. BOBB, *Gordon College* (Presented by Susan C. Bobb) – According to Communication Accommodation Theory, people adjust the way they talk based on the perceived comprehension level of their interlocutors (Ryan et al., 1994). One such speech change is foreign-directed speech (FDS), directed toward non-native speakers of a language and characterized by slowed and simplified speech with exaggerated vowels (e.g., Knoll et al., 2006; Scarborough et al., 2007). We evaluated the presence or absence of FDS in a naturalistic setting by analyzing conversational sequences between native and non-native speakers of English. Participants were audio and video recorded while they played a cooperative computer game. Importantly, both participants in the dyad were naïve to the nature of the study. Results suggest that native English speakers do adjust their speech toward non-native speakers in naturalistic settings: native speakers chose words of higher frequency and greater contextual diversity and spoke with greater intensity when speaking with non-native speakers compared to speaking with native speakers.
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6:00-7:30 PM (3139)

Nonlinear Serial Correlations in the Acoustics of Speech Support the Spectral Contrast in Compensation for Coarticulation. RACHEL WARD and DAMIAN KELTY-STEPHEN, *Grinnell College* (Presented by Damian Kelty-Stephen) – Producing phonemes in sequence leads to coarticulation. Compensation for coarticulation (CfC) and perceiving stable phonemes uses contrast between average formant structure. However, average formant structure omits intermittent, nonlinear structure incident to vocal timbre. Formant-preserving randomization of speech-context recordings produces synthetic phonemes that sound indistinguishable but lack the original nonlinearity. 42 participants listened to (context+target) pairs and judged whether targets from an 11-step GA-DA continuum was "GA" or"DA" following one of three contexts: natural-speech recordings of "AL" and "AR", same recordings with scrambled pitch periods only during the vowels, and non-speech sine-wave tones corresponding to "AL" and "AR" F3s). Mixed-effect modeling of cumulative "GA" judgments showed that CfC was weaker after synthetic speech than after natural speech ($p < .0001$), moderated by nonlinear serial correlations in the acoustic power in the scrambled sequences. Despite usefulness of formants for phoneme categorization and CfC, the nonlinearity of speech sounds supports recognition of later phonemes in sequence. Speech perception of phonemes in sequence uses both formants and supra-formant nonlinearities.
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6:00-7:30 PM (3140)

Infants' Recognition of Familiar Words in Sung Language. EMILY R. BARKER and MARIEKE VAN HEUGTEN, *University at Buffalo, State University of New York* (Sponsored by Marieke van Heugten) – Research in the field of early language development has presented us with a fairly detailed picture of how infants and toddlers learn to recognize words. However, despite the prevalence of music in our daily lives, very little is known about children's processing of sung language. Here, we start to address this gap in the literature by testing infants' ability to recognize words from lyrics. Using the Preferential Looking Procedure, English-learning 2-year-olds' eye movements were recorded while they listened to familiar words embedded in novel spoken and sung sentences. Meanwhile, two images were presented side-by-side, one of which depicted the labeled word. If infants increase their target fixations after target word onset when listening to sung items, this would suggest that they are able to recognize familiar words in sung contexts. Fixation patterns over time could reveal differences in speed of word recognition between spoken and sung language.
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6:00-7:30 PM (3141)

Talking Points: A Modulating Circle Reduces Listening Effort Without Improving Speech Recognition. JULIA FELD STRAND, *Carleton College*, VIOLET BROWN and DENNIS BARBOUR, *Washington University in St. Louis* – Speech recognition is improved when the acoustic input is accompanied by visual cues provided by a talking face (Erber, 1969; Sumby & Pollack, 1954). One way that the visual signal facilitates speech recognition is by providing the listener with information about fine phonetic detail that complements information from the auditory signal. However, given that degraded face stimuli can still improve speech recognition accuracy (Munhall, Kroos, Jozan, & Vatikiotis-Bateson, 2004), and static or moving shapes can improve speech detection accuracy (Bernstein, Auer, & Takayanagi, 2004), aspects of the visual signal other than fine phonetic detail may also contribute to the perception of speech. In two experiments, we show that a modulating circle providing information about the onset, offset, and acoustic amplitude envelope of the speech does not improve recognition of spoken sentences (experiment 1) or words (experiment 2), but does reduce the effort necessary to recognize speech. These results suggest that although fine phonetic detail may be required for the visual signal to benefit speech recognition, low-level features of the visual signal may function to reduce the cognitive effort associated with processing speech.
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6:00-7:30 PM (3142)

The Consolations of Clumpiness: How Top-Down Lexical Influences Explain a Paradox in the Structure of Lexical Perceptual Space. DAVID W. GOW, *Massachusetts General*

Hospital, MONICA Y.C. LI and JAMES S. MAGNUSON, *University of Connecticut* – Dispersion theory suggests that speech perception is robust, in part because of evolutionary pressures on language systems towards creating phoneme inventories that maximize perceptual distance between categories. Paradoxically, lexical perceptual space is clumpy, rather than dispersed, with words on average showing greater phonological similarity than would be predicted by phonotactic constraints alone. Surprisingly, words that contain common phoneme patterns (e.g., high frequency biphones) show processing advantages over words with more distinctive patterning. We hypothesize that this advantage comes from top-down lexical support from words with overlapping sequences. Simulations using the interactive TRACE model show how lexical feedback promotes biphone probability effects in spoken word recognition.
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6:00-7:30 PM (3143)

Effortful Listening to Accented Speech: A Foundational Study Using Pupillometry. DREW J. MCLAUGHLIN and KRISTIN J. VAN ENGEN, *Washington University in St. Louis* (Sponsored by Kristin Van Engen) – During speech perception, an unfamiliar accent can interfere with a listener's ability to understand a spoken message. There is ample evidence that listeners recruit additional cognitive resources when faced with difficult listening conditions, and that they can improve their ability to understand accented speech with perceptual training; however, little is known about the cognitive costs imposed by accented speech. Using pupillometry (the measure of pupil diameter over time, a physiological index of cognitive load), we compared task-evoked pupil response for Mandarin Chinese-accented English speech to native English speech. Preliminary results show that pupil dilation is larger (indicating greater cognitive load) for nonnative-accented English compared to native English—even when both speakers are 100% intelligible. Complementing this result, self-reported ratings of effort indicated that participants find listening to fully-intelligible accented speech more effortful than listening to native speech. These findings set a foundation for research of accented speech perception using pupillometry, indicating that listeners utilize more cognitive resources for processing nonnative-accented speech even when it is fully intelligible.
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6:00-7:30 PM (3144)

Phonetic Similarity Between Mothers and Their Children. ANGELA COOPER and ELIZABETH K. JOHNSON, *University of Toronto* – The present work examined whether 2.5-year-old children's productions are perceptually similar to their mothers' productions. Twenty mother-child dyads recorded words commonly known by toddlers. To assess similarity, adult listeners completed an AXB task. Listeners heard 3 repetitions of a word produced by a child (X) and two mothers (A and B), one of which was the child's mother and the other, a different child's mother, and were asked to indicate which of A or B sounded more similar to X. Results revealed listeners were above chance at selecting the child's mother as sounding most similar to the child. The child's gender did not modulate the magnitude of perceived similarity (i.e., girls did not sound more like their mothers than boys). These findings provide initial evidence for phonetic convergence between mothers and their children. Ongoing work examines the source behind convergence and whether perceived convergence increases with the child's age.
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6:00-7:30 PM (3145)

The Role of Attention in the Perceptual Learning of Variation in Foreign-Accented Speech. CHRISTINA TZENG, MARISSA RUSSELL, and LYNNE NYGAARD, *Emory University* – Listeners adapt to variation in foreign-accented speech, learning to disambiguate between talker-specific and accent-general variation. We asked (1) which features of the spoken utterance are relevant for this learning to occur and (2) whether task-driven attention to these features affects the extent to which learning generalizes to novel utterances and talkers. During an exposure phase, listeners heard English sentences produced by Spanish-accented talkers. In Experiment 1, listeners' attention was shifted either to linguistic content (sentence transcription) or indexical cues (talker identification). In Experiment 2, listeners' attention was directed either to an irrelevant acoustic dimension (amplitude judgment) or a concurrent visual stimulus (Fribble identification). For both experiments, listeners' test transcription of novel English sentences spoken by a new set of Spanish-accented talkers showed generalized perceptual learning relative to control performance. Results suggest that listeners implicitly encode accent-relevant attributes of the speech signal. These findings are consistent with models of speech perception in which language users perceptually adapt to classes of systematic variation in spoken language.
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6:00-7:30 PM (3146)

The Influence of Cohort Density on Lexical Competition of Chinese Spoken Word Recognition: Evidence From Eye Movements. CHUNG-I ERICA SU and JIE-LI TSAI, *National Chengchi University* – Several visual world eye-tracking studies have demonstrated that words sharing phonetic segments compete for recognition, with early/stronger lexical competition effect for onset segmental overlap (e.g., Allopenna, et al., 1998). It has also been demonstrated that word with many cohort members shown a disadvantage on spoken word recognition (e.g., Magnuson, et al., 2007). In a visual wor(l)d eye-tracking experiment, we examined the cohort density effect in Chinese spoken word recognition. Eye fixations were tracked as listeners looked at a display of four printed words on a screen while following a spoken instruction to click on a target. The visual display comprised a target, a cohort competitor, and two phonologically unrelated distractors. Each target-competitor pair was either high or low in cohort density. The results suggest that at 300~400-ms after the target onset, during which participants could not differentiate the target from its cohort competitor with the same tone, targets with high cohort density received lower fixations compared to the targets with

low cohort density. These results demonstrated that word with many cohort members shown a disadvantage on activation-competition of Chinese spoken word recognition.
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6:00-7:30 PM (3147)

Cross-Linguistic Differences in the Effects of Distal Prosody on Speech Segmentation. CAROLYN K. KROGER, NI LA LE, and JOHN DEVIN MCAULEY, *Michigan State University* (Sponsored by J. Devin McAuley) – Prosodic pitch patterning in the distal (nonlocal) context affects segmentation of lexical items in continuous speech. We used an artificial language paradigm to examine the role of distal prosody in novel word segmentation for native and non-native English speakers. Participants were initially exposed to 12 disyllabic (target) words in the artificial language and then listened to short utterances and rated how well they heard cued target words that were either present or absent. Consistent with a perceptual grouping hypothesis, native English speakers better perceived target words in congruent compared to incongruent distal prosodic contexts. Non-native English speakers revealed a mixed pattern of results. Notably, native speakers of tone languages did not show a congruency effect (i.e., no effect of distal prosody). Results suggest that although native speakers of English use distal prosodic cues to group syllables into words, native speakers of tone languages do not.
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6:00-7:30 PM (3148)

Text Captioning Reduces the Effects of Perceptual Effort on Speech Memory. BRENNAN R. PAYNE and JACK SILCOX, *University of Utah*, AMANDA LASH, *Whittier College*, SARAH HARGUS FERGUSON and MONIKA LOHANI, *University of Utah* – We examined the effects of text captioning on memory for speech. Young normally hearing participants listened to sentences in low (+7dB SNR) or moderate (+3dB SNR) speech-shaped background noise, or with no noise. Speech was presented alone (speech-only) or with adaptive text captioning. Pupil responses were recorded during a retention interval (RI), as a physiological index of cognitive demand. Participants were cued for free recall following the RI. In the speech-only condition, recall was poorer with moderate background noise relative to low or no noise. With text captioning, the effects of listening in noise on memory were reduced. In the speech-only condition, we observed graded effects of SNR on pupil dilation. With text captioning, the effects of noise on pupil dilation were reduced. These findings suggest that the visual presentation of captioned speech may ameliorate the negative effects of auditory perceptual decoding on speech memory in acoustically challenging situations.
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6:00-7:30 PM (3150)

Predictive Processing in Computational Models of Spoken Word Recognition. MONICA Y.C. LI, HEEJO YOU, SAHIL LUTHRA, RACHAEL STEINER, and JAMES S. MAGNUSON, *University of Connecticut* (Sponsored by James Magnuson) – In formal predictive coding (PC) models, prediction error is the primary currency: states at one level are compared to top-down predictions from a generative model at a superior level, and the discrepancy is passed forward. Thus, when processing proceeds in correspondence with top-down predictions, less signal is passed forward. Evidence for predictive processing (PP) is often interpreted as evidence of PC, leading to calls for predictive models (e.g., explicit PC models or simple recurrent networks [Elman, 1990], which are usually trained to predict upcoming inputs or states) for spoken word recognition rather than 'competition-based' models (e.g., the interactive activation model, TRACE; McClelland & Elman, 1986). We directly compare a recent predictive model (Gagnepain et al., 2012), a simple recurrent network, and TRACE. All three demonstrate PP. Interestingly, only TRACE directly shows signal reduction when predictions are confirmed. We discuss how this property emerges without an explicit PC mechanism.
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6:00-7:30 PM (3151)

Helping the Rich Get Richer: Aptitude and Challenging Learning Conditions Facilitate Overnight Improvement of Non-Native Phonetic Learning. PAMELA FUHRMEISTER and EMILY B. MYERS, *University of Connecticut* (Sponsored by Emily Myers) – Learning non-native speech contrasts can be challenging in adulthood, but recent work suggests that memory consolidation during sleep (Earle & Myers, 2015) as well as variability in training (i.e., varying the talker or phonological context; Lively et al., 1993) can help this process. Notably, not all learners benefit from a variable training set: for learners with poorer perceptual abilities, trial-to-trial (interleaved) variability has been shown to be detrimental, although even poorer learners benefitted if variability was blocked (Perrachione et al., 2011). The current study explored the effects of blocked vs. interleaved variability and individual aptitude on overnight improvement on a phonetic learning task. Participants who received blocked training outperformed those who received interleaved training, and a measure of pre-training aptitude positively predicted overnight improvement for interleaved training groups only. These findings emphasize the importance of individually-tailored training schedules for optimal learning and retention of non-native speech sounds.
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6:00-7:30 PM (3152)

Navigating Variability in Question-Statement Prosody. ANDRÉS BUXÓ-LUGO and CHIGUSA KURUMADA, *University of Rochester* – Variability is ubiquitous in sensory perception, and this complicates the problem of linguistic processing. We address this issue in the domain of prosody, a collection of cues (e.g., pitch, duration) communicating speakers' intentions. We extend Ideal Observer Models of perception (Kleinschmidt, 2018) to explore how listeners' use of prosodic cues might benefit from learning underlying statistical regularities conditioned on speakers' features (e.g., gender, age, identity). Models were trained on statements and questions produced by 33 speakers. With last syllable duration and F0 as cues, the models find that keeping track of gender and individual talker distributions are both informative compared to baseline

($p < .001$). When tested in a classification task, accounting for individual speakers especially improved classification accuracy (72% to 89%), suggesting that uncertainty can be drastically reduced by representing speaker identity. Such models can further be used to infer listeners' expectations for unseen speakers' productions.
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6:00-7:30 PM (3153)

The Role of Talker Intelligibility in Native and Foreign-Accented Sentence Speech Reception Thresholds: Insights From the Hearing in Noise Test (HINT). DORINA STRORI, ANN BRADLOW, SARAH SCHWARTZER, and PAMELA SOUZA, *Northwestern University* – Standardized speech intelligibility tests that implement adaptive procedures are commonly used in research and clinical settings. However, they do not include a component that measures the intelligibility of foreign-accented speech in noise, despite the challenge that it presents for listeners. In this study we measured listeners' speech reception thresholds (SRTs) using English sentences from the Hearing in Noise Test (HINT), spoken by three talkers: the native talker in the original HINT, another native and one high intelligibility non-native talker. As anticipated, preliminary results revealed higher SRTs for the non-native talker compared to the two native talkers. Interestingly, SRTs for the HINT native talker were higher than SRTs for the other native talker. These findings suggest that individual variation under the optimal conditions of native talker and native listener should be considered when assessing hearing in noise under non-optimal conditions, such as when examining the detrimental effect of a non-native accent.
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6:00-7:30 PM (3154)

Rethinking Duration and Rhythm in Language and Music: Can Duration Prime Rhythm in Metrical Speech? ZÜHEYRA TOKAÇ, ESRA MUNGAN, and SUMRU A. ÖZSOY, *Boğaziçi University* – Most studies of rhythm in language consider stress as the rhythm-inducing aspect, disregarding the salience of stress for the language of interest. Not surprisingly, a study with native French speakers failed to present satisfactory results in a phoneme detection task with rhythmic configurations of strong and weak beats priming stressed and unstressed syllables (Cason & Schön, 2012). Turkish, like French, is a syllable-based language that employs durational rather than stress-based cues in speech (Inkelas & Orkun, 2003; Topbaş, 2006). We revised Cason & Schön's paradigm by using binary or ternary rhythmic primes created via long-short pulse sequences in a phoneme detection task where listeners had to identify target consonants in rhythmically matching or mismatching bi- or trisyllabic Turkish pseudo- or non-words. We expect to find highest detection rates for number-of-pulse-wise and rhythmic pattern-wise matching trials and lowest for the all-mismatch condition. Findings will be discussed with respect to rhythmic grouping (e.g., Iversen et al., 2008), Dynamic Attending Theory (Jones, 1987), and the Attentional Bounce hypothesis (Pitt & Samuel, 1990).
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6:00-7:30 PM (3155)

Temporal Windows for Preceding and Following Distal Rate Effects on Function Word Perception. MATTHEW LEHET, LAURA DILLEY, CORINNE STREICHER, and ZACHARY IRELAND, *Michigan State University* – Previous studies demonstrate that rate of distal (i.e., nonadjacent) speech context (e.g., Glenn thought his friend and neigh…) influences listeners' reports of function words (e.g., neighbor are like… versus neighbor like…). Two experiments examined how varying the number of syllables of acoustic context before and after a function word which were slowed (i.e., time-expanded) affected lexical transcription. Experiment 1 examined how the number of slowed syllables preceding the function word affected function word perception. Experiment 2 examined how rate and presence of context after the function word modulated effects of slowing speech rate preceding a function word. Results showed that speech rate before and after the function word is integrated in perception of function words, presence or absence of following context drastically affected word segmentation. These findings support models of speech perception that include mechanisms for dynamic integration of rate information over time, with late commitment to lexical parses.
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6:00-7:30 PM (3156)

Recognition Memory for Accented Speech: Effects of Task at Encoding. JESSICA E.D. ALEXANDER, TONI L. FICARRA, and AMANDA B. FARR, *Centenary College of Louisiana*, SARAH T. IRONS, *Rice University* – Findings suggests that foreign-accent negatively impacts memory for spoken language. However, work from our lab has shown that accent can serve as a desirable difficulty, increasing memory for accented-speech for recall tasks and for recognition tasks, but only when tokens at test were identical to those presented during encoding (e.g., not when speakers change). To examine whether previous effects could be explained by encoding processes, we used a depth of processing task at encoding and tested with identical tokens. Listeners heard monosyllabic words and completed three tasks, a surface task, an acoustic/rhyming task, and a semantic/sentence completion task. Experiment 1 replicated a levels of processing effect with native English versions of our stimuli. In Experiment 2, listeners heard words from both native English and Spanish-accented speakers across all three tasks. Recognition memory performance depended on both task and accent. Accented-words were poorly recognized at deeper levels of encoding.
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6:00-7:30 PM (3157)

Spoken Word Recognition as a Resource-Free Process? Evidence From Eye-Movements and Individual Differences. BOAZ M. BEN-DAVID, *Interdisciplinary Center (IDC) Herzliya*, GAL NITSAN, *Interdisciplinary Center (IDC) Herzliya; Haifa University*, ARTHUR WINGFIELD, *Brandeis University*, LIMOR LAVIE, *Haifa University* – It has been argued that spoken-word recognition is an effortless process. However, a recent study, using the "visual world" eye-tracking

paradigm, found that online spoken-word recognition was slowed when listeners were required to retain in memory a list of four spoken digits (high-load) compared to only one (low load). In the current study, we compared participants with higher- and lower-memory spans on the time-course for spoken word recognition by testing eye-fixations on a named object relative to fixations on an object whose name shared phonology with named object. Results show that when there was a low working memory load, participants' memory spans had little effect on the time-course of preferential eye fixations. However, when a high working memory load was imposed, listeners with lower-span were delayed in discriminating target from sound sharing competitor by 350-450 ms, relative to higher-span listeners. Results further support the notion that spoken word recognition is a resource-demanding process.
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6:00-7:30 PM (3158)

Predict the Future, Change the Past: Age Differences in the Effects of Pre- and Post-Target Context on Speech Perception. ERIC J. FAILES and MITCHELL S. SOMMERS, *Washington University in St. Louis* (Sponsored by Chad Rogers) – When identifying words in noise, older adults often experience greater benefit from the presence of supporting semantic context than do younger adults. When context is misleading, however, older adults falsely perceive the contextually predicted word more often than do young adults, and frequently do so with high confidence. In past studies, context has always preceded the target word, introducing bias before the target word is presented. We used sentences that could be reorganized to place most of the context either before (They served soup in a bowl) or after (In a bowl, they served soup) the target word in noise (bowl). To investigate context-based misperceptions, one phoneme in the predicted target word was changed to form a word that was not predicted by context (They served soup in a hole). Younger and older adults identified words in noise using individually determined signal-to-noise ratios to equate audibility. We investigated the effects of age, target word frequency, and phonological neighborhood density on veridical and false perceptions across context conditions. The results and their implications for models of speech perception will be discussed.
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6:00-7:30 PM (3159)

Reliability and Individual Differences in Phonetic Learning and Adaptation. CHRISTOPHER C. HEFFNER and EMILY B. MYERS, *University of Connecticut* – Individual variation is ubiquitous in speech perception, for both the perception of degraded speech signals and the acquisition of non-native phonetic categories. Yet the extent to which those individual differences are reliable across talkers (for degraded speech) and across contrasts (for category learning) has rarely been explored. In the present study, we tested reliability in four different tasks. In two different phonetic learning paradigms, participants learned non-native fricative and consonant length categories. In two different degraded speech tasks, participants adapted to compressed speech and to non-native speech from two separate talkers. In all four tasks, participants showed evidence of reliable individual differences: performance for one set of categories or one speaker was related to performance for the other. These findings set the stage for determining whether individual differences in degraded speech perception and non-native learning rely on a core speech processing capacity.
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6:00-7:30 PM (3160)

Using the N100 EEG Signal to Measure Top-Down Influences Onto Sublexical Speech Perception. COLIN NOE and SIMON FISCHER-BAUM, *Rice University* (Sponsored by Simon Fischer-Baum) – Speech perception theories differ on whether the process of sublexical speech perception is autonomous or is influenced by contextual knowledge such as semantic or lexical context. A better understanding of sublexical speech perception would be useful for building cognitive models of speech perception and clinically, in understanding speech perception deficits after neurological injury. We employ the N100 EEG-ERP waveform to measure the sublexical processes involved in stop-consonant voicing categorization and test whether voice-onset-time encoding is altered by lexical status (e.g. /d/-/t/ in dape-tape versus date-tate). This project improves on previous work investigating sublexical perception (e.g. Ganong, 1980) by including an online measure of sublexical encoding. We demonstrate effects of lexical context on N100 encoding, indicating interaction of lexical and sublexical information. This finding supports online feedback accounts of speech perception. Practically, it also confirms the N100 is a useful candidate for measuring deficits in speech perception in neurologically damaged populations.
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6:00-7:30 PM (3161)

Sensitivity to Continuous Acoustic Cues Across Spectral and Temporal Dimensions in Speech. YANG AGNES GAO, *Villanova University*, OLIVIA PEREIRA, *Nemours Biomedical Research*, JOSEPH C. TOSCANO, *Villanova University* – Previous work has shown the auditory N1 event-related potential (ERP) component tracks continuous changes in voice onset time (VOT), a cue to voicing distinctions in speech (e.g., /b/-/p/), suggesting that listeners encode this cue independently of phoneme categories. In this study, we examine whether these effects generalize to other phonological distinctions, such as differences in place of articulation, which are primarily distinguished by spectral features (unlike VOT and voicing). Listeners heard stimuli varying along VOT continua and spectral continua (distinguishing place; /b/-/g/ and /g/-/d/). Results show that N1 amplitude varies as a function of VOT, replicating previous studies. Moreover, we see linear effects on N1 amplitude for spectral differences between bilabial and velar stops (/b,p/-/g,k/) and between velar and alveolar stops (/g,k/-/d,t/). This suggests that perceptual encoding is based on continuous acoustic differences and that sensitivity to these cues is a general property of the speech perception system.
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6:00-7:30 PM (3162)

Viseme Duration and Salience Impact Neural Processing of Auditory Speech. HANNAH SHATZER and MARK PITT, *The Ohio State University*, ANTOINE SHAHIN, *University of California, Davis* (Sponsored by Mark Pitt) – Humans tolerate asynchrony between the onset of visual and auditory speech signals, perceiving even 250 ms gaps as synchronous when watching a video of a person speaking. Several articulatory factors likely influence asynchrony tolerance. The current study investigated the effects of viseme salience and articulatory duration on asynchrony tolerance and their implications for neural processing of audiovisual speech. Subjects in an EEG experiment made asynchrony judgments for videos of /wa/, /la/, and /na/, three visemes that vary in visual salience. The duration of viseme articulations was also manipulated (short, normal, long). Asynchrony tolerance was lowest for the most salient viseme (/wa/) and the short articulation. Auditory-evoked potentials demonstrated an effect of visual salience on P2 amplitude (/wa/ > /la/ > /na/) and N1/P2 latency (/wa/ < /la/ < /na/), suggesting that auditory processing is enhanced by visually salient visemes. The P1 amplitude was also reduced for the normal articulation relative to short and long. Results suggest that more visually salient visemes and articulatory duration affect neural acoustic processing and subsequent integration of asynchronous audiovisual stimuli.
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ASSOCIATIVE LEARNING AND MEMORY

6:00-7:30 PM (3163)

Comparison of Semantic Networks in Alzheimer's Patients and Controls. JEFFREY C. ZEMLA and JOSEPH L. AUSTERWEIL, *University of Wisconsin, Madison* – The semantic fluency task (freelisting of items from a category) is regularly used in clinical settings to diagnose individuals with memory impairments such Alzheimer's Disease (AD). Though the task is diagnostically useful, the cognitive mechanisms that lead to impairments on the task are unclear. Central to this debate is whether these deficits are chiefly due to degradation of an individual's semantic representation or failures in executive functioning. Recent work has shown that semantic fluency data can be modeled as a censored random walk over a semantic network. We invert this generative model to estimate network representations for individuals (Zemla & Austerweil, in press). Using a longitudinal corpus of fluency data from both healthy and AD patients, we estimate a semantic network representation for each individual and compare these representations between groups (healthy versus AD) to determine whether representational changes could account for deficits in the fluency task.
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6:00-7:30 PM (3164)

Mnemonic Learning of Phobias Bearing Unfamiliar and Familiar Prefixes: From Alektorophobia to Zoophobia. RUSSELL N. CARNEY, *Missouri State University*, JOEL R. LEVIN, *University of Arizona, Tucson*, KATHY M. WARNER, ALISON L. KIRCHHOFF, and ONA M. BRETCHES, *Missouri State University* – The mnemonic keyword method has been shown to be an effective way to facilitate second-language vocabulary acquisition, and more broadly to associate terms with their meanings. Yet, there are situations in which the keyword method is likely more helpful than others (e.g., when the terms per se are unfamiliar). To examine this, 54 undergraduates were randomly assigned to one of two study conditions: repetition (control) or keyword method. Following training, students used their respective strategies to study 24 phobias and their definitions. Half had familiar prefixes (e.g., zoophobia means fear of animals) and half had unfamiliar prefixes (alektorophobia means fear of chickens). The outcome measures were twelve-item immediate and delayed recall tests, as well as higher-order "categorization" and "symptom" tests. Across tests, students in the mnemonic condition generally displayed descriptive advantages over their repetition counterparts. However, only on the immediate "Unfamiliar Categorization" test was there a statistically significant mnemonic advantage (69.4% vs. 57.7%), which supports the notion that mnemonic strategies can facilitate higher-order learning. Our poster will discuss these findings in detail.
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6:00-7:30 PM (3165)

Can We Control the Prediction in Prediction Error? JUSTINE K. GREENAWAY and EVAN J. LIVESEY, *University of Sydney* (Sponsored by Evan Livesey) – Prediction error models propose that the strength of learning is determined by the discrepancy between the predicted and observed outcome. This is clearly illustrated in cue competition effects like blocking, where learning about a cue is impaired when it is presented with a cue that already reliably predicts the outcome. The predictions driving learning are assumed to be derived specifically from the associative history of presented cues. However, we can also derive overt predictions about events from other sources like reasoning or instruction. We investigated the relative contributions of associative memory and instruction to cue competition. We used explicit instructions to manipulate the relevance of prior learning, and measured both causal ratings and memory for specific cue-outcome associations. While causal judgments were sensitive to the instructions, associative memory was not, instead showing consistent deficits related to associative prediction error. These results have implications for understanding how prediction error modulates learning.
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6:00-7:30 PM (3166)

East-West Cultural Differences in Encoding Objects in Social Contexts. LIXIA YANG, *Ryerson University*, JUAN LI, *Chinese Academy of Sciences*, ANDREA WILKINSON and JULIA SPANIOL, *Ryerson University*, LYNN HASHER, *University of Toronto* – Using a memory task that requires forming socially meaningful object-context associations (i.e., rating objects against socially meaningful contexts), a recent work revealed a memory advantage favoring Chinese over Canadian Western participants for social contexts in which the objects were rated and studied (Yang et al., 2013). To examine whether the cultural difference also occurred at encoding (i.e., study) phase,

the current report analyzed rating performance at encoding and its relationship to the subsequent memory performance. The results showed that Chinese participants provided higher ratings, took longer time to rate, and formed more vivid imagery of encoding contexts relative to their Canadian counterparts. Furthermore, rating performance at encoding tends to predict context recognition status at retrieval, correlate with context memory, and most importantly contribute to the context memory advantage in Chinese relative to Canadian participants. These results suggest that Chinese participants may have been differentially more engaged in constructing meaningful object-context associations, which thus leads to their memory advantage for context.
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6:00-7:30 PM (3167)

The Relationship Between Preadolescent Children's Memory for Past Errors and Later Error Correction. ABBEY LOEHR, LISA FAZIO, and BETHANY RITTLE-JOHNSON, *Vanderbilt University* (Sponsored by Lisa Fazio) – Current evidence suggests that committing and correcting errors can be beneficial for learning. Further, adults' memory for errors they previously committed facilitates error correction. However, children's memory for past errors is likely limited, which may influence the relationship between memory for errors and error correction. In Study 1, preadolescent children studied and were tested on their memory for math definitions. After reviewing the correct answers, children recalled their initial test answers and took a final test. Children's memory for errors was poor. Although remembering a specific error did not facilitate error correction, better memory for errors was positively associated with greater error correction. In Study 2, some children were reminded of their past errors along with the correct answers. In two other conditions, children recalled their past errors or studied the correct answers only. Providing reminders of errors and recalling past errors reduced error correction relative to studying correct answers only, suggesting feedback that includes errors may interfere with children's learning. These findings suggest that there are potential constraints on when memory for errors aids learning.
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6:00-7:30 PM (3168)

What Controls Reminding: Contextual Associations and Detection of Change. NICHOLAS GRAY and COLLEEN KELLEY, *Florida State University* (Sponsored by Colleen Kelley) – Being reminded of an earlier experience by a later, changed experience can allow one to avoid interference between the similar experiences, and can even produce memory facilitation. Therefore, it is important to understand the determinants of reminding. We propose that reminding is triggered by the elements of the second experience that overlap with the first experience, which in the case of word pairs that are changed in an A-B, A-D design are the cue words. Do pre-experimental contextual associations of the cue word influence spontaneous reminding? We examined the effects of contextual variability of cue words on rates of being reminded of a first studied pair of words when later presented with a changed pair. Low contextual variability cue words were potent reminders of earlier pairs.
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6:00-7:30 PM (3169)

Contextual Similarity and Associative Recognition Memory. KEVIN P. DARBY and PER B. SEDERBERG, *University of Virginia* – How do we recognize associations between past events? One possibility is that associations are mediated by reinstatement of similar event contexts. In this work, we examine effects of contextual similarity on associative recognition with a task in which participants encoded pairs of objects and were later asked to discriminate between intact and recombined pairs. To estimate contextual similarity, we analyzed performance as a function of the lag (i.e., distance in the list) between items at encoding: shorter lags presumably result in more similar contexts, and hence may worsen test performance for recombined pairs. However, preliminary results revealed no effect of lag length. In order to quantify associative memory, we fit the data to a temporal context model that calculated the similarity of paired items' reinstated contexts, which inaccurately predicted a lag effect. These preliminary results provide some evidence against an associative mechanism mediated by contextual similarity. In future model simulations, we will examine other potential mechanisms, such as a recall-to-reject strategy and direct associations between items. Overall, these results suggest an exciting avenue of research on mechanisms of associative recognition.
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6:00-7:30 PM (3170)

The Common and Unique Influences of Encoding Information Within a Spatial and Non-Spatial Context on Temporal Memory. SIGNY SHELDON, *McGill University* – Episodic memory involves linking items to a context. Research suggests that item memory is improved when learning occurs within a spatial context. Here, we test whether this improvement is selective for spatial information. Participants learned item sequences within a spatial, a conceptual or with no context. Then, participants made recency judgments, answering 'which came first?', to item pairs from the studied sequences. We presented these pairs on a computer screen either consistently with the study sequence (i.e., the first studied item was presented on the left side of the screen and the second item on the right side of the screen) or inconsistently with the study sequence to test how the encoding context affected the use a theorized left-right mental spatial timeline to learn item order. We found that both the spatial and conceptual contexts improved recency judgments, but the benefit of presenting pairs consistently versus inconsistently with the study sequence was only present for the conceptual context condition. These data highlight the conditions in which context affects temporal memory for items and contribute to current understandings of episodic memory mechanisms.
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6:00-7:30 PM (3171)

Associations Between Language Proficiency and Cognitive Control in Children: The Application of a Drift-Diffusion Model. KLARA MARTON and LUCA CAMPANELLI, *City University of New York* – Despite years of intensive research on cognitive control in bilingual children, the research community is still divided about the existence of a bilingual advantage. A common question is whether bilingual speakers perform faster and more efficiently in cognitive control tasks than monolinguals and if so, then why. We examined this question with a conflict paradigm measuring proactive interference in 8-12-year old children (N= 55) who exhibited a wide range of language proficiency in their non-English languages. The results from Multilevel Mixed-effects modeling revealed significant interactions between language proficiency and interference control. Highly proficient children resisted interference from previous memory traces more efficiently than their low-proficient and monolingual peers. Further analyses using a drift-diffusion model suggest that the aspect of task performance in which highly proficient bilingual children differ from their peers is the drift rate. Our results provide evidence for the following: 1. Higher bilingual language proficiency contributes significantly to more efficient cognitive control; 2. Bilingual children's processing advantage derives from faster accumulation rate of sensory evidence.
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6:00-7:30 PM (3172)

Reward Learning Interacts with Visual Statistical Learning. SU HYOUN PARK, LEELAND L. ROGERS, and TIMOTHY J. VICKERY, *University of Delaware* (Sponsored by Timothy Vickery) – We examined interactions between reinforcement learning and visual statistical learning (VSL). Subjects completed a gambling task in which they learned the values of individual faces and scenes. Images were either "high value" (75% chance of a win), or "low value" (25% chance of a win). Unbeknownst to participants, we paired items so that some images always predicted other images on the following trial. This led to four types of pairings (High-High, High-Low, Low-High, and Low-Low). In a surprise recognition task, we asked them to choose the more familiar of two pairs (a target and a foil). We found that low-reward images followed by high-reward images (Low-High) were recognized at lower rates than other combinations, particularly in cases that paired two items from different categories. Our work suggests reward contingencies affect VSL, and that the order of reward association within a set may play a key role in this effect.
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6:00-7:30 PM (3173)

The Roles of Testing and Prior Knowledge in Updating After a Reminder. WYATT G. SMITH and PETER F. DELANEY, *University of North Carolina at Greensboro* (Presented by Peter F. Delaney) – Updating often involves incorporating recently-learned (newer) information into earlier-learned (older) information. Furthermore, updating can occur after being reminded of the older information either with a test or by restudying. Earlier studies suggest that testing and restudying have different consequences for updating with incorporation. However, little is known about the role prior knowledge plays in this type of updating. Prior knowledge can be helpful when it supports linkages, or harmful when it competes with linkages. We report a series of experiments in which people updated a word pair (e.g., dog-spoon) into a word trio (e.g., dog-spoon-mulch). We varied whether the association between each pair of items was high or low, and whether strongly-related competitors appeared elsewhere on the list. The relative effectiveness of updating reflected an interaction between the type of reminder (test or restudy) and the pattern of word associations.
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6:00-7:30 PM (3174)

Eye Movements to Blank Spaces Occur Independently of How Well Information Is Learned, but the Test Format Matters. AGNES SCHOLZ and BETTINA VON HELVERSEN, *University of Zurich* – When retrieving information from memory that has been associated with spatial locations during encoding, people look back at the emptied spatial locations. Several studies have demonstrated this so-called „looking at nothing "-phenomenon (LAN). In this study, we now systematically investigated the interaction of the phenomenon with the accessibility of information stored in memory and with the presentation format during testing. Participants repeatedly decided upon inviting candidates for job interviews in a memory-based multi-attribute inference task. Therefore, they were first presented with cue information about four exemplar training candidates. LAN occurs both, when exemplars were learned by heart and when they were presented ten times on screen. However, when visually presenting test items without removing them from screen, LAN could not be observed. The results shed light on the interaction between visuospatial attention and attention to information held in memory as well as on the interaction of eye movements and multisensory input.
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6:00-7:30 PM (3175)

Factors Influencing Incidental Category Learning. CASEY L. ROARK (Graduate Travel Award Recipient) and MATT I. LEHET, *Carnegie Mellon University*, FREDERIC DICK, *University College London*, LORI L. HOLT, *Carnegie Mellon University* (Sponsored by Lori Holt) – Category learning is typically studied by instructing participants to make overt categorization decisions with explicit feedback, or by exposing participants to exemplars in an unsupervised fashion. However, it is also possible to learn categories incidentally when exemplars align with behaviorally-significant actions and events in an ostensibly distinct task. Incidental category learning may capture aspects of learning in which organisms are actively engaged in environments with rich multimodal regularities. Here, we examined the factors driving incidental category learning. Participants reported the location or color of a visual target preceded by exemplars drawn from a novel sound category. Incidental category learning, as measured by both covert reaction time measures and an overt labeling task testing generalization, emerged when the auditory categories were associated with unique motor responses in the visual

detection task. Association of sound categories with unique spatial locations irrelevant for motor response was not sufficient to drive incidental learning.
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METAMEMORY I

6:00-7:30 PM (3176)

Can Older Adults Flexibly Adapt Encoding to the Expected Memory-Test Format? Evidence From Expecting Free Versus Cued Recall. BEATRICE G. KUHLMANN, *University of Mannheim* – To optimize memory performance, one should adapt encoding to the test format. Finley and Benjamin (2012) found that younger adults adapted different encoding strategies depending on whether they expected free or cued recall, resulting in better performance on the expected format. Given their poorer memory, adapting to test format is particularly important for older adults. However, age-related deficits in inhibition and metacognitive control may hamper their ability to flexibly adapt encoding. In this experiment, 48 younger (18-27 years) and 48 older (60-85 years) adults were randomly assigned to expect and practice free or cued recall. Finally, all participants were tested with both formats (free then cued) and were queried on encoding strategies. Replicating Finley and Benjamin, younger adults showed both qualitative changes in encoding strategies and better performance on the expected format. This disordinal interaction was also evident in older adults' memory performance but to a lesser extent such that age-group differences on both formats were more pronounced when it was the expected format. Although older adults adopted test-format optimal encoding strategies, they used them less intensively than younger adults.
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6:00-7:30 PM (3177)

How Do Stimulus Difficulty and Amount of Temporal Delay Impact Judgments of Learning Made by Younger and Older Adults? EMILY L. ONKEN and JARROD C. HINES, *University of Wisconsin, Eau Claire* – Delayed judgments of learning (JOLs) are superior to those made immediately following study (e.g., Rhodes & Tauber, 2011). However, prior studies have generally only compared immediate JOLs to those made after a considerable delay (e.g., minutes or days). The current experiment is a more fine-grained investigation of JOLs made within the first minute following study. Online samples of both younger (18-25 years of age) and older adults (60-70 years of age) will be compared in terms of performance in a paired-associates learning task. Participants will generate JOLs after a 0s, 20s, 40s, or 60s delay following study of normatively easy, moderately-difficult, or difficult word pairs (both IVs within-subjects). JOL accuracy is anticipated to increase with increased delay for difficult but not easy items, with accuracy for moderately-difficult items falling in-between. We also anticipate similar metacognitive accuracy for both age groups. Even brief delays are expected to impact JOL quality.
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6:00-7:30 PM (3178)

How Do Students Regulate Their Learning of Emotional Information? AMBER E. WITHERBY and SARAH "UMA" TAUBER, *Texas Christian University* – The emotional salience effect on JOLs refers to the finding that people often give higher judgments of learning (JOLs) to emotional relative to neutral information. Although this effect has been demonstrated numerous times, researchers have yet to evaluate how students use JOLs to regulate their learning of emotional information. This was the goal of the present research. In a series of experiments, students made study decisions when learning items that were positive, negative, or neutral, and made a JOL for each. Following study, students took a free-recall test. JOLs and recall were higher for emotional (positive and negative) relative to neutral items. However, students' study decisions did not consistently discriminate between emotional and neutral items. Thus, although students were aware that neutral items were more challenging to learn relative to emotional items, they did not always use this knowledge to strategically regulate their learning.
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6:00-7:30 PM (3179)

Effects of Emotional Cue Words on Memory of Neutral Target Word and Memory Monitoring. TSUYOSHI YAMAGUCHI, *Nippon Institute of Technology*, YOSHIFUMI TAKAHASHI and RYOSUKE KANEKO, *Hosei University* – Several studies have examined the effects of emotions on memory and memory judgment by word pairs. However, they used the same valence (i.e., negative-negative, positive-positive, and neutral-neutral pairs) or arousal level for target and cue words. Therefore, the distorting effect of emotional stimuli on memory judgment of neutral stimulation is unclear. Thus, this study aimed to clarify whether memory judgment of neutral stimulation is overestimated when emotional and neutral stimuli are presented simultaneously (e.g., negative cue word and neutral target word). Results showed, when emotional words were presented simultaneously, the memory judgment of the target rather than neutral word was overestimated. Therefore, results suggest that attention to emotional stimulation distorts memory decision for the target.
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6:00-7:30 PM (3180)

Pupil Dilation Suggests a Role of Autonomic Arousal in Tip-of-the-Tongue State Phenomenology. ANTHONY J. RYALS, BROOKE L. REYNOLDS, and CHELSI L. PATTON, *University of North Texas*, ANNE M. CLEARY, *Colorado State University* (Presented by Brooke L. Reynolds) – A wealth of previous research suggests that the Tip-of-the-Tongue (TOT) phenomenon depends critically on an intense subjective feeling when initial retrieval of a target in memory fails. We hypothesized that this subjective state is related to autonomic arousal, which may serve to signal a continued memory search for the sought-after information. No empirical research to date has directly tested whether or how psychophysiological arousal relates to TOT states. We tested 57 young adults using a semantic TOT-induction paradigm while simultaneously

tracking eye movements and pupillary responsivity. Supporting our hypothesis, among instances in which target retrieval failed, individuals displayed significantly increased pupil dilation during TOT states relative to non-TOT states. No differences in pupil dilation were observed among TOT vs. non-TOT reports when answers were correctly retrieved. These results present a significant step toward understanding the phenomenological experience of TOT states and the potential role of emotion in these subjective states.
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6:00-7:30 PM (3181)

Searching for Answers: Metacognition and the Internet. EMMALINE E. DREW and ELIZABETH J. MARSH, *Duke University* (Presented by Elizabeth J. Marsh) – Previous work has shown that searching for answers online leads to inflated estimates of general knowledge (Fisher et al., 2015) and that recent internet searching increases future internet searching (Storm et al., 2017). In this study, participants were asked to rate how well they could explain the answers to questions (e.g., Why are there leap years?). Before rating their explanatory ability for each question, participants in the search condition searched online for a prespecified website that answered the question, participants in the read condition were given the same explanation text from the website to read, and control participants did not search or read any outside sources. Critically, participants who searched online thought they could explain the answers to these questions better than participants who were given the article to read – even though both groups read the same explanation text. These results suggest that searching for information online has important metacognitive consequences.
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6:00-7:30 PM (3182)

Development of the Situated Metacognitive Awareness of Reading Task Strategies Scale (SMARTS). RYAN D. KOPATICH, DANIEL FELLER, ALECIA SANTUZZI, and KARYN HIGGS, *Northern Illinois University* – Measurement of reading strategies often relies on retrospective self-report measures without a defined context. To improve precision in a reading context, we developed a pool of 103 items that are situated in a reading task and accommodate a variety of contexts (e.g., science or narrative). Each item was accompanied by a five-point ordinal response scale. Respondents (N = 604) read a text and completed a random set of 70 items from the pool. Polytomous IRT with a Graded Response Model (GRM) was used to evaluate item quality. We identified 64 items with acceptable discrimination. Response category threshold values confirmed that most items discriminated among respondents with low levels of metacognitive awareness at the low end of the response scale, and respondents with high levels of awareness were differentiated best at the high end of the response scale. Item and test information across contexts will be discussed.
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6:00-7:30 PM (3183)

Semantic Network Structure and Level of Processing: Implicit and Explicit Representations Influence Recall and Recognition of Items Studied in the Presence of Categorically-Related Words. NICHOL CASTRO, TAYLOR CURLEY, and CHRISTOPHER HERTZOG, *Georgia Institute of Technology* – We examined the influence of implicit and explicit representations on recall and recognition. Implicit representations include semantic network structure and explicit representations include episodic encoding strategies (Nelson, McKinney, Gee, & Janczura, 1998). Participants viewed 40-items (4 nouns from a taxonomic category, one designated as target). Participants generated features for the target under shared or distinctive orienting instructions. After a 7-day delay, participants performed recall cued by the category label, gave a FOK rating, and then completed a forced-choice recognition task (target with other category exemplars) with a confidence judgment. Multilevel regression models tested the effects of implicit (degree, clustering, and typicality of words) and explicit (processing condition) representations on these memory processes. An interaction between implicit and explicit representations was found for correct recall, but not correct recognition. Examination of FOKs, confidence judgments, and high confidence false alarms support varying influences of implicit and explicit representations on metamemory and memory.
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6:00-7:30 PM (3184)

When Memory and Metamemory Align: How Processes at Encoding Influence Delayed Judgments of Learning. AYANNA KIM THOMAS and GREGORY ISAAC HUGHES, *Tufts University* (Presented by Gregory Isaac Hughes) (Sponsored by Ayanna Thomas) – Judgments of learning (JOL) are most accurate when delayed from encoding of the assessed material. We tested the hypothesis that processes at encoding affect delayed-JOL accuracy by influencing the accessibility of cues stored in long-term memory. In a single experiment, we measured the delayed-JOL accuracy of participants who encoded unrelated and weakly-related word pairs either by passive reading (study practice), generating keywords (elaborative encoding), or reading pairs once and taking a cued-recall test with feedback (retrieval practice). We also measured accessibility of two cues at the time of the JOL: criterial cues (the targets), and (b) non-criterial cues (contextual details pertaining to encoding of the targets). For unrelated pairs, delayed-JOL accuracy did not vary across groups. For weakly-related pairs, retrieval practice led to higher delayed-JOL accuracy than study practice. Differences in delayed-JOL accuracy between groups was explained by differences in accessibility of criterial, and not non-criterial, cues.
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6:00-7:30 PM (3185)

Examining Metacognitive Behaviors During an Associative Recognition Memory Task. MARIO E. DOYLE and WILLIAM E. HOCKLEY, *Wilfrid Laurier University* (Sponsored by William Hockley) – The purpose of this study was to examine

how accurately people can monitor and control their associative memory. In Experiment 1 participants studied a list of word pairs of various associative strength. Judgments of learning (JOLs) and study time were recorded during study, while confidence judgments (CJs) and response time were recorded during the yes/no associative recognition test. Experiments 2 and 3 replicated the first Experiment while introducing a second study-test block and feedback, respectively. Overall the results indicated that compared to weakly or unrelated pairs, highly related pairs had higher hit rates but also higher false alarm rates (concordant effect) and no differences in discriminability (d'). Highly related pairs also had higher JOLs and CJs, but lower study time and reaction time at test compared to weakly or unrelated pairs. No significant changes were found when a second study-test block (Experiment 2) or when feedback was introduced (Experiment 3). Future research will attempt to extend these findings to a different stimulus manipulation (concrete vs abstract words) and explore the metacognitive measures further (e.g., comparing immediate vs delayed JOLs).
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6:00-7:30 PM (3186)

How Warnings Affect Eyewitness Memory in the Presence of Misinformation. ALIA N. WULFF, *Tufts University*, JESSICA KARANIAN, *John Jay School of Criminal Justice*, ELIZABETH RACE and AYANNA K. THOMAS, *Tufts University* – The misinformation effect occurs when information presented to an individual after an event impairs their original memory. The goal of the present research was to examine whether memory (final test performance) and metamemory (confidence-accuracy relationship) in the misinformation paradigm would improve when warnings and multiple tests were introduced. Participants were given a warning before or after post-event information and an initial test of memory immediately following the event or no initial test. Initial testing resulted in a greater misinformation effect than no initial testing, replicating retrieval enhanced suggestibility (RES). Additionally, warnings improved accuracy on the final test and strengthened the confidence/accuracy relationship. These data suggest that warnings may encourage source monitoring, which can improve individuals' ability to identify where they learned information, as well as influence the relationship between confidence and accuracy. Warnings may improve the memory and metamemory by encouraging individuals to more carefully examine contextual cues.
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6:00-7:30 PM (3187)

JOL Reactivity Depends on the Type of Test. SARAH J. MYERS and MATTHEW G. RHODES, *Colorado State University* (Sponsored by Matthew Rhodes) – JOL reactivity refers to the finding that making a judgment of learning (JOL) during study can change participants' memory for the studied material. Soderstrom et al. (2015) posited that JOL reactivity occurs when tests are sensitive to the cues that inform JOLs. We examined JOL reactivity for tests that should be sensitive to cues that inform JOLs (i.e., cued recall) and tests that should be less sensitive (i.e., free recall and recognition). JOL reactivity was found on a cued recall but not free recall test (Experiment 1). Surprisingly, reactivity was found on a recognition test (Experiment 2), potentially because JOLs foster encoding of recollective details that support later recognition performance (Experiment 3). These findings provide evidence that JOLs influence later memory under certain circumstances. Thus, JOL reactivity must be accounted for in future research.
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6:00-7:30 PM (3188)

Incidental vs. Intentional Memory for the Source of News Stories. KAREN J. MITCHELL, WILLIAM BORDA, KASEY DOUGHERTY, JOSEPH GRILLO, and MICHAEL MULLER, *West Chester University of Pennsylvania* – Using an incidental memory test, we previously showed a stereotype bias in source memory for news stories. Stories with headlines such as "Tentative deal is reached to raise taxes on the wealthy" were likely to be attributed to the more typical source The New York Times, even though participants were told the story came from Buzzfeed, and conversely stories like "Olympic diver covers 'single ladies'" were attributed to Buzzfeed, even though the story came from The New York Times. In the current study, we investigated the impact of attention on these stereotype-driven errors by comparing, between groups, source memory performance on an incidental vs intentional test. Consistent with the idea that stereotypes create strong biases in source memory, the rate of stereotype-consistent misattribution errors was the same in the two conditions. Mechanisms underlying these source memory errors, and possible reasons for the lack of an attentional effect, will be discussed.
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6:00-7:30 PM (3189)

Is Knowledge About Cue Effectiveness Necessary for Judgments of Learning to Influence Memory? MICHELLE L. RIVERS, JESSICA L. JANES, and JOHN DUNLOSKY, *Kent State University* – Participants (N = 128) studied two lists of word pairs, with half of each list presented with category cues (A type of gem: Jade) and the other half presented with letter cues (Ja: Jade). Half of the participants made judgments of learning (JOLs) during pair presentation. After studying the first list, all participants completed a cued-recall test, then followed the same procedure for a second list. Participants' JOLs updated across lists to reflect the recall advantage found for pairs presented with category versus letter cues. Extending on prior work investigating JOL reactivity, we found that when learners made JOLs, they focused on learning items they perceived as easier: Recall was higher for judged versus nonjudged pairs, but only for pairs presented with a category cue. Results suggest knowledge about cue effectiveness is necessary for JOLs to have a reactive effect on subsequent memory performance.
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6:00-7:30 PM (3190)

Remembering and Knowing: Empirical Consensus and Disagreement Between Participants and Researchers. SHARDA UMANATH, *Claremont McKenna College*, JEN COANE, COLE WALSH, and YI-PEI LO, *Colby College* – The Remember/Know paradigm has been a standard tool

used to probe the phenomenology of participants' memorial experiences. This paradigm has not been without its problems and has been used to capture many phenomenological experiences including retrieval from episodic versus semantic memory, recollection versus familiarity, confidence, etc. In fact, the paradigm has been used primarily to discriminate between recollection and familiarity. We examined how memory experts, other cognitive experts, psychology experts in non-cognitive areas, and lay participants (MTurk workers) define what it means to say, "I remember" and "I know." Lay participants did not see eye to eye with memory experts when it came to associating "remember" with recollection and "know" with familiarity, barely referencing these concepts. However, consistent with Tulving's original proposal for the use of these terms, all groups associated remembering almost exclusively with retrieval from episodic memory and knowing almost exclusively with retrieval from semantic memory.
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6:00-7:30 PM (3191)

Relationship Between Memory Judgment and Memory Performance for Emotional Words of Depressed Person. YOSHIFUMI TAKAHASHI, *Hosei University* (Sponsored by Tetsuya Fujita) – Many research revealed that memory judgment of negative items are overestimated recall possibility, but the results are not consistent for each previous study（e.g., Hourihan et al., 2017; Zimmerman & Kelly, 2010). As an individual difference factor overestimating the recall possibility for negative items, depression-specific cognitive bias may be considered. Therefore, the purpose of this study was to detect the difference between memory judgment and memory performance when presenting emotional words for depressed person. In Experiment 1, we conducted EOL that only makes judgments on items for negative and neutral words. In Experiment 2, participants were asked JOL for not only memory judgment on items but also judgment on their own memorization. As a result, depressed people overestimated recall possibilities for negative words when conducted JOL than EOL. Therefore, it was suggested that non-analytical processing is involved in the owner's memorization for overestimation of recall possibility for emotional stimuli.
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6:00-7:30 PM (3192)

Search Fluency as a Misleading Measure of Memory. SEAN M. STONE and BENJAMIN C. STORM, *University of California, Santa Cruz* (Sponsored by Benjamin Storm) – Retrieval fluency has been shown to affect the metacognitive judgments people make about their memory. In a study by Benjamin, Bjork, and Schwartz (1998), for example, participants predicted they would be better able to recall the answers to questions they retrieved more quickly than the answers to questions they retrieved more slowly, despite actual performance going in the opposite direction. In the present study we examined the effects of retrieval fluency in the context of the Internet. Preliminary data suggest an analogous pattern of results, with participants misattributing the time it takes to find information online as being a predictor of the likelihood of actually being able to recall that information from memory. This finding suggests that the metacognitive effects of retrieval fluency extend beyond the context of one's own memory to also encompass the way in which people interact with transactive memory partners like the Internet.
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6:00-7:30 PM (3193)

Beliefs or Fluency: Comparison of the Mechanisms Underlying Higher Memory Predictions for Perceptually Fluent Object Images. MIRI BESKEN, *Bilkent University* – Research has typically shown that perceptually fluent stimuli produce higher judgments of learning (=JOLs) than perceptually disfluent stimuli. This finding is explained by either online difficulties during the encoding of disfluent stimuli or by a priori beliefs about the ongoing task. In the current study, objects images were presented to participants in three conditions in a within subjects design: intact, half and fragmented presentation. Participants were asked to identify the objects as quickly as they can and produce JOLs for each item. This was followed by a free-recall test for object names. Participants identified the fragmented objects significantly slower than the other two conditions. However, they produced the lowest JOLs for half-presented objects. Hence, identification latencies did not correlate with JOLs linearly. The lack of a linear relationship between objective measures of perceptual fluency and JOLs refutes the notion of a direct link between online difficulties and memory predictions.
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6:00-7:30 PM (3194)

Strategic Asking for Help in Question Answering. MONIKA UNDORF, *University of Mannheim*, IRIS LIVE and RAKEFET ACKERMAN, *Technion - Israel Institute of Technology* – People generally strive to provide correct and informative answers to knowledge questions. Up to now, research on metacognition has explored two strategies people use to achieve high accuracy: withholding answers for which people have low subjective confidence and adjusting the preciseness of answers until people are reasonably confident in their answers. Both strategies, however, come at the expense of informativeness. Help seeking could potentially increase the correctness of answers while, at the same time, maintaining high informativeness. In three experiments, we compared the relationship between confidence and strategy use across conditions where participants had the option (a) to seek help or (b) to withhold answers. Results revealed that help seeking was associated with subjective confidence, but less strongly than withholding answers. This pattern held regardless of whether only one strategy or both strategies were available to participants. Together, our findings indicate that people use help seeking to strategically control their memory and suggest that subjective confidence provides one basis for help seeking.
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6:00-7:30 PM (3195)

Why Don't We Learn What We DO Know? Metacognition and the Perceptual Interference Effect. ALLISON M. WILCK, JENNIFER M. MARTIN, and JEANETTE ALTARRIBA, *University at Albany, State University of New York* (Sponsored by Jeanette Altarriba) – The perceptual interference effect proposes that individuals demonstrate an unexpected boost in memory for words presented in a perceptually disfluent format. However, individuals are inaccurate at judging their own learning of the words (Besken & Mulligan, 2013; Sungkhasettee et al., 2011). A series of experiments was conducted to investigate the metacognitive implications of the perceptual interference effects on judgements of learning by 1) measuring the effect of naïve theories of intelligence (Dweck, 1999), 2) observing the impact of practice, and 3) manipulating the specificity of feedback. Participants read aloud words displayed at varying durations and provided a JOL for each. A recognition test containing trial-by-trial feedback concluded each block. The feedback became more comprehensive across experiments. Results indicated that participants had a challenging time incorporating feedback into JOLs in later blocks. Furthermore, calibration of JOLs was not moderated by participants' perceptions of the malleability of intelligence. Future research should continue to investigate potential individual differences that may enhance one's ability to calibrate JOLs in the perceptual interference effect.
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6:00-7:30 PM (3196)

Agreement May Overshadow Emotion: Predicting Memory for Emotional Words. ETHAN FLURRY and DEBORAH K. EAKIN, *Mississippi State University* – Koriat (1995) demonstrated that FOKs are influenced by multiple cues by showing that FOKs based on both accessibility and fluency were accurate. Hertzog and colleagues showed that people could attend to multiple cues, including concreteness and item repetition (Hertzog et al., 2014). The goal of the present study was to determine whether adding an additional cue could improve JOL accuracy at predicting free recall of emotional words. JOLs are typically relatively accurate for these words, but emotional valence has been shown to overshadow other cues that could improve accuracy (Flurry & Eakin, 2018). The current study manipulated emotional valence (positive/neutral) and agreement level (agree more/agree less) to statements about the emotional words. Agreement overshadowed emotional valence, leading to accurate JOLs for agree-more statements. However, reliance on emotional valence contributed to JOL accuracy for agree-less statements. The findings will inform metamemory theories regarding multiple cue use.
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6:00-7:30 PM (3197)

Examining the Font Size Effect in Semantically-Related STEM Words. HILLARY ERWIN, LISA MATSUYAMA, PAYNE WINSTON, MARIAH EACRETT, and MICHELE TJARKS, *The University of Alabama in Huntsville* (Sponsored by Jodi Price) – Prior research suggests that individuals perceive words presented in large fonts as more memorable than words presented in small fonts, despite font size typically having no influence on memory performance. This discrepancy between predicted and actual memory performance is called the font size effect (Rhodes & Castel, 2008). A previous study in our lab that required participants to read STEM paragraphs found no impact of font size on judgments of learning (JOLs; i.e., subjective ratings regarding whether information will be remembered), or reading comprehension. We selected keywords from the previous study paragraphs to test whether JOLs and recall performance would differ when studying STEM words in small/large fonts instead of reading entire paragraphs in mixed font sizes. The present study found no impact of font size on JOLs or recall performance. This suggests the font size effect does not extend to semantically-related words presented in small and large fonts.
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6:00-7:30 PM (3198)

Multisensory Information Enhances Perception: What Happens to Memory and Metamemory? JOSHUA R. TATZ, *American University*, MONIKA UNDORF, *University of Mannheim*, ZEHRA F. PEYNIRCIOGLU, *American University* (Sponsored by Zehra Peynircioglu) – Judgment of learning (JOL) literature has recently focused on perceptual fluency and belief accounts (e.g., Mueller, Dunlosky, Tauber, & Rhodes, 2014). Multisensory information can also add to this debate through the consideration of inverse effectiveness, the idea that multisensory presentations benefit perception more when the contributing senses are less reliable. Two experiments investigated the impact of multisensory information to perceptual fluency, JOLs, and recall performance. Experiment 1 varied the presence or absence of spoken words against written words in several font sizes. Experiment 2 varied the presence or absence of lip movements against spoken words in three background noise levels. Whereas fluency measures followed predictions from inverse effectiveness, additional sensory cues increased JOLs similarly across all font sizes (or noise levels). JOLs were not entirely consistent with recall patterns, either. These findings support the belief account of JOLs and underscore the importance of saliency (Castel, 2008) in belief formation.
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PROSPECTIVE MEMORY

6:00-7:30 PM (3199)

Comparing Metacognition During Retrospective and Prospective Memory: Insights From the Underconfidence With Practice Effect. JOHN T. WEST and NEIL W. MULLIGAN, *University of North Carolina* (Sponsored by Neil Mulligan) – In multitrial learning situations, practice causes people to become relatively underconfident in their memory (Koriat, Sheffer, & Ma'ayan, 2002). While the Underconfidence with Practice (UWP) effect is well-established in retrospective memory research, the present study tested whether this effect generalizes to prospective memory (PM). Participants predicted their ability to recognize targets and recall responses embedded within a lexical decision task, performed the task, and repeated this procedure twice. In Experiment 1 participants

made judgments of learning (JOLs) with both the targets and responses onscreen, whereas in Experiment 2 participants made JOLs with only the targets onscreen. In Experiment 3 separate groups predicted their ability to recognize targets and recall responses. Taken together, these results suggest that as with retrospective memory, people become underconfident in their PM following practice. The extension of the UWP effect to PM suggests that prospective metamemory and retrospective metamemory may operate according to similar principles.
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6:00-7:30 PM (3200)

Prospective-Memory Associated Attentional Decoupling Is Context Dependent. JAN RUMMEL, *Heidelberg University*, JASON L. HICKS, *Louisiana State University*, BEATRICE G. KUHLMANN, *University of Mannheim* – Prospective memory (PM) denotes the ability to remember executing an intention in the future. Holding a PM intention has been shown to increase attentional decoupling from other ongoing tasks and this may be adaptive (Cohen, 2013; Rummel, Smeekens, & Kane, 2017). That is, PM-related thoughts occurring during an ongoing task may help to not forget one's intentions. However, to be truly adaptive, PM thoughts should primarily occur in situations where intention execution opportunities are likely. In two experiments, participants formed the intention to respond to animal names (PM cues) with a special response while performing an ongoing task. In Experiment 1, the intention was suspended during a first task phase during which participants were sometimes probed on their thoughts. Few PM thoughts were reported unless PM cues occurred in this phase. In Experiment 2, the font color of non-target ongoing task stimuli was varied block-wise and PM targets only occurred in a specific color. Thought reports showed that participants informed about the intention–font-color association experienced fewer PM thoughts in blocks of the PM-irrelevant color. Results speak to which adaptive strategies people use to remember to remember.
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6:00-7:30 PM (3201)

Age-Related Decline in Prospective Memory Consolidation Is Mediated by REM Sleep. CHENLU GAO, LYNAE ROBERTS, and PAUL FILLMORE, *Baylor University*, DONALD L. BLIWISE, *Emory University*, MICHAEL K. SCULLIN, *Baylor University* (Sponsored by Michael Scullin) – Prospective memory (PM) is memory for executing future intentions. Sleep benefits PM consolidation, but it is unclear whether age-related changes in sleep architecture compromise PM consolidation. Seventy-six adults aged 18-85 encoded a laboratory-based focal PM task (e.g., press the Q key when seeing the word "table") or a control task (e.g., recognize the word "table") in the evening. The next morning, we measured participants' PM performance. PM consolidation declined with increasing age, r=.32, p=.005, to the degree that REM sleep declined, r=.44, p<.001. Mediation analyses demonstrated that REM sleep mediated 56% of the age-related effect on PM. Response time analyses supported the Dynamic Multiprocess Framework's prediction of transient reliance on monitoring with some retrievals occurring spontaneously. Therefore, REM sleep seems to strengthen cue—intention associations rather than increase motivation or attention allocation. Future research should investigate whether behavioral or pharmacological interventions that augment REM sleep improve PM in older adults. Support: Sleep Research Society Early Career Development Award.
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6:00-7:30 PM (3202)

Prospective Memory Under Acute Stress: The Role of (Output) Monitoring and Ongoing-Task Demands. MARCUS MÖSCHL, MORITZ WALSER, CAROLINE SURREY, and ROBERT MILLER, *Technische Universität Dresden* (Sponsored by Rico Fischer) – In everyday life we often postpone intended actions (prospective memory) while performing ongoing tasks in stressful situations. While acute stress does not seem to impair intention retrieval, its effects on memory for past actions (output monitoring) and the role of ongoing-task demands in this are unknown. To test this, eighty healthy participants performed nonfocal event-based prospective-memory tasks during low- and high-demanding ongoing n-back tasks after undergoing the Maastricht Acute Stress Test or a standardized control treatment. Independent of ongoing-task demands, acute stress did not alter intention retrieval or output monitoring. Instead, acute stress substantially reduced performance costs of monitoring for prospective-memory cues, replicating previous work. We conclude that when identifying prospective-memory cues is hard, acute stress can increase the efficiency of monitoring for prospective-memory cues via changes in decision making, visual-sensory processes or a shift towards more automatic processing in prospective memory.
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6:00-7:30 PM (3203)

Examining the Role of Incentives and Cognitive Demands on Event-Based Prospective Memory. GABRIEL I. COOK, *Claremont McKenna College*, JAN RUMMEL, *University of Heidelberg*, LUKAS KLAPATCH, *Claremont Graduate University*, JOSHUA LOPEZ and SANTIAGO DAVID, *Claremont McKenna College* – For two decades, research has investigated the conditions under which executive control influences event-based prospective memory (PM). In their seminal article, Marsh and Hicks (1998) demonstrated that when compared to low concurrent demands, high concurrent demands placed on central-executive resources impair event-based PM. More recently, Cook et al. (2015) made the argument that value-added intentions, or intentions associated with incentives or rewards, may be performed more spontaneously or relatively free of conscious attentional resources. We empirically test the later claim by comparing traditional event-based intentions with those incentivized with monetary rewards under concurrent demand conditions of both full attention and divided attention using a random-number generation task. We further examine whether the demands placed on the central executive produce executive-depletion effects on PM in a subsequent task with the goal of understanding whether value-added intentions mitigate or exacerbate depletion effects.

Results are discussed in terms of executive functioning and monitoring, which are processed thought to be critical for fulfilling non-focal event-based intentions.
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6:00-7:30 PM (3204)

Response Sequencing and Response Mapping Influence Prospective Memory Commission Errors. SAMANTHA N. SPITLER and JASON L. HICKS, *Louisiana State University*, ANNA-LISA COHEN, *Yeshiva University* – Participants were given a focal PM intention to fulfill while engaged in an ongoing lexical decision task. Intentions were active in the first block of trials and cancelled in a second block. In the first experiment, a 2 x 2 between-subjects design was used with PM targets in the active phase or not (present vs. absent) and using a task-switch or dual-task response to PM targets. In contrast to prior work, the dual-task response was reversed where participants made their PM response first, followed by their ongoing task response. Although PM accuracy was similar in the present task-switch and dual-task conditions, we found that a small percentage of participants made at least one commission error in the present/dual-task condition. Consistent with prior work, commission errors were highest in the absent/task-switch response condition. In a second experiment, we changed the location of the lexical decision and PM response keys so that the responses were next to each other and participants could only use one hand. The percentage of participants that made a commission error was significantly higher than what we have found previously across all four conditions, suggesting that ease of making the PM response influences errors.
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6:00-7:30 PM (3205)

Hey Buddy, Why Don't We Take It Outside: An ESM Study of Prospective Memory. FRANCIS T. ANDERSON and MARK A. MCDANIEL, *Washington University in St. Louis* (Sponsored by Gilles Einstein) – Relatively little research has focused on how prospective memory (PM) operates outside of the laboratory, partially due to the methodological problems presented by naturalistic memory research in general and by the unique challenges of PM in particular. Experience sampling methods (ESM) offer a fruitful avenue for this type of research, as recent work from Gardner and Ascoli (2015) has shown. The present study sought to replicate and extend Gardner and Ascoli's findings by estimating participants' past, present, and future orientation of thoughts. More critically, however, we partitioned future thinking to separately estimate PM thoughts. In two studies, we replicated our own findings and those reported by Gardner and Ascoli. To summarize, people think about the future more often than the past (30% compared to 13%), and PM occupies our thoughts approximately 13-15% of the time. Of those PM thoughts, participants reported that 61% were internally cued, rather than externally triggered. These results support claims made by some researchers that our memory systems are forward-looking (Klein, 2013). We also found that PM thoughts were more likely alone than with people, earlier in the day, and by anxiously neurotic individuals.
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6:00-7:30 PM (3206)

Predicting Social Behaviors: Do We Remember Better When We're Wrong? ANDREA N. FRANKENSTEIN, MATTHEW P. MCCURDY, ALLISON M. SKLENAR, and ERIC D. LESHIKAR, *University of Illinois at Chicago* (Sponsored by Laura Matzen) – Prior work suggests that individuals use their memories adaptively by using the contents to predict future events. Little work has investigated whether the outcomes of those predictions influence subsequent memory for social behaviors. In this experiment, participants learned trait information about social targets and made predictions about those targets' future behaviors. Participants were then told the behavior the social target engaged in, with half of the behaviors consistent with previously learned trait information and the other half inconsistent. We predicted two potential outcomes: a) It could be more adaptive to remember inconsistent behaviors to avoid similar mistakes in the future or b) Pre-existing schemas may guide retrieval, resulting in better memory for consistent behaviors. Results showed that behaviors consistent with social targets' traits were better remembered than inconsistent behaviors, potentially reflecting an adaptive use of memory in predicting the behaviors of social targets.
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6:00-7:30 PM (3207)

Using Smartphone Technology to Improve Prospective Memory in Mild Alzheimer's Disease. WINSTON E. JONES and MICHAEL K. SCULLIN, *Baylor University*, JARED BENGE, *Scott and White Medical Center* – Prospective memory, or memory for performing intended actions in the future, is required for maintaining health and independent living. However, Alzheimer's disease pathology severely compromises top-down monitoring and bottom-up spontaneous retrieval processes that support prospective memory. Thus, interventions are needed to support prospective memory in the absence of monitoring or spontaneous retrieval. In healthy adults, smartphone-based reminders can circumvent the need for monitoring and spontaneous retrieval by providing time-based, event-based, and person-based reminders. However, it is unknown whether cognitively-impaired adults can be trained to effectively use smartphone reminder tools. We present self-report data on smartphone usage (social features versus memory aids) in adults referred for cognitive-disorder evaluation (N=53) and objective data on smartphone training and 1-month usage in patients with mild Alzheimer's disease (N=5). The latter introduces an ongoing clinical trial that contrasts prospective memory in patients using smartphone-based reminders versus the best-known prospective memory strategy, implementation intention encoding (NCT03384043).
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6:00-7:30 PM (3208)

The Remembered Future and Imagined Past: Phenomenological Characteristics of Episodic Memories, Episodic Future Thoughts, and Episodic Counterfactuals. JARED BRANCH and RICHARD ANDERSON, *Bowling Green State University* (Sponsored by Richard Anderson) – According to the constructive episodic simulation hypothesis,

the inherently constructive nature of episodic memory allows for the recombination of these events in order to plan for episodic futures and imagine alternative scenarios to the episodic past. Although episodic memory, episodic future thinking, and episodic counterfactual thinking appear to share underlying neural correlates, the expression of these correlates in the form of their cognitive mechanisms differ. In a between-subjects study, participants provided 15 autobiographical events that either occurred, could have but did not occur, or could occur in the future. Participants dated these events and rated the phenomenological characteristics (importance, sensorial detail, emotions, and whether the event was felt as remembered or imagined). Novel findings include future thoughts being rated as significantly more remembered than counterfactual thoughts (i.e. imagined pasts). As well, we found a novel temporal distribution of thoughts different from that of past research: The majority of past events occurred at 5 years' time, whereas the majority of future events occurred at 1 years' time.
Email: Jared Branch, branchj@bgsu.edu

6:00-7:30 PM (3209)

An Assessment of Learning Rates in Habitual Prospective Memory. ANNE E. VOGEL, *The University of Mississippi*, CIERA R. ARNETT, CHRIS BLAIS, and GENE A. BREWER, *Arizona State University* (Sponsored by Rebekah Smith) – Prospective memory refers to planning and completing intentions for future action. The focus of the present study is on habitual prospective memory, which is one's ability to routinize and fulfill intentions on a consistent basis. In the current study, we report one experiment where we analyzed learning rates for classic prospective memory measures in a sample of undergraduate students using a habitual prospective memory paradigm. Specifically, we examined cue detection, task interference, and cue interference across repeated event-based prospective memory cue trials (75 in total). Evidence of habitization to all aspects of prospective memory were discovered, as demonstrated by increases in prospective memory performance, decreases in ongoing-task latencies, and reductions in interference from prospective memory cues across repeated exposures. In addition, initial costs to attentional resources when participants held a prospective memory intention versus when they did not were completely eliminated by the end of the task. Overall, these results suggest that elements of prospective memory can become automatic when they are repeatedly enacted.
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6:00-7:30 PM (3210)

How Did I Remember to do That? The Role of Self-Reported Strategy Use in Laboratory Prospective Memory Performance. CELINDA REESE-MELANCON and ERIN HARRINGTON, *Oklahoma State University*, KERI KYTOLA, *Wilson College* – The role of metacognition in prospective memory (PM) has received relatively little attention (McDaniel & Einstein, 2007; Smith, 2016). This study combined data from several experiments to identify the strategy repertoire employed on a classic laboratory PM task and to determine whether self-reported strategy was related to performance. The results indicated that participants reported the same strategy repertoire regardless of whether the PM task was a focal or nonfocal one. Participants who reported using a strategy performed better than those who did not report using one, and this was especially true under nonfocal conditions. Self-reported strategy use was also associated with more cost to the ongoing task when the opportunity to complete the PM task was present. These findings add to what is known about the metacognitive components of PM and underscore the need for additional research in this area.
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6:00-7:30 PM (3211)

Missing Identifications of Missing Persons: Prospective Person Memory and Other-Race Effects. LAURA L. HEISICK and JASON L. HICKS, *Louisiana State University* (Sponsored by Jason Hicks) – Locating missing individuals is imperative, and has been conceptualized as prospective person memory (PPM), in which prospective intentions are responding to missing individuals' faces. PPM paradigms show poor performance relative to traditional prospective memory tasks: Observers often fail to complete PPM intentions (Lapinen & Moore, 2016). To combine PPM with known impairments to face recognition (e.g., other-race effects), participants classified facial expressions before studying four own- or other-race target faces. When targets were encountered later during classifications, participants were to make an alternate response to simulate alerting authorities. Retrospective face memory was assessed through subsequent lineup identifications. Participants demonstrated monitoring costs when maintaining faces, regardless of race, and both prospective intention completion and retrospective accuracy was lower for other-race targets. Observers also demonstrated stimulus-specific interference, with greater slowing for target-relevant (i.e., racially consistent) ongoing task faces. Overall, these results suggest prospective and retrospective difficulties contribute to low PPM intention completion.
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6:00-7:30 PM (3212)

Effects of Partial Intention Completion and Contextual Salience on Commission Errors. EMILY STREEPER, CASEY L. BOWEN, NANCY YANG, and JULIE M. BUGG, *Washington University in St. Louis* – The erroneous performance of a no-longer relevant prospective memory intention is a commission error (CE). CEs occur when the intention is spontaneously retrieved, and CEs are less likely following completed than uncompleted intentions. However, the effect of partial intention completion on CEs is largely unknown. After encoding a PM intention to respond to two PM targets, participants encountered one target in a salient context once or four times, or never encountered either target. CE risk was highest in the latter condition. Additionally, responding to one target once led to higher CE risk than responding four times. This suggests that the extent of intention fulfillment affects CE risk. In addition, in select conditions, fewer participants made a CE on lure trials

(e.g., non-target in the salient context) relative to typical trials. This finding suggests that contextual salience alone is not always sufficient to trigger spontaneous retrieval of the PM intention.
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6:00-7:30 PM (3213)

Remembering to Remember (and Remembering Other Stuff, too!): Incidental Encoding in Prospective Memory. JUAN D. GUEVARA PINTO, JASON L. HICKS, and MEGAN H. PAPESH, *Louisiana State University* (Sponsored by Megan Papesh) – Attention allocation in prospective memory (PM) can be adjusted according to PM and ongoing task (OT) demands. The present investigation examined how these flexible adjustments influence both OT performance and incidental memory for nontarget items. Across two experiments, participants completed a nonfocal PM task, with instructions manipulating their trial-by-trial expectations of encountering a PM cue, followed by a surprise recognition test for nontarget items. Participants showed greater OT interference costs (higher error rates and slower response times) during high, relative to low, PM expectation trials. Although OT performance was impaired when PM expectations were high, participants subsequently recognized more of the nontarget items encountered from high expectation trials. These results suggest that participants adjust their attention allocation policy in preparation for PM cues, diverting attentional resources away from the OT, and toward the PM task. The unintended consequence of this is enhanced item processing and incidental encoding of nontarget items.
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RECALL II

6:00-7:30 PM (3214)

The Role of Caffeine in Mitigating the Effect of Sleep Deprivation on Memory Maintenance. MICHELLE E. STEPAN, KIMBERLY M. FENN, and ERIK M. ALTMANN, *Michigan State University* (Sponsored by Kimberly Fenn) – In a prior study, we found that sleep deprivation increased errors within a procedural task that tested memory maintenance across interruptions. In the current study, we investigated the extent to which caffeine mitigated the effect of sleep deprivation on maintenance. In the evening, participants completed the procedural task and were randomly assigned to either sleep at home or stay awake overnight in the lab. Throughout the night, sleep-deprived participants were given either caffeine or placebo. Rested participants received caffeine or placebo in the morning. All participants then completed the procedural task. We replicated prior findings that sleep deprivation increased errors, particularly following interruptions – reflecting maintenance failures. Sleep-deprived participants who received caffeine made fewer errors than the sleep-deprived placebo group but still made more errors than rested participants. Thus, although caffeine does not eliminate errors due to sleep deprivation, caffeine may be a practical way to reduce potentially costly errors.
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6:00-7:30 PM (3215)

Memory Disruption due to Part-set Cues in Recall: The Role of Culture. NICHOLAS PEPE, *Stony Brook University*, LISHI TAN AND, KRISHNA SAVANI, *Nanyang Technological University,* SUPARNA RAJARAM, *Stony Brook University* (Sponsored by Suparna Rajaram) – The part-set cueing recall deficit is a well-established and counterintuitive memory phenomenon (Slamecka, 1968) where participants' recall of previously encoded words suffers if a subset of studied words is provided as retrieval cues. This effect has been mainly examined in Western cultures. Across three experiments we tested this effect in the United States and Singapore, to examine potential cultural differences arising from culturally prevalent processing styles (e.g., analytic vs. holistic). Experiment 1 (pen and paper; adapted from Barber & Rajaram, 2011) replicated the part-set cueing deficit in the U.S. but not in Singapore. Experiment 2 (fully computerized) replicated these patterns. Experiment 3 consisting of a direct replication of Barber and Rajaram (2011) in Singapore where the experimenter read the cues aloud with the participant during retrieval, saw the emergence of a part-set cue deficit in the Singapore sample. These studies show that while the US samples displayed a consistent part-set cuing deficit in recall across published findings and present Experiments 1 and 2, this effect varied in the Singaporean samples across nuanced experimental changes.
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6:00-7:30 PM (3216)

Retrieval-Induced Forgetting of Serial Order Memory: A Pre-registered Investigation. MASANORI KOBAYASHI, *Kawansei Gakuin University*, TAIJI UENO, *Takachiho University*, JUN KAWAGUCHI, *Nagoya University* – Retrieval-induced forgetting refers to a phenomenon where remembering memory can cause forgetting of other related memories (Anderson et al., 1994). We employed a pre-registration approach and examined whether this phenomenon extends to the domain of serial order memory. In Exp. 1 and 2, participants studied a sequence of six items, followed by retrieval practice. Finally, they took a serial order reconstruction test. Exp. 3 was the same except that retrieval practice was replaced to relearning. The results indicated that in Exp. 1 retrieval-induced forgetting was difficult to be detected because of a ceiling effect, but that in Exp. 2 retrieval-induced forgetting was successfully observed only for the earlier half of the 6 serial positions. Additionally, in Exp. 3 such forgetting disappeared. Thus, retrieval induced forgetting in serial order memory but relearning not. Given present evidence, inhibition may explain this type of forgetting in serial order memory.
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6:00-7:30 PM (3217)

The Mnemonic Effect of Choice. MICHELLE E. COVERDALE, *Purdue University*, JOSEFA N.S. PANDEIRADA, *University of Aveiro*, JAMES S. NAIRNE, *Purdue University* – Making choices during encoding leads to better memory than having the same choices made for you. Evidence also suggests that chosen items might be more memorable than unchosen alternatives. We found an incidental memory advantage for

chosen over unchosen items when participants chose which one of two words would be more useful to a situation, but it was uncertain whether the mnemonic benefit was due to the act of choosing or to differential congruity to the encoding situation. We conducted two experiments to dissociate choice and congruity effects. In both experiments, we manipulated choice and congruity and showed mnemonic benefits for chosen words over unchosen words and for congruent words over incongruent words, but these effects did not interact. There is apparently a mnemonic benefit for chosen words that cannot be explained by their preferential "fit" to the encoding task.
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6:00-7:30 PM (3218)

Search Patterns in Emotional Free Recall: How Do People Access Their Past Feelings? YING LI and THOMAS HILLS, *The University of Warwick* (Sponsored by Thomas Hills) – How do we recall our own past emotions and how is this affected by how we feel? In particular, do people recall emotions from a semantic topology of emotional words as they appear to do for recalling other categories, such as animals and social contacts? To answer these questions, we asked participants to complete the Emotional Recall Task (ERT) -- a recall-based affect measure that requires subjects to write 10 words to describe the feelings they had over the past month. We then modelled emotional recall using a representation of emotional space derived from free associations and computational models that searched over that space. Using model competition, we find search patterns are best described by models that incorporate semantic proximity between consecutive responses in combination with one's general affect (measured independently). Our analyses suggest that people use general affect as a cue to retrieve memories on experienced emotions, and therefore are more efficient when recalling affect-consistent emotions. Our results suggest that the ERT may be different from standard recognition-based emotion measures, and potentially capture better the emotions that come to people's minds in their day-to-day life.
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6:00-7:30 PM (3219)

An Investigation of Multi-Trial Free Recall Retrieval Dynamics in Preschoolers and Young Adults. ANDREW J. KELLY, *Georgia Gwinnett College*, MICHAEL J. BERAN, *Georgia State University* – This study examined the retrieval dynamics of a multi-trial free recall paradigm in preschool children and college students. Participants studied 4 lists of pictures (10 for preschoolers and 15 for college students) were immediately asked to recall the pictures they just saw. Preschoolers recalled their responses aloud and college students typed them into the computer. Each participant was given 5 opportunities to retrieve each list. For two of the lists, the presentation order remained constant and for the other two lists, the presentation order of the stimuli changed with each presentation. Results demonstrated similar correct recall on the first trial. However, young adults' recall increased with more trials when compared to preschoolers. Both groups demonstrated standard serial position curves. All participants were most likely to start their recall with the last word in a list, regardless of list presentation. Finally, both groups transitioned between words similarly, such that there was a tendency for forwards transitions to neighboring serial positions. These data suggest that the principles that govern memory retrieval in adults can be observed early in childhood, implying continuity in the memory system.
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6:00-7:30 PM (3220)

Item-to-Item Associations in Serial Recall: Evidence From Spin List Sequence Learning. DAKOTA LINDSEY and GORDON LOGAN, *Vanderbilt University* (Sponsored by Gordon Logan) – There is an unresolved debate in the domain of serial memory concerning item-to-item associations: Do previously retrieved items contribute to retrieval of subsequent items? We addressed this question using a serial recall task in which participants had to remember and type sequences of letters in their presented order. Each sequence was presented multiple times (spaced practice), and we analyzed sequence-specific learning over practice. Half of the sequences were spin-list sequences (SLS; same relative order of items but with different starting points; e.g., "abcdef" and "cdefab"), and the other half were control sequences (CS; letter order scrambled using a balanced Latin square). To manipulate the amount of interference among position-to-item associations, we varied the number of different spins of a sequence learned. SLS were learned more quickly than CS (Exp. 1). Training on SLS transferred to new SLS when 4 different spins of a sequence were learned (Exp. 2) but not when just one spin of a sequence was learned (Exp. 3). Our results suggest that item-to-item associations may play a role in serial recall, but their influence seems contingent on other methods of retrieval (e.g., position-to-item associations) being unreliable.
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6:00-7:30 PM (3221)

When Molly Is Gracie: Wrong Name Retrieval Influences Face-Name Learning and Recall. JESSICA TEALE CAMPBELL, *University of Florida*, LISE ABRAMS, *Pomona College* (Sponsored by Lise Abrams) – Proper names are difficult for people to learn and later recall, and this process gets increasingly difficult as individuals age. However, the role of interference during learning, specifically generating the wrong name, has not been well-explored. Previous research with learning non-name word pairs has shown that unsuccessful retrieval attempts during learning followed by feedback with the correct answers increased subsequent recall accuracy. The present experiment explored the role of interference from competing names during face-name learning, i.e., the degree to which wrong name retrieval during learning impacts later recall accuracy. Faces consisted of adult females and canines, and the faces' affect was either positive or neutral. Younger and older adult participants learned faces paired with first names until the name for each face was retrieved correctly three times. After a 30-minute delay, memory for each face's name was tested

again. Results will be discussed in terms of competition and the circumstances under which it can contribute to difficulties in learning proper names
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6:00-7:30 PM (3222)

Episodic Memory Contributions to Mentalizing. RUBEN D.I. VAN GENUGTEN and DANIEL L. SCHACTER, *Harvard University* – We can infer the thoughts, feelings, and intentions of another person (mentalizing) by simulating what it would be like to be in the other person's situation. Prior research indicates that remembering past episodes, imagining future episodes, and mentalizing share neural substrates in the default network, raising the possibility that episodic memory contributes to mentalizing. However, shared default network activation does not provide conclusive evidence that episodic memory is involved in simulation-based mentalizing. To address the issue, we utilized an episodic specificity induction (ESI) that selectively impacts tasks that draw on episodic retrieval. If episodic retrieval contributes to mentalizing, then ESI should increase the number of task-relevant details that people subsequently generate on a mentalizing task. Results revealed an increase in the number of details regarding thoughts that are attributed to another individual after ESI versus a control induction, suggesting that episodic memory retrieval does indeed play a role in mentalizing.
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6:00-7:30 PM (3223)

Category Clustering Recall: A New Recall Strategy to Enhance Eyewitnesses' Memory During Investigative Interviews. RUI PAULO, *Bath Spa University*, PEDRO B. ALBUQUERQUE, *University of Minho*, RAY BULL, *University of Derby* – The Cognitive Interview (CI) is one of the most studied and used methods to interview crime witnesses and has proved to be very effective. However, a newly developed recall strategy, Category Clustering Recall (CCR), was found to be more effective than some of the original CI components (e.g., the Change Order mnemonic) in certain situations. We focused on examining CCR capacity for increasing the amount of recalled information in comparison with witness-compatible questioning and tested if a Revised Cognitive Interview (RCI) with CCR instead of witness-compatible questioning and without the change order and change perspective mnemonics would be effective for this purpose. Using a between-subjects design, participants watched a mock robbery video and were interviewed 48 hours later with either the CI or the RCI according to randomly assigned groups. The RCI group produced more correct information than the CI group, with a lower number of confabulations. Further analyses revealed CCR was largely responsible for this increase in correct recall. These findings support our previous studies suggesting CCR is a very promising interview strategy allowing the interviewer to obtain more information without using additional questions.
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6:00-7:30 PM (3224)

Testing a Positional Model of the Hebb Repetition Effect. GEORGIANA CHEUK, SIMON FARRELL, and MARK HURLSTONE, *The University of Western Australia* (Sponsored by Stephan Lewandowsky) – The Burgess & Hitch (2006) model of serial recall accounts for the Hebb effect—the improvement recall of repeated sequences across repetitions—by assuming that people match incoming sequences to those already experienced, and re-use existing representations to remember new sequences that match old ones. One prediction of the model, tested in our experiment, is that the Hebb effect should be disrupted by a change to a learned list, but only for items at the position of the change, or following the change, in the list. We tested this prediction by training people on a list in a standard Hebb paradigm, and then introducing a final transfer list in which items at different positions of the repeated Hebb sequence were modified. In contrast to the predictions of the Burgess & Hitch (2006) model, we found only weak effects of such modifications, including no apparent effects of a change on items later in the sequence. Potential alternative explanations will be discussed.
Email: Georgiana Cheuk, georgianaswcheuk@gmail.com

6:00-7:30 PM (3225)

An Extension of Source-Constrained Recall: Disrupting Retrieval at the Front End? ANDREW B. LOGIUDICE, GEOFFREY R. NORMAN, and SCOTT WATTER, *McMaster University* (Sponsored by Scott Watter) – Prior work suggests a mechanism called source-constrained recall can be used to enhance memory accuracy "at the front end". Namely, reinstatement of encoding context at test—i.e., processing test items similarly to how they were originally encoded—is thought to improve recall by constraining what first comes to mind (e.g., Halamish, Goldsmith, & Jacoby, 2012). Inspired by a finding in the medical diagnosis literature (Kulatunga-Moruzi, Brooks, & Norman, 2011), we hypothesized that source-constrained recall might be disrupted if test items are processed in other ways before reinstating encoding context. Some word pairs were encoded by judging pleasantness and others by counting syllables. On a later cued recall task that highlights early memory production, only one of two groups was notified how they originally encoded each pair. Critically, half of all test trials were deemed 'disruption trials' because two other arbitrary tasks were done with the retrieval cues before engaging in cued recall. The hypothesis predicts a group by trial type interaction, such that the reinstatement of encoding context will be less beneficial on disruption trials. Results are discussed in relation to mechanisms operative early during retrieval.
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6:00-7:30 PM (3226)

Vividness and Accuracy of Episodic Memory Retrieval. PHYLLIS M. WINDSOR, JAMIE G. MURRAY, and DAVID I. DONALDSON, *University of Stirling* (Sponsored by David Donaldson) – Memory theory suggests that vivid experiences are more likely to be remembered, however, experimental data reveals only a weak correlation between vividness and episodic memory accuracy. To investigate this mismatch between theory

and data, we assessed the relationship between vividness and the quality and quantity of information remembered, using a novel source task. Participants studied photographs of natural scenes, linked to a specific location (a cross on a circle). Vividness ratings of images were made either at encoding, or at retrieval before recollection of the associated location. Results revealed that cue vividness at encoding correlated strongly with cue vividness at retrieval, and both predicted location accuracy. Critically, however, when evaluated as a function of recollection, the data revealed that location accuracy strongly influenced vividness ratings at retrieval. Vivid events may be remembered more accurately, but when we recollect details of an event accurately, the remembered event is perceived more vividly.
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6:00-7:30 PM (3227)

Does Making Judgments of Learning Affect Memory for Word Lists? AMANDA R. STEVENS and BENTON H. PIERCE, *Texas A&M University, Commerce* (Sponsored by Benton Pierce) – Making judgments of learning (JOLs) for paired associates enhances memory performance when those word pairs are strongly related (e.g., blunt-sharp; see Mitchum, Kelley, & Fox, 2016; Soderstrom, Clark, Halamish, & Bjork, 2015). We asked whether the reactive effects of JOLs, in which later memory is either enhanced or impaired, extend to lists of individual words. In Experiment 1, using both unrelated and associative (i.e., DRM) lists, we found that making JOLs for each item had no effect on later memory performance (either true or false recall) compared to a condition in which participants simply studied the words. Experiment 2 used categorized lists and also employed two separate types of JOL: (a) scale (0-100); and (b) binary (remember/forget). Once again, we found no effect of either type of JOL on later recall. Our results suggest that reactive effects of JOLs may be limited to strongly associated word pairs.
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6:00-7:30 PM (3228)

List-Method Directed Forgetting Can Be Long-Lasting – But Probably Not Due to Selective Rehearsal. MAGDALENA ABEL and KARL-HEINZ T. BÄUML, *University of Regensburg* – Outdated and no longer relevant information can be intentionally forgotten, a finding termed directed forgetting. Recent research indicates that such forgetting can be long-lasting. To examine the proposal that selective rehearsal of relevant (but not of irrelevant) information during prolonged retention intervals might maintain directed forgetting across delay, we conducted three experiments. In Experiment 1, we replicated the prior finding that directed forgetting persists across 20-min delays. In Experiment 2, we observed persistent directed forgetting not only after intentional learning, but also after incidental learning. Finally, in Experiment 3, we manipulated the type of distractor activity during the delay and found that an undemanding distractor task eliminated the forgetting. The results of Experiment 2 and 3 are inconsistent with predictions derived from a selective rehearsal perspective and indicate that selective rehearsal may not be the critical mechanism that maintains directed forgetting across delay.
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6:00-7:30 PM (3229)

A Role of Sleep in the Consolidation of Dynamic Episodes. JOHN P. PAULUS, GRIFFIN E. KOCH, and MARC N. COUTANCHE, *University of Pittsburgh* – Declarative memories can take a number of different forms, including episodic memories of vivid personal experiences and semantic memory for general knowledge. Theories of consolidation suggest that over time, and possibly sleep, episodic memories are transformed from their place and time-specific experience into abstract semantic memory. The current study investigated the role of time and sleep in this process. Participants were randomly assigned into groups that controlled for the presence of sleep and time-of-day in order to examine the effect of sleep. In the first session, participants viewed six videos featuring episodes involving animals, and were given memory recall questions targeting half the presented animals. The specificity of these recall questions varied. After the assigned delay (12 or 24 hours), participants returned and were asked questions on the remaining half. We found that although participants recalled less episodic information after a period of wakefulness, they experienced little reduction when the training / testing interval included sleep. This effect was specific to the recall of episodic information. These findings suggest that sleep can protect against the deterioration of episodic memory over time.
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6:00-7:30 PM (3230)

Examining the Structure of Recall and Recognition Ability. KYLE G. FEATHERSTON and SANDRA HALE, *Washington University in St. Louis* (Sponsored by Sandra Hale) – We investigated how recall and recognition differ depending on the nature of the memory items and what one is asked to remember about them. Participants were asked to remember lists of various types of verbal items, including words, nonwords, common first names, and the names of common objects in pictures that they viewed, or to remember the contextual information that accompanied those items, including their size, location, color, or font. Immediately following presentation of each list, free recall or recognition tests for items or context were administered. It has been proposed that memory for context differs from episodic memory for items themselves. However, principal components analyses of free recall and recognition tasks provided no evidence of separate components for items versus their contexts. Instead, the evidence suggests that recall performance is more sensitive to differences between item types than to differences between memory for items and context.
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6:00-7:30 PM (3231)

Does the Decision to Offload Information Influence Forgetting? MARY B. HARGIS, ALAN D. CASTEL, and ROBERT A. BJORK, *University of California, Los Angeles* (Sponsored by Alan Castel) – We often use technology to

create lists of items to remember (e.g., groceries), an act of offloading which can affect memory. To determine how the decision process to offload influences what is later remembered and forgotten, we presented participants with a set of 30 words to study, and they were able choose six words to "save" to the computer. Saved words were not presented at test (the computer "remembered" the words). After studying, participants were asked to recall as many words from that list as they could remember, and were given feedback on how many words they and the computer recalled. Across eight lists (with new words on each list), people usually offloaded six items, and free recall accuracy did not increase across tests. When given a final surprise recognition test after the eighth recall test, participants accurately recognized many words they offloaded across the task, suggesting that offloaded items are not completely forgotten. In another experiment in which some words were made more important than others, those high-value words were offloaded more often than low-value words with task experience. We interpret these findings in light of research on savings-enhanced memory and metacognitive strategy use.
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6:00-7:30 PM (3232)

Expertise Moderates Incidentally Learned Associations Between Words and Images. HEATHER BRUETT, XIAOPING FANG, DEEPAN KAMARAJ, ELIZABETH HALEY, and MARC N. COUTANCHE, *University of Pittsburgh* (Sponsored by Marc Coutanche) – Individuals with expertise in a domain of knowledge demonstrate superior learning for new information in their area of expertise, relative to non-experts. In this study, we investigated whether expertise benefits extend to incidental associations between words and images. Sport-experts and non-sports-experts encountered unknown faces in a basic perceptual task. Faces were incidentally presented as candidates for a position in a sports team (a focus of knowledge for only the sports-experts) or for job in a business (a focus of knowledge for both the sports-experts and non-sports-experts). Experts were better able to form associative memories between expertise-related words and (expertise-unrelated) images, than non-experts. Both groups were similarly familiar with the images after learning. These findings suggest a specific effect of expertise on associative memory between words and images, but not for item recognition, supporting a dissociation in how expertise modulates the human memory system for word-image pairings.
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6:00-7:30 PM (3233)

Individual Differences in Social Motivation and the Animacy Effect. JOSHUA E. VANARSDALL and ATIYA RAZI, *Elmhurst College* – The animacy effect in episodic memory is the simple finding that animate concepts (e.g., "baby," "minister") are generally more memorable than inanimate concepts (e.g., "journal," "violin"), if other word variables are held constant. It is a reasonable prediction that individual difference variables related to social motivation such as extraversion, the need to belong, and loneliness might moderate the effect: Extraverts are more interested in social contact, for example, and social targets are (with some rare exceptions) animate. Using an extreme groups design, we predicted that those high in individual difference measures related to social motivation (e.g., extraverts) would show better memory for animate targets compared to those low in individual difference measures low in social motivation (e.g., introverts). Across several measures of social motivation, this pattern was not found; the animacy effect was similar across groups. These results seem to point toward the robustness and universality of the animacy advantage.
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6:00-7:30 PM (3234)

Testing Effect and Output Interference in Recall: The Effects of Retrieval on Memory. SHARON CHEN and AMY H. CRISS, *Syracuse University* (Sponsored by Amy Criss) – Retrieval affects memory. Retrieval benefits memory, because forgetting is reduced when material is repeated by testing rather than by restudying (testing effect, TE, Tulving, 1967). Retrieval also harms memory, because performance decreases across output positions in a given memory test (output interference, OI, Tulving & Arbuckle, 1963). In other words, both TE and OI demonstrate the complexity of how retrieving from memory affects the contents of memory. One common assumption for both phenomena is that encoding occurs during retrieval. In terms of the current state of research, on one hand, there is a wealth of behavioral research of TE in recall, while there is little computational modeling work. On the other hand, there are limited empirical investigations of OI in recall, while there are established theories and models. Therefore, examining TE and OI concurrently will advance our understanding of the effects of retrieval on memory, and its underlying mechanism. Here we present an implementation in the retrieving effectively from memory (REM, Shiffrin & Steyvers, 1997) that simultaneously accounts for the benefit and harm caused by testing episodic memory.
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6:00-7:30 PM (3235)

Guided Convergent Retrieval Practice Enhances Object Recall. WILLIAM J. HOPPER and DAVID E. HUBER, *University of Massachusetts, Amherst* (Sponsored by David Huber) – The Primary and Convergent Retrieval (PCR) model assumes successful recall strengthens directional associations between the features defining the recalled memory trace, a process referred to as convergent retrieval learning. Critically, associations between the features are strengthened during recall because their activation is asynchronous. This predicts that activating an item's features sequentially during learning will lead to better recall performance than simultaneous activation. We tested this prediction by comparing participant's ability to identify whole objects from just a small part after they had either studied the object's features simultaneously, studied the object's features sequentially (guided convergent retrieval practice), or not studied the object at all. Object naming accuracy was highest in the sequential presentation condition, and the advantage did not change after a long retention interval. Recall latency was similar between the simultaneous and sequential presentation

conditions initially, but was faster in the sequential presentation condition after a long retention interval. These findings support the PCR model of recall practice benefits.
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6:00-7:30 PM (3236)

Not all Isolation Effects Are Created Equally: Evidence for Greater Processing Requirements for Semantic vs. Physical Isolation Effects. TAMRA BIRETA and CHRISTINA WOOD, *The College of New Jersey* – The finding that memory is better for an item that differs from the surrounding items is known as the von Restorff effect or isolation effect (von Restorff, 1933). Isolated items can differ physically (e.g., a different font) or semantically (e.g., a different category). Most theories argue that the effect requires effortful processing (e.g., Hunt & Lamb, 2001). However, there is evidence that some isolation effects can occur more automatically (e.g., Bireta & Mazzei, 2016). The current study examined the processing requirements for physical and semantic isolation effects by manipulating the processing at encoding (Exp. 1), presentation rate (Exp. 2), and presence of divided attention during recall (Exp. 3). Participants viewed lists of items with all similar items (control), one item from a different category (semantic), or one item in a different font color (physical) for immediate recall. Semantic isolation effects were eliminated with certain types of processing, speeded presentation, and divided attention. None of the manipulations eliminated the physical isolation effect. These results suggest that physical isolation effects occur relatively automatically, whereas semantic isolation effects require more effortful processing.
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6:00-7:30 PM (3237)

Comparing Single Report and Serial Recall of Sequential Visual Line Orientations. ADAM K. BOSEN and MARY C. LUCKASEN, *Boys Town National Research Hospital* – Continuous visual memory tasks (such as color hue or line orientation recall) estimate both memory precision and capacity. Previous studies have either used cued report of a single item or sequential report of all items. Here, we compare both tasks within subjects, to determine if they produce similar response patterns. Young adults were tested on both single and full report response conditions. In the single report condition, subjects viewed a sequence of lines that each had a unique color and rotation around a midpoint on the screen, then rotated a probe line of one of the shown colors to match the rotation of the corresponding line in the stimulus sequence. In the full report condition, subjects viewed similar sequences, but then had to match the orientation of probes to every line in the sequence, presented in the same color sequence as the stimulus. Results showed strong recency effects for single report but graded primacy effects for full report, indicating that the response process alters the observed memory precision. This finding indicates that results and conclusions drawn from each task cannot be directly compared, as they are likely influenced by different underlying mechanisms.
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6:00-7:30 PM (3238)

The Effect of Contextual Variability on Memory for Words in Sentences. NICHOLE RUNGE and MITCHELL S. SOMMERS, *Washington University in St. Louis* (Sponsored by Mitchell Sommers) – Recall of target words is typically better for varied (spoon-knife, blade-knife) compared with consistent (spoon-knife, spoon-knife) word pairs (e.g., Glenberg, 1979). It is unclear, however, whether benefits of contextual variability will be found for more naturalistic stimuli such as sentences. The present study investigated the effect of contextual variability on target word recall for semantically predictable sentences. In Experiment 1, target words were sentence-final items presented visually and auditorily, with half of the participants receiving the same sentence three times and half receiving three different sentences once each. No significant effects of context variability were observed. In Experiment 2, encoding demands were reduced by presenting the sentences in an auditory-only condition. Again, no difference was found between consistent and variable contexts. Results are discussed with regard to encoding variability and working memory capacity.
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SENSATION AND PERCEPTION II

6:00-7:30 PM (3239)

Cognitive Audiology: Investigating Resource Allocation in a Dual-Task Listening Paradigm. STEFANIA CERISANO, *McMaster University*, JEFF CRUKLEY, *Starkey Hearing Technologies Canada*, MARIJA RADENOVIC, KARIN R. HUMPHREYS, and SCOTT WATTER, *McMaster University* (Sponsored by Karin Humphreys) – Listening can be cognitively demanding, particularly when listening in noise or when attention is being divided. The cognitive resources required to listen and understand what is being heard are limited and must therefore be allocated according to task demands. Knowing this, the current study uses a dual-task paradigm to investigate the allocation of cognitive resources in a listening experiment. Normal-hearing undergraduate students listened to and repeated words presented in varying difficulties of background noise while responding to a secondary task that varied in presentation timing (presented either simultaneously with the target word or significantly later). Word recognition and dual-task performance demonstrate resource allocation and provide an indication of listening effort. Subjective ratings and objective (physiological) measures provide an additional indication of listening effort. Furthermore, individual differences in cognitive ability (as measured by working memory) are reflected in task performance. These results will be discussed in relation to cognitive aging and the clinical applications of cognition research to hearing aid fitting and use.
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6:00-7:30 PM (3240)

Role of the Basal Ganglia in Explicit and Implicit Rhythmic Timing. ELISA M. GALLEGO HIROYASU and YUKO YOTSUMOTO, *The University of Tokyo* (Sponsored by Kou Murayama) – Aging comes with a set of neurophysiological and cognitive deterioration, but whether a decline in temporal

processing is part of the aging process is unclear. On one hand, the basal ganglia, known to be involved in temporal timing, deteriorates with age, but others suggest that the deficit in temporal processing is due to memory and attentional decline. In this study, we investigated whether this timing deficit is caused independently from those of memory and attention. Moreover, the task we employed had no motor components since this may recruit other compensation mechanisms to account for loss in dopaminergic functions. Participants were tested in their ability to distinguish beat from non-beat based sequences. Although working memory and attentional components were minimized, results showed that older adults exhibited higher thresholds in the explicit beat-discrimination task. We will further explore the role of the basal ganglia in implicit rhythmic beat perception.
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6:00-7:30 PM (3241)

Impact of Interstimulus Interval on Habituation of the Startle Response. ALEX FAUNCE, KATHRYN ATKINS, and TERRY D. BLUMENTHAL, *Wake Forest University* (Sponsored by Terry Blumenthal) – Startle response magnitude habituates with stimulus repetition and spontaneously recovers with time between stimuli (intertrial interval, or ITI). Both phenomena are relevant to the study of physiological regulation, but relatively little is known about how their kinetics operate across different time frames. The present study modeled the impact of ITI on startle magnitude at the trial level, and tested whether this relationship differed by trial or prior ITI. Participants (n=33) were presented 37 pulses of 100 dB, 50ms duration broadband noise at ITIs of 1, 2, 4, 8, 16, and 32s. Startle magnitude increased with longer ITI (particularly when immediately preceded by another trial with a short ITI), albeit with diminishing returns after 4s. This supports the use of ITIs as short as 4s in startle habituation blocks, with the caveat that the range of ITIs should be narrowly distributed to control for mid-block spontaneous recovery.
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6:00-7:30 PM (3242)

Age-Related Declines in Spatial Release From Informational Masking. BENJAMIN H. ZOBEL and LISA D. SANDERS, *University of Massachusetts, Amherst*, ANITA WAGNER and DENIZ BAŞKENT, *University Medical Center Groningen* (Sponsored by Lisa Sanders) – In spatial release from informational masking, spatial separation of target and masking speech improves target processing. While older adults report difficulties in understanding speech in multi-talker noisy environments, it remains unclear if a reduction in benefiting from spatial separation of target and masker is a factor. The present study improved on prior approaches by limiting non-spatial separation cues (e.g., pitch cues), reducing task demands, and employing better controls for hearing loss. Young and (age-normal hearing) older adults listened to low-pass-filtered noise-vocoded targets and maskers that were spatially co-located and spatially separated with a perceptual manipulation that did not offer release from energetic masking (Freyman et al., 1999). Target detection thresholds were equal for young and older adults for spatially co-located sounds indicating that non-spatial attributes were well matched for the groups. However, older adults did not benefit as much as young adults from perceived spatial separation of target and masker. These results show clear age-related declines in spatial release from informational masking that likely contribute to age-related declines in understanding speech in noisy environments.
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6:00-7:30 PM (3243)

The Emotional Valence of Expected Images Influences Time Estimation: Behavioral and Electrophysiological Evidence. WILLIAM MAURICE VALLET and VINCENT LAFLAMME, *Université Laval*, BENOÎT BEDIOU, *Université de Genève*, SIMON GRONDIN, *Université Laval* – Behavioural studies have extensively explored interactions between time perception and emotions, but little is known about the cerebral bases of these interactions. The goal of current study was to investigate the electrophysiological processes involved in time perception when aversive stimuli are expected. Participants had to compare the relative duration of a comparison interval (1250, 1600, 2500 or 3125ms) with that of a 2000-ms reference interval; reference intervals were marked by two successive 250-ms grey circles. Comparison intervals were marked by a colored circle announcing the upcoming valence of the picture. After each response, a picture was presented for 2000ms. Results revealed that, compared to positive or neutral conditions, time is significantly overestimated when aversive stimuli are expected. Moreover, the contingent negative variations (CNV) showed significantly greater negative deflection when aversive stimuli are expected. These results show that expecting emotional stimuli can modulate CNV and the subjective estimation of time perception.
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6:00-7:30 PM (3244)

Long-Term Memory Does Not Affect Temporal Preparation for Auditory Durations. EMILY CROWE and CHRIS KENT, *University of Bristol* (Sponsored by Chris Kent) – Starting procedures in racing sports consist of a warning (e.g. 'Set') followed by a target (e.g. 'Go') signal. During this interval (the foreperiod) athletes engage in temporal preparation whereby they prepare to respond to the target as quickly as possible. The cognitive mechanisms underlying this process are still debated. Recently, Mattiesing et al. (2017) suggested that long-term memory traces drive temporal preparation performance, rather than performance being related to the perceived hazard function (Luce, 1986). Racing sports typically rely upon auditory stimuli, so we replicated Matteissing et al., who used visual stimuli, using auditory stimuli. In an acquisition phase, two groups of participants were exposed to different foreperiod distributions. One week later, during a transfer phase, both groups received the same distribution of foreperiods. There was no evidence for transfer effects, directly contradicting Mattiesing et al. We discuss interpretations of this contradiction including modality-specific memory differences.
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6:00-7:30 PM (3245)

Face Adaptation Aftereffects on Local Information. TILO STROBACH and RONJA MUELLER, *Medical School Hamburg*, SANDRA UTZ and CLAUS-CHRISTIAN CARBON, *University of Bamberg* – Previously inspected faces can affect the perception of faces seen subsequently. The underlying mechanisms of these face adaptation aftereffects have been considered to be based on sensory adaptation. More recent studies however also suggest a high level effect and an adaptation on a rather representational memory basis. Although research on adaptation effects in faces seems to be well-advanced, it still lacks a systematic analysis of its generalizability to different types of face information since most research indeed focused on configural information. Adaptation effects on local feature information however are barely investigated. We investigate these effects employing color alteration as implementation of local feature changes. Results of our studies indicate that face adaptation aftereffects to local features differ from effects regarding configural information, most probably due to perceptual interpretation of such properties as being more transient than those of configural aspects.
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6:00-7:30 PM (3246)

Bimanual and Unimanual Haptic Shape Discrimination. J. FARLEY NORMAN, CATHERINE J. DOWELL, JACKIE R. MOMENT, LINDSEY M. SHAIN, and HIDEKO F. NORMAN, *Western Kentucky University*, FLIP PHILLIPS, *Skidmore College*, ASTRID M.L. KAPPERS, *Vrije Universiteit* – In this study of haptic shape discrimination, younger and older participants successively explored objects using either one hand only or both hands (each hand explored a separate object). Because of the organization of the somatosensory system, performance in the unimanual condition requires processing only in a single cerebral hemisphere, whereas communication across hemispheres is required for effective performance in the bimanual condition. The obtained discrimination performance was essentially identical across the unimanual and bimanual conditions. This outcome demonstrates that there is no necessary loss in shape discrimination ability when interhemispheric communication of tactile information is required. The performance of older adults was moderately reduced (14 percent) relative to that exhibited by younger adults. Subsequent experiments found bimanual performance to deteriorate for simultaneous haptic exploration when compared to successive haptic exploration. The poorer discriminability accompanying simultaneous bimanual exploration is consistent with either interhemispheric interference or adverse effects of divided attention.
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6:00-7:30 PM (3247)

Inertia-based Haptic Perception of Disk Diameter in a Novel Visual Comparison Task. COREY M. MAGALDINO, *Arizona State University*, PATRICK A. CABE, *University of North Carolina at Pembroke*, KENNETH M. STEELE, *Appalachian State University* (Sponsored by Patrick Cabe) – Rotational inertia, the force required to change the angular velocity of a rotating object, has been well documented to inform the haptic system about object properties. Commonly, participants judged lengths of wielded rods, with access to inertia about all the rods' principal axes. We examined whether people can identify disk diameter, with rotation restricted to a single axis, providing information solely through rotational inertia. Participants rotated visually-occluded disks by reciprocally pulling up and down on two strings, each operated by a single finger. Earlier (Magaldino et al., 2017), using a multiple-choice response method, we showed that participants' judgments accurately and reliably tracked actual disk diameters. Here we report the results of an experiment using a larger range of responses and participants adjustment of a visual display showing finer gradations between responses, approximating scalar responses. We found that participants reliably differentiated and scaled disk diameters, replicating earlier results.
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6:00-7:30 PM (3248)

Differences in Virtual Object Location Memory Between Old-Old and Young-Old Adults. KYLE R. KRAEMER, and SHEILA R. BLACK, *University of Alabama* – Associative source memory is particularly difficult for old-old compared to young-old adults, as has been demonstrated in paired-associate tasks. Due to this decline in source memory, we sought to assess whether old-old adults would show a similar deficit in a virtual object-location task—a task that similarly relies upon source memory but is more relevant to the everyday functioning of older adults. Sixty-one older adults were exposed to a series of 10-second video walkthroughs of virtual rooms and approximately 30 seconds later were asked to identify the location of a particular item that was in the room. We found that old-old adults (age, M = 75.6) showed significantly poorer performance than young-old adults (age, M = 64.0) on the object-location task, despite showing no difference in education, vocabulary, or global cognition. Results suggest that older adults' decrements in source memory likely lead to diminished object-location ability in a virtual environment.
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6:00-7:30 PM (3249)

Monolingual and Bilingual Perceptual Cue Weighting for Voicing Contrast in English and Spanish. KATHY CARBONELL, *University of Florida*, JESSAMYN SCHERTZ, *University of Toronto at Mississauga*, ANDREW LOTTO, *University of Florida* – For any speech sound contrast, there are multiple acoustic cues to categorization. In both English and Spanish, voice onset time (VOT) is the primary cue for stop voicing contrasts. This work compares the use of secondary cues to a stop voicing contrast in Spanish and English and tests whether language-specific cue use extends to early bilinguals. Monolingual and bilingual listeners of the two languages categorized sounds varying in VOT and three secondary cues: f0 at vowel onset, F1 onset frequency, and stop closure duration. Listeners heard acoustically identical target stimuli preceded by language-specific carrier phrases in both English and Spanish modes. All listeners made use of all three secondary cues; however, monolingual English listeners relied

more on F1, and less on closure duration than monolingual Spanish listeners indicating language-specificity in cue use. Early bilingual listeners used the three secondary cues similarly in English and Spanish despite showing different VOT category boundaries in each mode. These results reinforce previous work demonstrating language-specific phonetic representations in bilinguals in terms of VOT boundary, but also suggests that this specificity may not extend to all acoustic cues.
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POSTER SESSION IV

Saturday Noon
Elite A
Viewing 11:00-1:30, Author Present 12:00-1:30 PM

ATTENTION III

12:00-1:30 PM (4001)

Investigating Attentional Suppression of Reward-Related Distractors. DANIEL PEARSON, JANICE TANG, POPPY WATSON, and MIKE E. LE PELLEY, *University of New South Wales, Sydney* (Sponsored by Mike Le Pelley) – Researchers have long debated whether physically-salient but task-irrelevant stimuli automatically capture attention. Recently, a model has been proposed (the signal suppression hypothesis) that argues physically salient stimuli automatically generate an attentional priority signal, which can be suppressed by top-down control. Previous studies suggest that individuals can suppress this attentional priority signal below baseline levels under conditions that promote feature-search. We have shown that pairing a stimulus with reward increases its attentional priority in a way that mimics an increase in its physical salience. This Value-Modulated Attentional Capture (VMAC) effect has been shown to persist even when attending to the reward-related stimulus is counterproductive, in that orienting to the stimulus results in omission of the reward that would otherwise have been received. We will present new behavioural and eye-tracking research that investigates whether encouraging feature-search allows participants to suppress the increased attentional priority signal associated with reward-related distractors.
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12:00-1:30 PM (4002)

Revisiting the Role of Prime Awareness in the Cognitive Control of Single-Prime Negative Priming. HSUAN-FU CHAO, *Chung Yuan Christian University* – Single-prime negative priming refers to the findings that repeating a single prime as the probe target delays the response to that target. Using negative priming as the index, it has been shown that single-prime negative priming is modulated by the awareness of the prime, as well as the awareness of the contingency between the prime and probe target. In the present study, using the distractor-to-distractor repetition benefit as an index of distractor inhibition in single-prime negative priming, the impact of prime awareness and the awareness of the contingency was further investigated. The results showed that while negative-priming was reduced when the participants were aware of the primes, the distractor-to-distractor repetition benefit was increased. These findings suggest that the negative-priming effect and the distractor-to-distractor repetition benefit may involve different mechanisms.
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12:00-1:30 PM (4003)

The Impact of Stroop Interference and the Simon Effect on Implicit Association Test Performance. CHRISTOPHER KOCH and ELIZABETH MEADERS, *George Fox University* – The implicit association test (IAT) is a method used to examine associations individuals make between concepts and evaluations (Greenwald & Banaji, 1995). The typical finding with the IAT is that RTs are faster when the concepts and evaluations share the same response key. While the IAT has been used to examine a variety of associations, factors influencing these associations are still under consideration. For instance, Klauer et al. (2010) examined aspects of cognitive control in the IAT. They included measures related to switching mental sets, inhibition of responses, and working memory capacity. They found that switching between mental sets was related to IAT performance. In this experiment, participants completed a Simon task, Stroop task, and the flower-insect IAT. Participants showed typical Simon effect and Stroop interference. IAT results were consistent with Greenwald, McGhee, and Schwartz (1998). While covarying Simon performance had no impact on the IAT, covarying Stroop performance did reduce the size of associations found between flowers and insects across conditions. These results suggest that the ability to inhibit one response in favor of another contributes to IAT findings.
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12:00-1:30 PM (4004)

Task Files, Post Error Slowing, and the Flexible Boundaries of Cognitive Control. DEREK M. SMITH, *Georgia Institute of Technology*, TOBIN DYKSTRA and ELIOT HAZELTINE, *University of Iowa*, ERIC H. SCHUMACHER, *Georgia Institute of Technology* (Sponsored by Eric Schumacher) – Although great strides in the study of cognitive control have been made in recent years, the influence of task structure on cognitive control is not well understood. Prior research has shown that adjustments of cognitive control depend subtle manipulations of the stimulus response set (Hazeltine, et al., 2011). In order to determine if manipulations like those used in the aforementioned study could erect a control boundary for post error slowing an adaptive (difficulty adjusted via stimulus duration) antisaccade paradigm was developed. Subjects were randomly assigned to split set or a single set condition. The split set condition was marked by post error speeding while the single set condition exhibited post error slowing. These results imply that task structure can influence the boundaries of cognitive control adjustments.
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12:00-1:30 PM (4005)

Differences in Dual-Task Performance Between Children With and Without ADHD and the Effects of Stimulant Medication. JONATHAN SCHACHERER, MOLLY NIKOLAS, and ELIOT HAZELTINE, *University of Iowa* (Sponsored by Eliot Hazeltine) – Attention-deficit/hyperactivity disorder (ADHD) is the most commonly diagnosed and treated neurodevelopmental disorder in children. Understanding the types of cognitive deficits that characterize ADHD and account for the heterogeneity among ADHD youth crucial for

enhancing intervention strategies. Yet, the exact nature of these cognitive deficits remains unclear. Using an innovative dual-task experiment, youth with and without ADHD must coordinate an attentional-discrimination task and an inhibitory Go/No-Go task. The task requires attentional and inhibitory processes to be simultaneously managed. We examined two types of dual-task costs: Dual-Go—both tasks require response execution, and Dual-No—requires both response execution (discrimination) and response inhibition (NoGo). Moreover, we evaluate the efficacy of medication on ameliorating attention and inhibition deficits. Results suggest that ADHD youth experience greater dual-task costs. Medication appears to improve inhibition, but has no significant effect on attention. These findings can help devise learning techniques and educational paradigms to assist ADHD youth.
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12:00-1:30 PM (4006)

Multitasking Efficiency Is Subject to Circadian Variation. FRANZISKA PLESSOW, *Technische Universität Dresden/ Harvard Medical School*, RICO FISCHER, *Technische Universität Dresden/University of Greifswald* – There is accumulating evidence for circadian variations in the efficiency of human information processing linked to either time of day (creating general performance fluctuations) or individual differences in circadian variations of physiology and behavior (resulting in individual daytime optima and disoptima). However, little is known about whether efficiency of multitasking, a prerequisite for successful performance in modern work places, is subject to circadian variation. We investigated the impact of time of day and individual daytime (dis)optima on multitasking performance. Individuals with pronounced morning (n = 34) and evening (n = 34) chronotypes completed a dual-task paradigm in the morning and evening (i.e., at their respective daytime optimum and disoptimum). The psychological refractory period (PRP) effect, a measure of multitasking efficiency, was increased in the morning compared to evening hours for individuals with daytime optima in the evening. Importantly, even individuals for whom morning hours represent the optimum time of day displayed considerable central slowing in dual-task performance in the morning. This finding indicates a general circadian fluctuation of multitasking efficiency.
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12:00-1:30 PM (4007)

Encoding Target Order Modulates the Magnitude of the Attentional Blink. HAYLEY E.P. LAGROIX, KARLA MACHLAB, SUSANNE FERBER, and JAY PRATT, *University of Toronto* – The perception of the second of two rapidly-presented sequential targets is impaired when shown soon after the first (attentional blink; AB). According to the episodic-distinctiveness hypothesis, the AB reflects a strategy for preserving target order. This hypothesis predicts that the magnitude of the AB should be modulated by whether targets must be encoded as episodically-distinct, ordered events. To test this prediction, the importance of target order was manipulated across three experiments by requiring different observers either to report the category (letter or digit) of the two targets separately (dual response, order important), make a single response about the order of the target categories (single response, order important), or compare the category of the targets (single response, order irrelevant). Consistent with the episodic-distinctiveness hypothesis, the magnitude of the AB was reduced when target order was irrelevant to the task, suggesting that a strategy of enhancing episodic distinctiveness may underlie the AB.
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12:00-1:30 PM (4008)

Subjective Difficulty of Physical and Mental Tasks. IMAN FEGHHI and DAVID A. ROSENBAUM, *University of California Riverside* (Sponsored by David Rosenbasum) – To shed light on how people perceive the subjective difficulty of physical and mental tasks, we asked university students to choose the easier combination of a physical and a mental task. The physical task was carrying an empty box through a wide (81 cm) or a narrow (36 cm) gap, and the cognitive task was memorizing a 6, 7, or 8-digit list. Choices were modeled by assuming that subjective difficulty of a task could be characterized by a normal distribution. The overlap between two tasks' subjective difficulty distributions predicted the chance of choosing the easier task. The model explained 99% of the variance of the choice data provided that going through the narrow gap was treated as simply adding .5 digits to be memorized. The results suggest that participants considered these tasks, metacognitively, to rely on separate but comparable resources.
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12:00-1:30 PM (4009)

Cognitive Control Across Adolescence: Investigating Dynamic Control Adjustments and Mind-Wandering. MATE GYURKOVICS, TOM STAFFORD, and LIAT LEVITA, *University of Sheffield* (Sponsored by Katarzyna Zawadzka) – Cognitive control refers to our ability to carry out goal-directed behaviours in the face of distractions. Notably, the cognitive control system is still not fully mature across the adolescent period. We investigated the development of cognitive control at different stages of adolescence by examining: 1) dynamic adjustments of control, as indicated by the congruency sequence effect (CSE; the finding that the interference effect in conflict tasks is smaller following incongruent compared to congruent trials); and 2) the frequency of mind-wandering (MW). To that end, participants from four age groups (12-13, n = 30; 14-15, n = 25; 18-20, n = 28; 25-27, n = 25) completed confound-minimized Simon and flanker tasks, and a Go/No Go task with periodic thought content probes. No significant age differences were found in the CSE in either of the tasks, although nominally the two tasks showed opposing developmental patterns. Self-reported MW frequency increased with age. The size of the CSE in the flanker, but not in the Simon task, correlated negatively with MW frequency. Our findings support the cognitive resource account of MW, and tentatively suggest that the CSE might reflect different mechanisms in different conflict tasks.
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12:00-1:30 PM (4010)

Every Person Has a Price: How Do Individual Differences in Switch Costs Influence the Ability to Pursue Reward While Multitasking? DAVID BRAUN and CATHERINE M. ARRINGTON, *Lehigh University* (Sponsored by Catherine Arrington) – Switching between tasks when multitasking is effortful, and this switching cost is greater for some people than for others. However, it is unclear whether people are sensitive to their individual switch costs when selecting between tasks. We addressed this question by investigating whether switch costs measured during cued task switching predicted choice performance during reward-based voluntary task switching (rVTS), where rewards were tied to tasks. Task reward either diminished with repeated selection as in a foraging context (predictable rVTS) or updated randomly (unpredictable rVTS). Results revealed that high-switch-cost individuals adjusted their task selections during strategic rVTS, leading them to perform as efficiently as low-switch-cost individuals. However, individual differences in switch costs did not predict task selections in spontaneous rVTS, leading low-switch-cost individuals to perform more efficiently than those with high switch costs. These results suggest that the pressures of a foraging environment might increase the salience of internal effort costs.
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12:00-1:30 PM (4011)

Are Saccadic Tasks Compatible With a Manual Response Mode? EDDIE A. CHRISTOPHER and THOMAS S. REDICK, *Purdue University* (Sponsored by Darryl Schneider) – One popular assessment of executive attention, the anti-saccade task, requires participants to make a saccade away from an attention-demanding stimulus, exercising top-down control of visual attention. Often, researchers measure participants' ability to perform this task by briefly presenting a symbol where participants should have looked. Participants must press a key indicating which symbol they saw. Frequently, participants are making a horizontal saccade (i.e., left or right), and they are responding by pressing one of two keys along a horizontal axis (e.g., "LEFT" and "RIGHT" arrow keys). Other lines of research have demonstrated that directional compatibility facilitates accurate and timely responding, even when directional information is irrelevant. We hypothesized that incompatible trials (e.g., making a saccade to the left and responding with a right key press) would lead to slower and less accurate responding. Surprisingly, we found evidence favoring a null hypothesis, suggesting a previously unidentified boundary condition for compatibility effects.
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12:00-1:30 PM (4012)

The Control Mechanism Underlying the Processing of Horizontal and Vertical Dimensions. CHAE-EUN LIM, JUYOUNG PARK, and YANG SEOK CHO, *Korea University* – The present study investigated whether a common control mechanism is applicable to processing the horizontal and vertical dimensions. In three experiments, horizontal and vertical congruency tasks were presented in turn to examine the congruency sequence effect (CSE) between the two tasks. To avoid the dominance of the horizontal dimension over the vertical dimension, aimed movement responses were adopted, instead of left-right hands keypress responses. In Experiment 1, a significant CSE was obtained between horizontal and vertical Simon tasks only when they were performed with the same response mode. This finding was replicated in other congruency tasks, as the CSE was significant between horizontal and vertical spatial Stroop tasks in Experiment 2 and horizontal and vertical arrow flanker-compatibility tasks in Experiment 3. These results provide evidence that the horizontal and vertical dimensions are to be governed by the same control mechanism in various types of congruency tasks when they are represented as a single spatial dimension by using the same response mode.
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12:00-1:30 PM (4013)

My Phone Is There, But I Will Ignore It: Mobile Phones Do Not Induce Attentional Bias in an Antisaccade Task. WISNU WIRADHANY, SEBASTIAAN MATHOT, and MARK R. NIEUWENSTEIN, *University of Groningen* (Sponsored by Mark Nieuwenstein) – Mobile phones are ubiquitous, and they might induce attentional bias and affect task performance. In this study, we recorded eye movements of participants while they performed an antisaccade task. To investigate attentional bias, we positioned participant's own mobile phones adjacent to the monitor, so that participants may make a saccade either toward or away from their phones. Our initial analysis showed a sizeable antisaccade effect: Participants made more saccade errors and started their eye movements later in the antisaccade block. Importantly, we did not find evidence for attentional bias: The proportion of gazes to the area outside the monitor was not larger in a condition in which participants would make a saccade toward their phones and with regard to task performance, the proportion of saccade errors was not larger and the saccade latency was not slower in conditions in which participant's own phones were present. Critically, Bayes Factor analysis indicated more support for the models in which the presence of the phones was not taken into account. Accordingly, our set of results indicate that the physical presence of mobile phones does not induce attentional bias and affect task performance.
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12:00-1:30 PM (4014)

Combined Expectations of Time and Color: Synergistic Effect and Independent Effect. ZHAO FAN, HONGXIANG LI, XIANFENG DING, and XIAORONG CHENG, *Central China Normal University* – Time and color are two important dimensions which usually appear together in complex environments. Single predictive information of time or color can form an attentional expectation to affect perceptual and behavioral performance. However, it is yet to know, whether and how these information can be extracted together to form a combined expectation and which factor(s) may modulate it. Here, we explored whether combined expectations of time and color share a common attentional system (synergistic effect), or rely on functionally independent systems (independent

effect). Our results demonstrated independent effects for both measurements of sensitivity and response bias when temporal expectation was kept constant in a block (lower task demand) by manipulating the relative frequency of the preparatory intervals. In contrast, a dissociation was found between the indexes, i.e., independent effects for sensitivity and synergistic effects for response bias, when temporal expectation changed trial by trial (higher task demand) by using signal cues. Thus, the combined time-color expectation is modulated by task demands and measurements employed.
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12:00-1:30 PM (4015)

Finding Proactive Control in the Flanker Task. KIRA BAILEY and ERIKA SHULTZ, *Ohio Wesleyan University* – The Dual Mechanisms of Cognitive Control theory posits that individuals adaptively use reactive or proactive cognitive control based on current task demands (Braver, 2012). The frontal slow wave ERP component has been identified as a marker of proactive control. This component is reliably observed during mostly incongruent blocks of the Stroop task (West & Bailey, 2012). In the Flanker task, detection of the slow wave has been unreliable. In two studies, we replicate the modest slow wave sometimes found in a traditional Flanker task, and then demonstrate a more robust slow wave in the mostly incompatible blocks of a proportion compatible Flanker task. The implications of these data are twofold: 1) as posited by the DMC theory, manipulating task demands influences the use of reactive and proactive control; 2) the unreliable detection of the slow wave in the traditional Flanker task may be indicative of individual differences in the use of proactive control regardless of task demands. Future research should examine what factors other than the current task demands may influence individuals to rely more on reactive or proactive control.
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12:00-1:30 PM (4016)

Latent Input Joint Model Analyses of Intra-trial Conflict During Perceptual Decisions. EMILY WEICHART, *University of Virginia*, BRANDON TURNER, *The Ohio State University*, PER SEDERBERG, *University of Virginia* (Sponsored by Per Sederberg) – Neurophysiological studies using cognitive control paradigms have provided insight into how the competition between choice alternatives, or conflict, is represented in the brain. We incorporated an accumulator-based calculation of conflict into the Shrinking Spotlight model, a single-process model of the flanker task featuring a drift rate that changes over time within a trial as a function of a shrinking attentional spotlight. Through model comparison analyses, we demonstrated that model variants featuring conflict-based evidence accumulation processes provided superior fits to behavioral data across cognitive control tasks relative to time-based alternatives. We then investigated the neural plausibility of conflict-based attentional spotlight mechanisms. Participants completed a version of the Eriksen flanker task while EEG data was recorded. After fitting the models of interest to each subject's behavioral data, we investigated the relationship between model-generated conflict and the observed neural response at the level of each individual trial. The current work demonstrates a method for evaluating intra-trial mechanistic model predictions as they relate to neural signal measured by EEG.
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12:00-1:30 PM (4017)

Modulation of Cognitive Restoration Dependent on Time Spent in Natural Environments. RACHEL J. HOPMAN, SARA B. LOTEMPLIO, EMILY E. SCOTT, and DAVID L. STRAYER, *University of Utah* (Sponsored by David Strayer) – According to the Attention Restoration Theory, spending time in natural environments can restore cognitive functioning, decrease stress, and improve cognitive performance. Previous research shows prolonged exposure to natural environments changes cognitive processing and neural activity. Specifically, electroencephalography (EEG) research shows those who have spent prolonged time in natural environments have decreased theta (4-8 Hz) power in the midfrontal regions due to a downregulation of the attentional control network, thus restoring neural regions associated with attentional processing. However, research has yet to determine the time course of the restorative experience. In this series of studies, EEG was collected during a resting baseline period from 104 participants before, during, and after a four-day nature trip to determine the amount of change in neural activity associated with attentional fatigue. Midfrontal theta power, extracted using a fast Fourier transform, significantly decreased from pre-trip testing each day during the nature exposure and increased each week after the trip. These findings show that exposure to natural environments influences attentional processing and that the effects are additive over time.
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12:00-1:30 PM (4018)

Different Prefrontal Cortex Regions Mediate Unintentional and Intentional Forgetting. BRITTANY M. JEYE and SCOTT D. SLOTNICK, *Boston College* (Sponsored by Scott Slotnick) – The prefrontal cortex (PFC) is widely thought to mediate inhibition during unintentional forgetting in the retrieval practice (RP) paradigm and intentional forgetting in directed forgetting (DF) and think/no-think (TNT) paradigms. However, it is unknown whether the same or different regions of the PFC are recruited during unintentional forgetting and intentional forgetting. In the present study, we performed an activation likelihood estimation meta-analysis of 26 fMRI studies to identify the PFC regions associated with RP, DF, and TNT paradigms. Preliminary results indicated that left lateralized PFC regions were associated with RP paradigms and right lateralized PFC regions were associated with DF and TNT paradigms. Furthermore, across DF and TNT paradigms, there were three common regions in the right PFC, while there were no common PFC regions between RP and DF or RP and TNT paradigms. These results suggest that different inhibitory control processes mediate unintentional and intentional forgetting.
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12:00-1:30 PM (4019)

The Importance of Inattention and Convergent Thinking in Creative Idea Generation. RACHEL APPEL, MAREIKE B. WIETH, and ANDREA P. FRANCIS, *Albion College* (Presented by Mareike B. Wieth) – A decrease in attentional processes has been linked to increased creativity (Wieth & Zacks, 2011). White and Shah (2006) found that individuals with ADHD generated more creative uses on the Alternative Uses Task (AUT; Guilford, 1967) than individuals without ADHD. Using a think-aloud procedure, Gilhooly et al. (2007) found participants initial responses on the AUT were based on retrieval of general uses in memory, while later responses required cognitive control processes related to convergent thinking. This study explored the role of inattention and convergent thinking on creative idea generation for items with high (paperclip and newspaper) and low (picnic table and Uno cards) memory retrieval. Similar to previous research, inattention positively predicted creative uses. However, for low memory retrieval items, an interaction indicated that higher levels of inattention and higher convergent abilities related to more creative idea generation. This study highlights the importance of convergent thinking in the generation of non-memory based creative uses.
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12:00-1:30 PM (4020)

Sources of Cue-Transparency Effect in Task-Set Activation: An Eye-Tracking Study. ERINA SAEKI, *Kobe-yamate University*, SATORU SAITO, *Kyoto University* – A transparent and meaningful cue that is given for selecting a target task can produce a faster response than an arbitrary cue. We conducted an eye-tracking study to investigate the effect of cue transparency on activating task information. We used a transparent word (Kanji) cue and an arbitrary sign cue and separately examined the effect of cue transparency on stimulus-selection and response-execution by manipulating cue-target interval (CTI). The analysis of eye movements indicated that compared to the arbitrary sign cue, the transparent word cue decreased both stimulus-selection time and post-selection response-time under a short CTI, whereas under a long CTI, the arbitrary cue indicated similar stimulus-selection times and post-selection response times to the word cues, in the latter half of the experiment. These results suggest that transparent word cues activate all the task information quickly and strongly including the stimulus dimension and the S-R rule. In contrast, arbitrary cues do not activate task information to a similar degree under a short preparation time. Moreover, even when given long preparation time, arbitrary cues needed to practice to achieve similar performance as transparent cues.
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BILINGUALISM II

12:00-1:30 PM (4021)

Tracing Bilingual Advantage in Inhibition: SEM Approach. PATRYCJA KAŁAMAŁA, JAKUB SZEWCZYK, MAGDALENA SENDERECKA, ADAM CHUDERSKI, and ZOFIA WODNIECKA, *Jagiellonian University in Krakow* (Sponsored by Michał Wierzchoń) – In recent years, the criticism on the bilingual advantage (BA) has increased due to drawbacks in study designs and failures in replicating positive results. The situation generates the need for a more rigorous, theory-driven approach and powerful designs. The adaptive control hypothesis offers an interesting insight into the origin of the BA: different patterns of using two languages implicate different demands on bilinguals' executive functions (EF), determining their effectiveness. The present study aimed to test the hypothesis by investigating the mechanism of inhibition among bilinguals representing different patterns of using two languages. We ran a large-scale experiment and employed extensive battery of experimental tasks on inhibition against a group of 213 Polish-English bilinguals. To test the hypothesis, we planned to use a latent variable approach, which would enable us to compare inhibitory skills among different types of bilinguals. However, the model of inhibition had low explanatory power: although the tasks have good reliabilities, they scarcely correlate among each other. Together, the study calls into question the inhibition as a unitary construct and shows why tracing of the BA in EF is so far complicated.
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12:00-1:30 PM (4022)

The Influence of Bilingual Language Experience on Resistance to Interference in Young Adults: Looking Beyond Spoken Language Proficiency. DEEPTI WADHERA and KLARA MARTON, *The Graduate Center, City University of New York* (Sponsored by Patricia Brooks) – Bilingual speakers' language experience has been shown to affect their cognitive control processes across the lifespan. The nature of this relationship is complex because bilingual individuals differ in various aspects of their language experience and cognitive control encompasses multiple processes. One function that has been repeatedly highlighted in the literature is resistance to proactive interference. We examined the relationship between the bilingual experience and interference control in 43 bilingual young adults with high spoken proficiency of English and another language. Two proactive interference tasks were used; a word categorization with a conflict paradigm and a working memory updating letter n-back task with lures. Age of language acquisition and bilingual literacy were used as predictors in multilevel mixed-effects analyses. Non-English literacy significantly predicted performance in both interference tasks. Individuals with high non-English literacy scores showed more efficient resistance to interference than individuals with low biliteracy scores. The results highlight the role of biliteracy and show that the bilingual experience that interacts with cognitive control processes is not limited to spoken language.
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12:00-1:30 PM (4023)

Exploring the Bilingual Advantage in Cognition: Comparing Monolinguals to Early- and Late-Bilinguals. LIAM J. GLEASON and STEPHANIE A. KAZANAS, *Tennessee Technological University* – Recent studies comparing cognitive abilities across monolingual and bilingual populations have produced varied results. Some argue that cognitive differences, namely in the form of bilingual advantages, result from more

frequent and complex language-switching experiences, while others are more tentative in their conclusions.. The current study aimed to extend these efforts and compare cognitive performance across monolinguals, early-bilinguals, and late-bilinguals. All participants completed a series of tasks, including the n-back, flanker, and Stroop tasks. Bilingual participants also completed the Language Experience and Proficiency Questionnaire (LEAP-Q; Marian, Blumenfeld, & Kaushanskaya, 2007) to determine their status as early- or late-bilinguals. Overall, it appears that late-bilinguals excel on memory tasks relative to both monolinguals and early-bilinguals. We surmise that this particular type of advantage is due to late-bilinguals' exposure to memory-based activities in their foreign language coursework. Results from the attention tasks contribute to the ongoing debate regarding bilingualism and executive processing.
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12:00-1:30 PM (4024)

Inhibition Accumulates Over Time at Multiple Processing Levels in Bilingual Language Control. DANIEL KLEINMAN, *University of Illinois at Urbana-Champaign*, TAMAR H. GOLLAN, *University of California, San Diego* – It is often assumed that bilinguals enable production in their nondominant language by inhibiting their dominant language temporarily, fully lifting inhibition to switch back. In a re-analysis of data from 416 Spanish-English bilinguals who repeatedly named a small set of pictures while switching languages in response to cues, we separated trials into different types, revealing multiple cumulative effects. Bilinguals named each picture more slowly for each time they had previously named that same picture in the other language, an effect that was equivalent across languages and implies symmetric lateral inhibition between translation equivalents. In addition, they named pictures in the dominant language more slowly for each time they had previously named unrelated pictures in the nondominant language, exhibiting asymmetric language-wide inhibition. By dynamically altering the balances of activation between languages and lemmas, these mechanisms naturally explain several key signatures of bilingual control (block order effects, reversed dominance). Our results indicate that inhibition is applied cumulatively at both local and global levels during bilingual language production, persisting long after each individual act of selection.
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12:00-1:30 PM (4025)

Variability in Bilingual Lexical Access Driven by External Social Factors. DANIEL J. OLSON, *Purdue University* – Previous research has demonstrated that bilinguals are slower switching into their dominant vs. non-dominant language (Meuter & Allport, 1999). Moreover, switch costs are modulated by individual (proficiency: Schwieter & Sunderman, 2008) and linguistic factors (language ratio: Olson, 2016; stimuli factors: Gollan & Ferreira, 2009). Within an inhibitory framework, these results suggest a gradient interpretation of inhibition (Green & Abutalebi, 2013). The current study explores variability in language switching costs considering an external factor: social environment. A picture-naming study, in which participants produced English/Spanish depending on background color, was conducted with L1-dominant bilinguals in two social environments (USA, Spain). As sessions were a few days apart, no change in proficiency was observed (DELE: Montrul et al., 2008). Preliminary results (19,584 tokens) show a significant difference in switch costs between the two social environments, with less asymmetry in the L2-environment. Findings suggest a flexible inhibitory mechanism sensitive to external social factors.
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12:00-1:30 PM (4026)

Challenge Your Brain! A Longitudinal Study of Possible Benefits of Multilingualism on Episodic Memory Recall. JESSICA K. LJUNGBERG and DANIEL ERIKSSON SÖRMAN, *Umeå University* – Recenty, Ljungberg et al (2013) found beneficial memory effects in bilinguals compared to monolinguals in verbal episodic recall and verbal letter fluency applying a longitudinal design. In the present study, we aimed to longitudinally investigate if these advantages in memory were even larger in multilinguals. Participants between 35 and 70 years at baseline were drawn from the Betula Prospective Cohort Study of aging, memory, and health. Results revealed a positive cumulative effect of knowing several languages at first testing session and across time both in episodic memory recall and in letter fluency. As predicted, based on results from previous data from the same study sample, no advantages was found in the categorical fluency task. With respect to the cognitive reserve hypothesis, these findings indicate that language learning may be a factor that contribute to enhanced cognitive ability over the life course.
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12:00-1:30 PM (4027)

The Effects of Bilingualism and Stereotype Cues on Measures of Executive Function. JOSEPHINE O'MALLEY, VIRGINIA VALIAN, and PAUL FEITZINGER, *Hunter College, City University of New York* (Sponsored by Virginia Valian) – The existence of a bilingual advantage in executive function (EF) has been greatly contested in the literature. We examine the effects of bilingualism and stereotype cue on two EF tasks, the Wisconsin Card Sorting Task (WCST; shifting) and the Flanker task (inhibition). Participants were recruited from an undergraduate sample (N=162) and Amazon Mechanical Turk (N=91). They were identified as monolingual or multilingual using self-reported language proficiency scores, and were randomly shown a stereotype threat cue, stereotype lift cue, or control cue before completing the EF tasks. Multiple regression revealed no differences in accuracy or reaction time between any language or stereotype cue group on the WCST for either participant source. Undergraduate monolinguals were slower on the flanker task (β=-.305, $t(93)$=-3.16, $p<.01$) and had larger conflict effects (β=-.224, $t(93)$=-2.12, $p<.05$), but were more accurate than bilinguals on incongruent trials (β=-.265, $t(93)$=-2.55, $p<.05$), suggesting a speed-accuracy trade-off rather than a true bilingual advantage in inhibition.
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12:00-1:30 PM (4028)

An Online (Re)examination of Frequency and Context Effects in Code-Switching Using the Auditory Moving Window. ROBERTO R. HEREDIA, *Texas A&M International University*, TANJA ANGELOVSKA, *University of Salzburg*, ANNA B. CIEŚLICKA, *Texas A&M International University* – Three experiments examined the processing of code-switched sentences by bilinguals from a community known to code-switch, and an English-dominant bilingual community. Bilinguals participated in the auditory moving window task in which successive sound segments of a sentence (e.g., "Quiero^hamburguesa^con^PICKLES") were presented one at a time. In Experiment 1, participants listened to Spanish sentences in which the critical target was either a code-switch (|'pIk(ə)ls|) or a borrowing (i.e., |pikos|). Experiment 2 compared code-switched versus non-switched targets within Spanish sentences. Experiment 3 was a direct replication of Experiment 2 but with English sentences. Context (low- vs. high constraint) and word frequency (low vs. high) were manipulated as well. Results showed that code-switched targets took longer to be integrated into the linguistic processing system; high frequency words affected bilingual processing; there was evidence of contextual effects. Results are discussed in terms of the featural restriction model.
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12:00-1:30 PM (4029)

Do our Languages Shape How We Recruit Phonology? Eye Movements Reveal Bilingual Listeners' Phonological Units in Spoken Word Recognition. YU-CHENG LIN, *University of Texas, Rio Grande Valley*, PEI-YING LIN, *University of Saskatchewan* – How does language shape the size of the phonological unit in bilingual spoken word recognition? This unanswered question was addressed by three eye-tracking visual world experiments. Previous monolingual studies have showed that native English and Mandarin Chinese speakers use the grain size of the phonological units differently – English uses the phoneme to recognize spoken words, while the Chinese phonological unit relies on the syllable. In Experiment 1, Chinese-English bilingual listeners exhibited an increased phonological competition effect of the syllable-sized unit in Chinese, suggesting the predominant role of syllables in the L1 Chinese spoken word recognition. Experiments 2 and 3 showed that increased phonological competition effects of the phoneme were exhibited by both Chinese-English bilinguals and native English monolinguals, revealing that the most prominent unit of the L2 English spoken word is a phoneme. Thus, our eye movement data provide direct support for the language-specific hypotheses of phonology that, depending on the type of language involved, bilingual listeners recruit different sizes of phonological units while listening to spoken words.
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12:00-1:30 PM (4030)

¿Quién Dijo What? Source Language and Voice Memory in Bilingual Speakers. ILEANA RATIU, *Midwestern University*, TAMIKO AZUMA, *Arizona State University* – In bilinguals, lexical representations must include salient language-specific information for the comprehension and production of words across languages. It is not clear how that language-specific information is encoded in memory. A bilingual may easily identify a word as being English or Spanish, but can they accurately identify the original source language at a later testing? This study examined whether the encoding of language-specific information is similar to the encoding of other source details, such as speaker voice. Seventy-nine Spanish-English bilingual participants verified short English and Spanish phrases spoken by either a male or female speaker. After a distractor task, they received a surprise recognition test, which involved the identification of the source language and voice details. Participants were more accurate at identifying the source language than source voice details; however, the pattern differed for English vs. Spanish items. Interestingly, voice mismatch between study and test detrimentally affected participants source language identification. The findings suggest that memory for language specific information is affected by language proficiency and other source details during encoding or retrieval.
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12:00-1:30 PM (4031)

A Mixed Method Study of Emotion Processing in a Highly Proficient Multilingual Population. ASIYA AYOOB JAFFERANI, *University of Nottingham*, DANA M. BASNIGHT-BROWN, *United States International University* (Sponsored by Dana Basnight-Brown) – The study of emotion in bilingual populations has historically focused on processing differences between one's first (L1) and second languages (L2). Specifically, it has been shown that emotional stimuli in the L1 activate stronger physiological responses (see Caldwell-Harris, 2015), as well as differences in ratings, personal narratives, and memory retrieval (see Dewaele, 2008). In the current study, highly proficient multilinguals in Sub-Saharan Africa participated in a mixed design study aimed at understanding processing differences between one's L1, L2, and L3. Results from a qualitative narrative experiment revealed that the L1 was most often used to express negative emotions, while the L2 and L3 were used to express positive emotions, revealing that language selection depended on valence. Quantitative results when the Affective Simon Task was used to examine whether emotionality was captured automatically in the L2 and L3, revealed significant congruency effects for positive emotion words only, suggesting that negative words in those languages were not as strongly encoded. This will be discussed in terms of the implications this has on L2 and L3 language acquisition for multilingual speakers.
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12:00-1:30 PM (4032)

Investigating Syntactic Co-Activation in Bilingual Language Processing: An Event-Related Potential Study. ALICIA LUQUE and KARA MORGAN-SHORT, *University of Illinois at Chicago* – In order to understand bilingualism, we must examine the way in which bilinguals process their languages as well as how their languages interact and influence each other (e.g., Bialystok et al., 2010; Kroll et al., 2014). Relatively little

research has addressed this phenomenon for syntax. One event-related potential (ERP) study (Sanoudaki & Thierry, 2014) showed syntactic co-activation as Welsh-English bilinguals completed a picture-sentence matching Go/No-Go task in English: Bilinguals evidenced a N200 ERP effect reflecting response inhibition due to the syntactic structure of Welsh. The current study has replicated these findings with Spanish-English bilinguals. Ongoing analyses address the relationship between bilinguals' Spanish verbal fluency and the degree of syntactic co-activation of Spanish during the English Go/No-Go task, as assessed by magnitude of the N200 component. Thus, the current study provides additional evidence for syntactic co-activation during bilingual language processing and will address factors that may modulate this phenomenon.
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12:00-1:30 PM (4033)

Influence of Orthographic Forms on Second Language (L2) Pronunciation in Cantonese Experienced L2 Learners of English. KA MAN AU YEUNG and KIT YING CHAN, *City University of Hong Kong* (Presented by Kit Ying Chan) – This study explored the influence of orthographic forms on second language (L2) pronunciation in Cantonese experienced L2 learners of English with different levels of L2 proficiency and phonological awareness. Fifty-four native Cantonese speakers completed a homophone recognition task and a word-reading task involving the pronunciation of "silent letter" that indicate the orthographic influence. Participants' phonological awareness was measured by three tasks: segmentation, phoneme deletion and pseudo-word read aloud. Participants' English proficiency level was based on their results in a local public exam. The average error rates for the homophone recognition and word-reading tasks were 38.5% and 36.8%, respectively. More than 50% of participants pronounced the silent letter in the word-final position. Orthographic effect on pronunciation was negatively correlated with phonological awareness and L2 proficiency. These results suggested that orthographic forms affect L2 learners' pronunciation, especially those with lower phonological awareness, even their first language's writing system is not phonologically transparent.
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12:00-1:30 PM (4034)

Second-Language Exposure Impacts the Scope of Speech Planning During First- and Second-Language Picture Naming. ANNIE C. GILBERT and DEBRA TITONE, *McGill University* – In language production, people plan the meaning they wish to convey (semantics), the sounds of their utterances (phonology), and motor movements (articulation) to physically produce their utterances. Past work investigating the scope of speech planning in picture naming commonly manipulated word length to vary planning demands, but has yielded mixed results. Here, we investigate whether individual differences in language experience may be responsible. Fifteen FrenchL1-EnglishL2 bilinguals, varying in L2 exposure and age of L2 acquisition; L2 AOA) performed an L1 and L2 picture naming task that manipulated word length. Latencies for FrenchL1 trials yielded no word length effect, but were longer with increased L2 exposure. Conversely, speech onset latencies for EnglishL2 trials were jointly modulated by word length and L2 exposure; L2 AOA failed to modulate L1 or L2 planning. These results highlight the importance of individual differences, and have implications for theories of L2 production, and usage-based models generally.
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12:00-1:30 PM (4035)

Tip-of-the-Tongue After any Language: Cross-Language Interference Is Not What It Appears To Be. ALENA STASENKO, *San Diego State University/University of California, San Diego*, TAMAR H. GOLLAN, *University of California, San Diego* (Sponsored by Tamar Gollan) – Bilinguals commonly report that one language feels less accessible after immersion in another, but empirical support for this experience is minimal. Recently, Kreiner and Degani (2015) reported that Russian-Hebrew bilinguals had more tip-of-the-tongue states (TOTs) in Hebrew after watching a movie in Russian. Aiming to replicate this work we tested 72 Spanish-English bilinguals and 72 monolingual controls in a similar protocol. Surprisingly, both bilinguals and monolinguals exhibited a significant and similarly sized movie interference effect such that TOTs increased and correct retrievals decreased post-movie. Follow-up experiments with an additional 72 monolinguals in each of four additional conditions including a) Russian movie, b) Spanish movie with English subtitles, c) ASL movie, and d) playing Tetris all demonstrated similar effects with the exception of the Tetris condition. These results suggest immersion interferes with native language speech production, not via between-language competition for selection, but rather by lower-level processing of abstract phonology.
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12:00-1:30 PM (4036)

The Role of Different Scripts in Bilingual Word Production. NORIKO HOSHINO, *Tsuda University*, LAURA RODRIGO CRISTOBAL, *The Pennsylvania State University*, HIROMU SAKAI, *Waseda University* – When bilinguals plan to speak, both languages are activated regardless of language similarity. However, some research suggests that language similarity may modulate the degree of language co-activation. The present study examined the role of script in bilingual word production. Specifically, Japanese-English bilinguals whose two languages differed in script were asked to perform a picture-word interference task. Half of the participants named a set of pictures in English while ignoring visually presented Japanese distractor words. The other half named the same set of pictures in English while ignoring English distractors. The results showed that the English distractor group experienced semantic and phono-translation interference, whereas the Japanese distractor group did not. These results suggest that when the script in the nontarget language is perceptually available as a nontarget language cue, Japanese-English bilinguals appear to reduce the degree of cross-language competition and select the language of production earlier although distractors could increase the

activation of the nontarget language. The implications of the results will be discussed for the models of lexical access during bilingual word production.
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12:00-1:30 PM (4037)

Phonetic Accommodation Between Interlocutors With Different Language Backgrounds. KUNNING YANG, *University of Kansas*, ANNIE J. OLMSTEAD and NAVIN VISWANATHAN, *Pennsylvania State University* – Phonetic accommodation is the phenomenon of interlocutors adjusting aspects of their speech throughout an interaction. In the current experiment, we asked how interlocutors with different language backgrounds accommodate to each other when solving a specific problem. Specifically, we examined pairs of native English speakers and Mandarin speaking English learners, and pairs of two learners while they performed a word matching task. Stimuli were English words that contain difficult, non-native phoneme contrasts for Mandarin speakers, such as beat/bit/bid. Participants were tested on individual word naming tasks, and a collaborative word matching task, in which one participant read the target word, the other participant identified the word they heard. Acoustic properties of the vowels and final consonants of words were measured to assess accommodation. Specifically, we focused on length and spectral characteristics of the vowel. Implications for how language background affects language accommodation in collaborative speech acts is discussed.
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12:00-1:30 PM (4038)

Age of Acquisition Effects in Verbal Fluency Performance of Proficient Spanish-English Bilinguals. EVE HIGBY, *University of California, Riverside*, MELISSA CASTILLO, KELLY MEDINA, and DANIELA CASTILLO, *City University of New York Graduate Center* – The age of second-language acquisition affects the organization of the mental lexicon (Hernandez, Li & MacWhinney, 2005). We asked whether verbal fluency production differs for highly proficient Spanish-English bilinguals who learned English at various ages. We divided the 60-second trials for two semantic and two phonemic fluency trials in each language into six time bins and calculated number correct, average lexical frequency, and percentage of cognates in each bin as well as overall. Despite their later age of L2 acquisition, late bilinguals produced just as many responses in English as early bilinguals, but early bilinguals produced fewer Spanish responses ($p < .001$). Late bilinguals produced more high-frequency words in English than early bilinguals ($p = .005$). Time courses did not differ between groups. Late bilinguals showed more balanced proficiency in the two languages than early bilinguals, but their average higher-frequency responses in English may indicate lack of semantic category depth.
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12:00-1:30 PM (4039)

Does Chocolate Elicit More Intrusion Errors? CHUCHU LI and TAMAR GOLLAN, *University of California, San Diego* – The current study investigated the contribution of phonology to bilingual language control in connected speech. Mandarin–English bilinguals read aloud paragraphs either in Chinese or English, while 6 words were switched to the other language in each paragraph. The switch words were either cognates or noncognates, and switching difficulty was measured by production of cross-language intrusion errors on the switch words (e.g., mistakenly saying 巧克力 (qiao3-ke4-li4) instead of chocolate). All the bilinguals were Mandarin-dominant, but produced more intrusion errors when target words were written in Chinese than when written in English (i.e., they exhibited robust reversed dominance effects). Most critically, focusing on Chinese target words, bilinguals produced significantly more intrusions on cognates than noncognates, but conversely were also better at detecting and self-correcting theses same intrusions on cognates early. Phonological overlap boosts dual-language activation thus leading to greater competition between languages, and increased response conflict, thereby increasing production of intrusions but also facilitating error detection during speech monitoring.
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12:00-1:30 PM (4040)

Impact of Contextualized Visual and Auditory Comprehension Exposures on Bilingual Word Production. BIANCA V. GURROLA, MICHELLE MARTÍNEZ, JOSEPH A. NEGRON, PRISCILLA MEDELLÍN, and WENDY S. FRANCIS, *University of Texas at El Paso* (Sponsored by Wendy Francis) – Two bilingual experiments tested whether words encountered during sentence comprehension would exhibit facilitation in later spoken production. In Experiment 1 ($N = 112$), all word and sentence stimuli were presented in the visual modality, and in Experiment 2 ($N = 112$), all stimuli were presented in the auditory modality. In the encoding phase, in order to practice word comprehension processes, participants read (listened to) words and sentences and translated words and sentences that were presented in the language that would be used to name pictures at test. In order to practice production processes, they translated other words and sentences to the language that would be used to name pictures at test. We measured repetition priming by comparing picture-naming RTs for new and repeated items. The effects of context, processes practiced, language proficiency, word frequency, and comprehension modality were assessed. Supported by NSF Grant BCS-1632283.
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PSYCHOLINGUISTICS II

12:00-1:30 PM (4041)

Phonetic Correlates of Sublexical Contributions to Reading Aloud Familiar Words. SARAH T. IRONS and SIMON J. FISCHER-BAUM, *Rice University* (Sponsored by Simon Fischer-Baum) – The ability to read words aloud requires the cognitive systems responsible for visual word recognition and speech production. In dual-route connectionist (DRC) models of reading (Coltheart et al., 2001), there is cascading activation from the initial orthographic analysis extending through the lexical and sublexical processes to level of representation argued to correspond to the post-lexical phonological level in theories

of spoken production (Goldrick & Rapp, 2007). Previous studies of speech production have used phonetic measurement as a tool to evaluate how information cascades from post-lexical phonological planning to articulatory implementation by demonstrating phonetic traces of the phonemes activated, but not selected (Goldrick & Blumstein, 2006). Using this logic, in irregular inconsistent words, we investigated whether there are phonetic traces of the phonological plan generated by the sublexical route, even when participants correctly read words aloud using the pronunciation generated by the lexical route.
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12:00-1:30 PM (4042)

Working Memory, Cognitive Load, and Overspecification During Referential Communication. JULIE BANNON and KARIN R. HUMPHREYS, *McMaster University* – According to Grice's (1975) maxim of quantity, speakers should include only the precise amount of information needed to convey a message. However, research in referential communication has shown that speakers often include superfluous reference to features of an object, resulting in overspecified descriptions. There has been ample research investigating the contexts that influence the likelihood of overspecification, but less is know about the underlying cognitive mechanisms that support this behaviour, or the relationship between overspecification and other characteristics of speech. The current research investigates the relationship between working memory capacity (WMC), cognitive load, and referential overspecification. Results show a negative correlation between WMC and overspecification in the high load condition, suggesting that individuals with lower WMC are more likely to use an inefficient communicative strategy when working memory is taxed. Negative correlations between overspecification and speech rate were observed in the no load and low load conditions, but not in the high load condition. This suggests that the relationship between overspecification and speech characteristics varies depending on the amount of load.
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12:00-1:30 PM (4043)

Using Errors to Measure Learning of Phonotactic-Like and Arbitrary Positional Constraints. JILL A. WARKER, *University of Scranton*, SIMON FISCHER-BAUM and CHARLI HOLLOWAY, *Rice University*, RACHEL POIRIER and REGINA FASANO, *University of Scranton* – Speakers implicitly learn artificial phonotactic constraints (e.g., /f/ is only a syllable onset) from speaking syllables that follow those constraints. This learning is reflected in their speech errors. The current research asks whether phonotactic-like constraints are more easily learned than arbitrary positional constraints and whether this learning is domain-general. In Experiment 1, participants recited syllables containing phonotactic-like constraints or arbitrary positional constraints. Their speech errors revealed learning of both constraint types, although learning was greater for phonotactic-like constraints. Experiment 2 tested whether errors would reveal a similar pattern of learning in an immediate serial recall task. Participants saw sequences of items containing phonotactic-like or arbitrary positional constraints and then recalled the order of the items. Errors in recall indicated that both constraint types were learned equally well. These results suggest that the statistical learning mechanism responsible for phonotactic constraint learning has domain-general and language-specific aspects.
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12:00-1:30 PM (4044)

Does Phonotactic Learning Exploit Indexical Features? THOMAS DENBY and MATT GOLDRICK, *Northwestern University* (Sponsored by Matt Goldrick) – Recent work suggests when listeners adapt to novel phonotactic constraints in perception, they are sensitive to indexical features like language background. Listeners were exposed to talker-dependent phonotactic patterns (for Speaker A /f/ is restricted to onset while /s/ is restricted to coda; Speaker B exhibits the reverse constraint). Listeners showed greater adaptation when talkers differed in their language backgrounds (one English, one German talker) vs. when talkers shared a language background (two English talkers). However, adaptation in production may differ from perception; previous work suggests production may utilize simple associative learning mechanisms that may not take high-level indexical features into account. We examine this using speech errors during repetition of syllable sequences from two model talkers (with varying language backgrounds), each talker exhibiting a different phonotactic constraint. A simple associative model predicts error patterns will be insensitive to language background; a model including indexical features predicts results will mirror perception.
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12:00-1:30 PM (4045)

Young Children's Sensitivity to Surprisal Embedded in Different Types of Ba-Construction. DONG-BO HSU, *National Taiwan Normal University* – It has been hypothesized that the less common construction that participates in an alternation leads to (stronger) structural priming effects, i.e., the inverse frequency hypothesis. However, this hypothesis fails to account for the difference in structural priming effects when the same less common construction has different internal structures. The present study capitalizes on the three different internal structures of the ba-construction, each of which was judged grammatical as primes in Mandarin Chinese, to show that they exerted different impact on structural priming effects in Mandarin-speaking five-year-olds. The results suggest that surprisal embedded in each internal structural should provide better accounts for the different structural priming effects of magnitude.
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12:00-1:30 PM (4046)

Using the Semantic Priming Project to Understand Variability in Priming. ERIN M. BUCHANAN and NICHOLAS P. MAXWELL, *Missouri State University*, K. D. VALENTINE, *University of Missouri*, ARIELLE CUNNINGHAM, AMBER M. GILLENWATERS, WILLIAM E. PADFIELD, TABETHA HOPKE, ABIGAIL VAN NULAND, and ADDIE WIKOWSKY, *Missouri State University* – The Semantic Priming Project

was a large-scale effort to provide normed priming data of nearly 2000 concepts (Hutchison et al., 2013), and this data was combined with other lexical and relatedness variables in order to investigate how to predict the variability in priming effects. Word length, frequency, neighborhood/set sizes, and part of speech were used to predict priming effects, along with associative, semantic, and corpora-based relatedness measures. Across lexical decision and naming tasks, we found that priming was most commonly related to word frequency and neighborhood size at the lexical level, associative overlap and set size, semantic feature overlap, and a corpora-based pointwise mutual information measure. Predictive variables were mixed across stimulus onset asynchrony and type of prime-target relatedness portraying a medium effect size prediction, displaying the difficulty in capturing the variability in simple priming effects. Item versus subject level regression approaches will also be discussed.
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12:00-1:30 PM (4047)

Effects of Linguistic Focus and Lexical Frequency on Reading Times. MATTHEW W. LOWDER, *University of Richmond*, FERNANDA FERREIRA, *University of California, Davis* – Previous work has suggested that information that is linguistically focused in a sentence is encoded into memory more effectively than information that is not focused. This would suggest, then, that increases in linguistic focus should be associated with longer online processing times—a pattern that has been demonstrated in some experiments, but not others. We conducted two eyetracking-while-reading experiments to further examine the role of linguistic focus on processing times. In addition, we introduced a word-frequency manipulation to gain additional insight into the cognitive mechanisms underlying this effect. Experiment 1 manipulated focus using cleft constructions. Results showed overall longer processing times when words were focused versus defocused; in addition, the magnitude of the word frequency effect was reduced when target words were focused, suggesting that linguistic focus enhanced lexical encoding. Experiment 2 manipulated focus using a contrast between simple sentences and relative clauses. Although effects of frequency emerged, there were no effects of the structure manipulation. The results suggest that focusing constructions enhance lexical encoding, but only for strong forms such as clefts.
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12:00-1:30 PM (4048)

Phonology and Individual Differences in Incidental Vocabulary Learning During Reading. MEGAN E. DEIBEL and JOCELYN R. FOLK, *Kent State University* – Previous research has demonstrated that readers can learn new words incidentally during silent reading (Williams & Morris, 2004). Researchers have also found that novel homophones are more difficult to learn incidentally than nonhomophones (Brusnighan, Morris, Folk, & Lowell, 2014). Reader skill may influence these findings, since lower skilled readers are more influenced by phonology while reading and take more time to recover from homophone confusion than higher skilled readers (Perfetti & Hart, 2002). Following up this work, we investigated how phonology and lexical skill interact during incidental vocabulary learning. Lexical skill was determined through tests of spelling, vocabulary, and naming. Novel homophones (e.g. 'skarph') or novel nonhomophones (e.g. 'gloobs') were embedded in sentences containing context indicating the intended meaning of the novel word. Readers' eye movements were recorded, and surprise vocabulary and spelling tests were given afterwards. Results indicated that, across skill level, novel nonhomophones were learned more easily than novel homophones. However, novel homophones were difficult to learn regardless of lexical skill, indicating the important role of phonology in word learning during reading.
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12:00-1:30 PM (4049)

Spatial Language and Reference Tracking. ANSLEY POTTER and AMIT ALMOR, *University of South Carolina* (Sponsored by Amit Almor) – Repeated proper name references to the most salient referent in the discourse are read slower than pronoun references to the same referent. Previous fMRI research suggested that the brain regions underlying this effect are the same regions engaged to track objects in space. We tested the hypothesis that linguistic reference tracking engages spatial cognitive processes and that pronoun and repeated proper names engage these processes differently, with pronouns utilizing spatial neural circuits more efficiently. Results from two experiments involving a reading and image verification task indicate that both repeated references and pronouns facilitate responses in spatial contexts more than in non-spatial contexts. In contrast, new references did not show any difference between spatial and non-spatial contexts. Overall, this indicates that reference tracking is facilitated in spatial contexts although the effect appears similar for both repeated references and pronouns.
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12:00-1:30 PM (4050)

Investigating the Influence of Orthographic and Phonological Similarity Structure of Language Networks on Visual Word Recognition: Insights From Megastudies. CYNTHIA S.Q. SIEW, *University of Warwick* – The mental lexicon, the part of long-term memory where lexical representations are stored, can be represented as a language network consisting of words that are connected if they are phonologically or orthographically similar to each other. Network measures of phonological and orthographic similarities (degree, clustering coefficient, closeness centrality) were calculated for various alphabetic languages (English, Dutch, German, French, Malay). Using behavioral data from megastudies of visual word recognition, stepwise regression models were employed to select the best model (while minimizing model complexity) that could account for reaction times and accuracies in visual naming and visual lexical decision tasks. Across languages and tasks, word frequency and a number of network similarity measures consistently emerged as variables in the best performing model. Although the variance accounted by network measures is small compared to word frequency, their membership in the best

performing models suggest that lexical processes involved in visual word recognition are universally sensitive to the local and global similarity structure of language.
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12:00-1:30 PM (4051)

Minding Inconsistency: Second Language Learning Changes Sensitivity to Inconsistent Spelling-Sound Mappings in the Native Language. MONA ROXANA BOTEZATU, *University of Missouri*, JUDITH F. KROLL, *University of California, Riverside*, MAYA MISRA, *Previously at the Pennsylvania State University*, CAROL A. MILLER, *Pennsylvania State University* – This presentation examines the consequences of bilingualism on word reading in the native language. Decades of research on word reading in a deep orthography such as that of English have revealed that mapping spellings to sound is easier when spellings have one-to-one grapheme-phoneme correspondences, a property known as regularity and when spellings map to a single phonological representation, a property known as consistency. Effects of spelling-sound regularity and consistency are thought to be modulated by reading skill in children, yet to be stable in adulthood. Across a series of behavioral and electrophysiological studies with adult skilled readers, we made a surprising discovery: that these effects are disrupted during the early stages of second language (L2) learning. Replicated in non-native English speakers, where it is modulated by L2-English proficiency, this counterintuitive finding suggests that the magnitude of this typically robust, stable effect may be an early marker of native language change.
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12:00-1:30 PM (4052)

Nonwords Induce Reverse Priming Effects in a Lexical Decision Task. KRISTEN A. BOWMAN, STEPHANIE ROBERTSON, and THOMAS J. FAULKENBERRY, *Tarleton State University* (Sponsored by Thomas Faulkenberry) – In a classic study, Meyer and Schvaneveldt (1971) found that when words shared a similar meaning, participants were faster to make surface-level decisions about these words, demonstrating that word meaning can prime lexical decisions, even if meaning is unrelated to the task. The present study was an extension of Meyer and Schvaneveldt. Participants were presented two strings and asked to respond "yes" only if both strings represented words. We manipulated semantic relationship (related, unrelated) and word type (abstract, concrete). Similar to Meyer and Schvaneveldt, we found that participants responded "yes" faster when words were semantically related. Also, participants responded faster to concrete words than to abstract words. Surprisingly, participants responded "no" slower when words were related, showing a reverse priming effect. This could have been because participants were primed to access the correct spelling of the misspelled word, inducing a decision penalty due to the mismatch with the presented nonword.
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12:00-1:30 PM (4053)

Predicting Sarcasm With Psycholinguistic Features. JACLYN K. MAASS and PAIGE E. TROUT, *University of Central Oklahoma* – The purpose of the current work was to determine if psycholinguistic features could predict sarcasm in written statements. Research has found that interjections (Carvalho, Sarmento, Silva, & De Oliveira, 2009), hyperbolic adjectives/adverbs (Kreuz & Caucci, 2007), words related to sentiment and explicit hashtags in Twitter posts (Bamman & Smith, 2015), and emoticons (González-Ibánez, Muresan, & Wacholder, 2011) can be used to detect sarcasm in text. For the current work, participants consisted of undergraduate students from the University of Central Oklahoma who were given two lists of broad topics. For one list participants wrote a sarcastic statement for each topic and for the other list one serious statement per topic, with the lists presented in random order. A second set of participants were tasked with interpreting whether each statement was intended to be sarcastic or serious. The current work used LIWC2015 (Linguistic Inquiry and Word Count, http://liwc.wpengine.com) to investigate if psycholinguistic aspects such as the use of adjectives, positive or negative emotion words, and comparison words (e.g., "best") could predict sarcasm.
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12:00-1:30 PM (4054)

Reducing Semantic Matching Ironically Boosts Backward Priming. RYAN D. CALCATERRA and KEITH HUTCHISON, *Montana State University* (Sponsored by Keith Hutchison) – The main explanatory mechanism for semantic priming in prime-target pairs containing a backward association (e.g. baby-stork) is a retrospective semantic matching strategy. Accordingly, after target onset, participants search for the presence or absence of a relation between target and prime to bias a "word" or "nonword" response, respectively. If indeed this is the cause of backward priming, then reducing the utility of semantic matching should attenuate backward priming. In our study, we tested semantic priming for forward associates (e.g. keg-beer), backward associates (e.g., baby-stork), symmetric associates (e.g., brother-sister), and integrative pairs (e.g., park-bench) within lists that contained 50% related prime-word target pairs (e.g. cat-dog) and either 0% or 50% related prime-nonword target pairs (e.g. ketchup-mastard) in which the nonword's closest orthographic neighbor was related to the prime. Surprisingly, backward priming was actually boosted, rather than diminished, when we increased the proportion of related word-nonword pairs in the list.
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12:00-1:30 PM (4055)

Extrapolating Semantic Norms for Less-Studied Semantic Dimensions. BRYOR SNEFJELLA, *McMaster University* (Sponsored by Elizabet Service) – Large data sets of semantic norms; measurements of an aspect of word meaning, exist for only for the most studied semantic constructs in psycholinguistics, such as valence, arousal, concreteness, and age of acquisition. Reducing the scarcity of large data sets of semantic norms for

less-studied semantic constructs can be performed through statistical extrapolation, yet existing methods for extrapolation of semantic norms are not well suited for smaller data sets. I present evidence that for small data sets of norms, high-quality extrapolated norms can be derived from a combination of the highest quality available word-embeddings as training data, and the Bayesian LASSO as the predictive model. Using this method, I extrapolate semantic norms for many less-studied constructs, such as the 65 dimension, compositional model of Binder et al. (2016), danger and usefulness ratings (Wurm, 2007), and body-object interaction ratings (Tillotson, Siakaluk & Pexman 2008) and make these extrapolations available for other researchers to use.
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12:00-1:30 PM (4056)

Emoji Use Does Not Predict Relational Closeness. MONICA RIORDAN, *Chatham University* – Non-face emojis convey positive affect and decrease ambiguity in a text message. Riordan (2018) theorized that as a result, they may help build and maintain social relationships. The current project is an exploration as to whether non-face emojis convey the impression of relational closeness. Several stimuli were created in which either person A uses a non-face emoji, person B uses a non-face emoji, both persons A and B use non-face emojis, or neither person A nor B uses a non-face emoji, in a text exchange. Participants were asked to rate the affect of person A and person B as well as how close a relationship they have. Results show that while using non-face emojis make both person A and B seem happier, their use does not lead to higher ratings of relational closeness. Additional exchanges tested whether replacing words with non-face emojis leads to higher ratings of relational closeness than texts in which non-face emojis were appended to the text (i.e., whether the emoji was key to disambiguating the text or not). Results show no effect on relational closeness. Such conclusions suggest that non-face emojis lead to perceptions of positive affect, but they do not necessarily suggest relational closeness between two interlocutors.
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12:00-1:30 PM (4057)

Speech Perception Engages Both Motor Simulation and Abstract Rules. RUTH CORDDRY and IRIS BERENT, *Northeastern University* (Sponsored by Iris Berent) – Across languages, certain syllables are systematically preferred to others (e.g., plaf>mtaf). But whether these preferences are due to abstract linguistic principles or to sensorimotor pressures is unknown. To adjudicate between these possibilities, here, we examine whether people remain sensitive to syllable structure despite articulatory suppression. Participantsheard four types of monosyllables, either labial- (e.g., plaf>pnaf>ptaf>mtaf) or coronal-initial (e.g., traf>tmaf>tpaf>lpaf), arrayed according to their structural well-formedness. Monosyllables were presented mixed with their disyllalbic counterparts (e.g., plaf vs. pelaf). Participants performed a syllable count task (e.g., does plafhave one syllable or two?) while they immobilized either their lips or tongues. Results showed that, compared to tongue suppression, lip suppression selectively reduced sensitivity to labial- (but not coronal) initial syllables. Remarkably, people remained sensitive to syllable structure, irrespective of suppression. Results suggest that speech perception engages both motor simulation and abstract rules.
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12:00-1:30 PM (4058)

Adaptation to Foreign-Accented Speech in Musicians: Preliminary Data. ANNA MARIA DI BETTA and ZOFIA JAKUBIEL-SMITH, *Sheffield Hallam University* – Expert musicians outperform non-musicians at processing tone languages (Delogu et al, 2010), L2 sounds off-line (Slevc & Miyake, 2006), and linguistically-relevant dimensions of non-tonal languages (Intartaglia et al, 2017). The present study investigated whether this advantage extends to the ability to adapt to foreign-accented speech. Monolingual native English speakers (expert musicians/non-musicians) carried out a cross-modal priming task: they heard prime words and made lexical decisions to printed targets (Weber et al, 2014). Primes were English words (e.g., single, dream) containing either /I/ or /i:/ recorded by an Italian speaker in both correct and mispronounced versions (/sINgl/, /si:Ngl/, /dri:m/, /drIm/). Mispronounced primes like /si:Ngl/ are typical for an Italian accent, those like /drIm/ are atypical. Results showed that whilst both groups adapted to the typical Italian accent during the course of the experiment, only musicians adapted to the atypical accent, showing greater flexibility in their speech recognition system compared to non-musicians.
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12:00-1:30 PM (4059)

Pupil Dilation as an Index of Non-Native Speech Category Learning. RACHEL TESSMER, ZILONG XIE, and BHARATH CHANDRASEKARAN, *The University of Texas at Austin* (Sponsored by Bharath Chandrasekaran) – Categorizing non-native speech sounds is a challenging task for adults learning a second language. The dual learning systems theory posits that categories are learned explicitly in early training and implicitly in later training. The current study investigated changes in pupil size as a function of speech category training. Seventeen native English-speaking young adults were trained to categorize Mandarin tones. Results show that pupil size increased more for trials where learners correctly categorized tones in earlier training, while pupil size increased more on trials where listeners did not know the correct category in later training. Individual variability was seen in both speech categorization success and in pupil size patterns across training, with differences in pupil size in early training relating to ultimate learning success. An overall trend of pupil size reduction over the course training is consistent with a posited switch from more explicit to more implicit learning strategies.
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12:00-1:30 PM (4060)

Bilingual Gender Activation: ERP Evidence. ALBA CASADO, *University of Granada*, PILAR FERRÉ, *Universitat Rovira i Virgili*, DANIELA PAOLIERI, *University of Granada* – The present experiment aims to identify the locus of

gender activation in bilinguals, and to compare it with that of the semantic ambiguity effect. We hypothesized that the processing of L2 words for which the gender assignment is different in the two languages will involve a greater cognitive load than the processing of L2 words with the same gender assignment due to the double activation of the grammatical gender feature in both languages. Italian-Spanish bilingual speakers performed a lexical decision task where the gender congruency between languages (congruent vs. incongruent) and words' semantic ambiguity (ambiguous vs unambiguous words) were manipulated. The results showed a modulation of the N400 component related to cognitive load, such as greater amplitudes appeared with gender incongruent unambiguous words, similarly to gender congruent ambiguous words, and in contrast to gender congruent unambiguous words. In conclusion, the activation of the L2 gender when incongruent requires an additional cognitive load.
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12:00-1:30 PM (4061)

McGurk Doesn't Work: Evidence Against the McGurk Effect as a Perceptual Illusion. LAURA M. GETZ and JOSEPH C. TOSCANO, *Villanova University* – Visual speech cues play an important role in speech recognition, and the McGurk effect is a classic demonstration of this. In the original McGurk and McDonald (1976) experiment, 98% of participants reported an illusory 'fusion' percept of /da/ when listening to the spoken syllable /ba/ and watching the visual speech movements for /ga/. However, recent work (e.g., Mallick et al., 2015, PB&R) shows that subject and task differences influence the proportion of fusion responses. In the current study, we varied task (forced-choice vs. open-ended), stimuli (synthetic vs. naturally-produced), and design (mixed vs. blocked audio-visual and single-modality trials). Across all conditions, we found a low number of fusion responses (e.g., 12% for natural stimuli in a 3AFC task). Instead, individuals were either largely auditory (79.5%) or visual (20.5%) responders. Rather than a robust perceptual illusion, we therefore argue that the McGurk effect is a product of individual differences and task demands.
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12:00-1:30 PM (4062)

Representation of Number in Agreement Comprehension. YINGZHAO ZHOU, RHEA T. ESKEW, JR., and NEAL J. PEARLMUTTER, *Northeastern University* – We investigate whether representations of number encoded during comprehension are discrete versus continuous. 306 participants read 160 singular-head stimuli like "The key to the cabinet(s) was/*were rusty...", varying head-local noun number match and grammaticality, mixed with 80 plural-head stimuli, using self-paced reading. We compared reading time distributions (RTDs) for mismatch versus match conditions at the verb phrase. Subject NP number in match cases should be clearly singular; each of these conditions should yield its own single (ex-Gaussian) RTD. In the grammatical mismatch condition, the discrete model predicts a mixture RTD: Either the subject NP is specified as singular, resulting in easy reconciliation with the verb; or the subject NP is specified as plural, resulting in difficult verb reconciliation. The continuous model predicts grammatical mismatch trials should come from a single distribution with a mean between the two match cases. We show that two-distribution mixture models fit better than single-distribution models, supporting the hypothesis that number is represented discretely rather than continuously during comprehension.
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EMBODIED COGNITION

12:00-1:30 PM (4063)

Metaphor Incongruent Effect of Bodily Movement on Selective Attention to Negative Visual Stimuli. YUKI NISHIGUCHI, *Sophia University*, SHU IMAIZUMI and YOSHIHIKO TANNO, *The University of Tokyo* – Metaphorical association between space and emotional valence (i.e., good is up, bad is down) modulates emotional cognition. For example, negative mood facilitates selective attention to emotionally neutral visual stimuli at a lower location. Vertical manual movement can also promote emotional processing such that upward movement promotes recollection of positive memory. This study investigated the effect of orientation of manual movement on selective attention to emotional visual stimuli by integrating joystick manipulation into a dot-probe task. Negative or positive words were paired with neutral words and presented as emotional stimuli. The results revealed that upward movement preceding stimuli enhanced attentional bias toward negative stimuli over horizontal movement. This result is incongruent with the "good is up" metaphor. To speculate, bodily movement might first affect the internal emotional state of participants consistent with the metaphorical association, but secondarily, participants may be more sensitive to the stimuli with emotional valence opposite to their internal state, like the mood incongruent effect.
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12:00-1:30 PM (4064)

Influence of Hand Properties on Visual Attention in a Response-Selection Task. ISIS CHONG and ROBERT W. PROCTOR, *Purdue University* (Sponsored by Robert Proctor) – Embodied cognition accounts of attention have suggested that human attention can be modulated by the basic biological properties of palms (i.e., greater bimodal neuron density attracts attention), whereas other accounts have suggested that attentional benefits are due to the spatial relationships among items. To test these accounts, participants completed two-choice Simon tasks with or without an irrelevant stimulus in the opposite location. Participants held their hands in different referential positions while using foot pedals to make their responses. These postures allowed for stimulus-to-hand relations in which either the palm or the back of the hand faced the critical stimuli. Performance benefited from compatible stimulus-response locations and presentations without an irrelevant stimulus. However, neither an interaction of those two variables nor a hand-to-stimulus relation benefit was

observed. The results imply that the biological properties of one's own hands do not uniquely affect visual attention and response selection.
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12:00-1:30 PM (4065)

Please Remain Standing: Standing Alters Perception and Cognition. KENDRA C. SMITH, *Washington University in St. Louis*, CHRISTOPHER C. DAVOLI, *Central Michigan University*, WILLIAM H. KNAPP and RICHARD A. ABRAMS, *Washington University in St. Louis* (Sponsored by Richard Abrams) – Davoli, Knapp, and Abrams (2009) and Rosenbaum, Mama, and Algom (2017) have shown that standing reduces Stroop interference. We report experiments demonstrating further evidence that standing affects aspects of perception and cognition, including visual search and cognitive control. We compared performance on a visual search task when sitting to performance when standing and found that visual search rate was slower when standing. Further, in a task-switching experiment, switch cost was reduced when participants were standing compared to sitting. These experiments provide additional evidence that standing alters aspects of cognition.
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12:00-1:30 PM (4066)

Investigating Bilingual Advantages: Evidence for Articulatory but not Cognitive Enhancement. DAVID MARTINEZ and JENNY L. SINGLETON, *Georgia Institute of Technology* (Sponsored by Richard Catrambone) – The purpose of this study was to investigate differences in paired-associate learning, phonological short-term memory (STM), and working memory (WM) in monolingual and bilingual individuals. Participants were drawn from a larger study and classified as monolingual if they reported late second language exposure and little fluency and bilingual if they reported high second language proficiency and early exposure. The final sample (N = 114) included 88 monolinguals and 26 bilinguals. Participants completed a variety of tasks assessing the aforementioned constructs as well as tasks assessing fluid intelligence. Analyses were conducted on the full sample of 114 individuals as well as a subsample in which propensity score matching was used to match participants on fluid intelligence. The results consistently revealed a significant bilingual advantage in one measure of phonological-STM, letter span, but no difference on any of the other STM, WM, or lexical learning tasks. One possible interpretation of these results is that being proficient in two languages enhances articulatory fluency, allowing bilinguals to rehearse meaningless sequences of letters at a faster rate compared to monolinguals. Other possible explanations will be discussed.
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12:00-1:30 PM (4067)

Common Constraints in Language and Motor Planning. NATALIE SCHWOB and AMY LEBKUECHER, *The Pennsylvania State University*, MISTY KABASA, JOY KWON, ANDREA MASON, and MARY ELLEN MACDONALD, *University of Wisconsin, Madison*, DANIEL WEISS, *The Pennsylvania State University* (Sponsored by Daniel Weiss) – While language is uniquely human, it is possible that language shares similar constraints with other aspects of cognition observed in nonhuman animals, such as action planning. The current study aims to examine common constraints in motor and language planning by utilizing comparable tasks between domains. These tasks test hysteresis (plan re-use) and easy-first (executing shorter/easier subgoals earlier) constraints in sentence-level language production, reaching, and maze tasks, each with two-alternative responses possible. If planning is similarly constrained across domains, then we predict participants will exhibit both hysteresis and easy-first biases in both motor and language planning tasks. Preliminary results show that participants are demonstrating hysteresis in the reaching task, easy-first in the maze task, and a combination of these plans in the syntactic production task. Future analyses will examine individual behavior across the domains to help shed light on the presence of shared planning constraints between motor and language planning.
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12:00-1:30 PM (4068)

Investigating the Relation Between Declarative Versus Embodied Knowing of Physics Concepts. QUENTIN KING-SHEPARD, ERIC KUO, and TIMOTHY NOKES-MALACH, *University of Pittsburgh* – Much prior work has identified and described students' misconceptions of physical concepts related to force and motion. The majority of this work has assessed students' understanding of these concepts vis-à-vis problem solving and interviews – two modes of activity and measurement that tend to rely heavily on declarative (verbalizable) knowing. We investigated the possibility that for some physics concepts people may have multiple understandings: one based on declarative knowledge acquired through instruction and the other embodied, based on one's physical experiences in the world. If these two forms of knowing are represented separately it is possible that one can have a correct embodied understanding but incorrect declarative knowledge and vice versa. In the current work, we tested whether an individuals' incorrect declarative knowledge can cause misperception and misremembering of physical motion in a video (e.g., a person regaining balance on a balance beam).
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12:00-1:30 PM (4069)

Effects of Embodied Cues on Mental-Rotation Performance in Children. SHIIKA MAKINAE, *Hokkaido University, JSPS*, TETSUKO KASAI, *Hokkaido University* (Sponsored by Junichiro Kawahara) – Embodied cues have been found to facilitate "body analogy" and improve mental rotation performance in adults. The present study examined whether embodied cues are also useful for children. Eighty-nine elementary school children (1-3 grades) participated in a pencil-and-paper task that required mental rotation to indicate solid figures were identical to standards. Imitability of whole shapes and existence of a face at an appropriate position were manipulated, and participants were separated into three groups based on the scores in the condition without the embodied cues. The results indicated that imitability increased in the low

WITHDRAWN

and middle score groups, suggesting a facilitation of holistic rotation with body analogy. Adding face also improved scores in those groups, although it worsened in the high group. This suggests a distractive effect of face involved in performing the current task. Overall, the present results show that children can use embodied cues for body analogy.
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12:00-1:30 PM (4070)

Meditation Alters Representations of Peripersonal Space: Evidence From Auditory Evoked Potentials. VIET HAN H. NGUYEN, SHANNON B. PALMER, JACOB S. ADAY, CHRISTOPHER C. DAVOLI, and EMILY K. BLOESCH, *Central Michigan University* – Meditators often report the sensation of a loss of body boundaries during meditation, but a remaining question is whether these phenomenological reports arise from measurable changes in peripersonal, or near-body, space. In the current study, we identified changes in the representation of peripersonal space through the auditory P300 evoked potential response to stimuli presented at three distances in a soundfield: in peripersonal space, at the boundary of peripersonal space, and in extrapersonal space. In the middle of this task, participants followed a guided meditation that employed body-based imagery. Prior to meditation, the P300 showed a larger amplitude and faster latency for stimuli in peripersonal space. After meditation, however, these differences were eliminated, and the P300 components were similar at all three distances. These findings provide support for meditation's ability to alter peripersonal space boundaries at the neural level, consistent with the perceptual experiences of meditators.
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12:00-1:30 PM (4071)

Tool Actions in Far and Near Space Affect the Distribution of Visual Attention Along the Tool. GEORGE D. PARK, *Claremont Graduate University* (Sponsored by Catherine Reed) – Although prior tool-use studies indicate active tool actions as a prerequisite for changes in visuospatial attention along the tool space, no study has assessed if the kind of active tool action performed leads to different distributions of attention. Two experiments varied a tool's functional action (object push/probe vs. pull/retrieval) and operating space (far vs. near) performed by participants, N = 192. Before and after tool actions, visual attention (mean correct RT and d') was measured using a 50/50, go/no-go target discrimination task while participants held a tool in far space next to three target locations: tool's handle, middle shaft, and functional end. Regardless of pushing or pulling, far space tool actions indicated improved attention only towards the tool's functional end. Near space tool actions indicated distributed attention between tool parts, including the tool's middle shaft. Results reconcile prior conflicting studies and demonstrate that attention to the tool space is influenced by the functional tool actions performed relative to body space.
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12:00-1:30 PM (4072)

Embodied Meaning Contributes to Sound Symbolism in English and Mandarin. CHRISTINE YU, MICHAEL MCBEATH, and ARTHUR M. GLENBERG, *Arizona State University* – Three experiments tested an embodied account of a new sound symbolism phenomenon: For minimal pairs differing only in whether the middle phoneme is /i:/ (e.g., "gleam" and "cream") or /^/ (e.g., "glum" and "crumb"), people find the /i:/-word more positive. The embodied account is based on the fact that saying /i:/ requires musculature similar to smiling, whereas saying /^/ inhibits smiling. In Experiment 1, participants judged /i:/-words as more positive when reading silently. In Experiment 2, we encouraged use of the smiling musculature by asking people to read the words aloud, and we discouraged use of smiling by having people chew gum during the task. As predicted, the effect was enhanced in the speaking condition and reduced in the gum chewing condition. Experiment 3 was a conceptual replication using Mandarin Pinyin in China, and we replicated the effects: The difference between /i:/- and /^/-words was reduced in the gum chewing condition. These results provide a test of one of the few cognitive explanations of sound symbolism, and the cross-language effects demonstrate the generality, if not universality, of the explanation.
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12:00-1:30 PM (4073)

The Vertical Spatial Metaphor of Moral Concepts: Psychological Reality and Bidirectional Mapping. NING JIA and ZHONGYI LU, *Hebei Normal University*, GAOFANG JIANG, *Cangzhou Normal University*, ZHIJIE ZHANG, *Hebei Normal University* – The research through three experiments investigated the psychological reality of moral concept of vertical space metaphor and it's bidirectional mapping. Experiment 1, participants should match the face pictures and moral words. The results confirmed that the psychological reality of the moral concept of vertical space metaphor. Experiment 2, participants should finished a moral evaluation task. The face pictures were evaluated more morality, when they are located higher of the screen. That confirmed the influence of space information on the moral evaluation. Experiment 3, participants should finish a memory task with spatial location information. The results show that the words of morality affects the judgment of spatial information. We can draw the conclusions: moral concepts are represented psychological reality. It was not only possible to mapping from the source domain to the target domain, but also mapping at the opposite direction.
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12:00-1:30 PM (4074)

A Dual Mechanism of Cognition and Emotion in Processing Moral-Vertical Metaphors. ZHONGYI LU, YALING GUO, and NING JIA, *Hebei Normal University* (Presented by Yaling Guo) – A moral concept involves moral cognition（indicated by morality） and moral emotion (indicated by emotionality). By separating emotion from cognition, we conducted three implicit association tests to examine the dual mechanism in processing moral-vertical metaphors. In experiment 1, high morality words formed a stronger association of "moral-

up, immoral-down," which proves the facilitation of moral cognition. In experiment 2, high emotionality words formed a stronger association of "moral-up, immoral-down," indicating the facilitation of moral emotion. Experiment 3 reveals that high morality and high emotionality have a stronger tie with verticality than either condition. The three experiments indicate that both moral cognition and moral emotion facilitate the processing of moral-vertical metaphors, and the forces of the two, which jointly affect the metaphorical connection between morality and verticality, are basically equal, although the processing of moral emotion is faster than moral cognition.
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12:00-1:30 PM (4075)

Do All Sizes Matter? Are Sensorimotor Simulations on Manipulable and Non-Manipulable Objects Affected by Task Demand and Written Word Size? STEVE BUENO, ALIX SEIGNEURIC, and HAKIMA MEGHERBI, *Université Paris 13 Sorbonne Paris Cité*, NATALIE A. KACINIK, *Brooklyn College*, CARSTEN ELBRO, *University of Copenhagen*, JANE OAKHILL, *University of Sussex* – According to the embodied cognition theory, sensorimotor simulations occur while reading words or sentences implying movement. Behavioral studies have mostly used the interference paradigm to test this viewpoint: Participants are requested to perform a specific movement to give their response. This movement can be congruent or not with the movement implied by the linguistic material they are presented to. The present study explored sensorimotor simulations using a paradigm that does not involve a congruent or incongruent movement to respond. The material consisted of words referring to large objects (building) or small manipulable objects (pencil), and the words were displayed in a small or large font size. Participants performed two tasks that differed in terms of sensorimotor simulation: Is the item a word? (weak simulation) vs. Can the object be manipulated? (stronger simulation). Differential results on (Object size and Font size) compatibility effects are discussed as a function of the task.
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12:00-1:30 PM (4076)

Time Course of Effector-Specific Inhibition in Motor Imagery. VICTORIA K.E. BART, *UMIT*, IRING KOCH, *RWTH Aachen University*, MARTINA RIEGER, *UMIT* (Sponsored by Martina Rieger) – Effector-specific inhibition is one mechanism preventing actual actions in motor imagery. We investigated the time course of effector-specific inhibition by analyzing sequential effects of hand movements from start buttons to target buttons in imagination (I) and execution (E). Trial sequences differed depending on current mode (I, E), previous mode (I, E), hand (same, different), target (same, different), and response stimulus interval (RSI: 200ms, 700ms, 1300ms, 2000ms). In E-E sequences hand repetition benefits occurred at all RSIs. In I-I, I-E, and E-I sequences hand repetition costs occurred at short RSIs. This indicates effector-specific inhibition (I-I and I-E sequences) or effector-specific activation (E-I sequences) in the previous trial, causing costs when the same effector was used in the current trial. With increasing RSIs hand repetition costs decreased, indicating decay of effector-specific inhibition/activation over time. In I-I sequences hand repetition benefits were observed at long RSIs. Thus, effector-specific inhibition and activation due to stimulus and response repetition may occur simultaneously. Effector-specific inhibition may be initially stronger, but decays faster than stimulus and response activation.
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12:00-1:30 PM (4077)

Aftereffects of Imagined Inhibition. MARTINA RIEGER and STEPHAN F. DAHM, *UMIT Hall in Tirol* – We investigated whether people can imagine inhibiting an ongoing action without actually inhibiting it using the stop signal task. In this task, participants perform a visual discrimination task (primary task). This is occasionally interrupted by a stop signal (a tone; stop task) signaling participants to withhold the response. Participants a) executed the primary task and the stop task, b) executed the primary task but imagined the stop task, and c) executed the primary task and ignored the tones (control condition). We analyzed inhibitory after-effects, i.e. whether reaction times are slower in go trials following a stop signal trial than in go trials following go trials. Inhibitory aftereffects occurred after imagined inhibition. They were smaller than after actual inhibition but could not be explained by the presentation of the tone in stop signal trials. In conclusion, imagined inhibition is functionally similar to actual inhibition.
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12:00-1:30 PM (4078)

Body Schema Representation in Children and Adolescents. SANDRA PACIONE, AAROHI PATHAK, SHIKHA PATEL, LUC TREMBLAY, TIMOTHY WELSH, *University of Toronto* (Sponsored by Timothy Welsh) – The present study investigated if children and adolescents represent and match the observed body parts of other people to the representation of their own body. Male and female participants of different age groups (7-9, 10-12, and 13-16 years old) completed a body-part compatibility task in which they executed hand responses to coloured targets (relevant feature) presented over the hand or foot (irrelevant feature) of pictures of male models of different ages (7, 11, and 15 years old). Body-part compatibility effects (shorter RTs when targets appeared over the hands than over the feet) emerged for the males in the 10-12 and 13-16-year-old age groups when viewing models of their own age-group (11 and 15 year old models, respectively). No body-part compatibility effects were found for males in the 7-9-year-old group nor for any female group. These data suggest that males 9 years and older match the bodies of other males to their own body representation and this matching process seems strongest for their peers of a similar age.
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12:00-1:30 PM (4079)

When Does a Starfish Become Patrick: Anthropomorphization of Cartoons of Non-Human Animals With Faces and Clothes. TIMOTHY WELSH, SHIKHA PATEL, AAROHI PATHAK, KIMBERLEY JOVANOV, SANDRA PACIONE, and EMMA YOXON, *University of Toronto* – Anthropomorphization is

a human-animal self-other matching process where human characteristics are attributed to non-human entities. The purpose of the present study was to determine if anthropomorphization of a cartoon, non-human animal (a starfish) occurs when visual elements associated with humans, such as facial features and clothing, were presented on the non-human animal's body. The current study employed a body-part compatibility task in which hand and foot responses were executed to coloured targets (relevant feature) on the limbs (irrelevant feature) of a cartoon starfish. The experiment consisted of four blocks. In blocks 1 and 4, the starfish had an unstructured arrangement of internal lines and dots. In blocks 2 and 3, the internal lines and dots were rearranged to create "clothes" (block 2) or "face and clothes" (block 3) inside the starfish. Results revealed body-part compatibility effects in conditions when the starfish was presented with visual features (i.e., clothing and face), but disappeared when these features were removed on the last block. Overall, these results suggest that human-like characteristics prime the anthropomorphization of non-human animals.
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12:00-1:30 PM (4080)

Identifying Changes in Photos of Real Objects Near the Hands: An Eye Movement Study. STEPHEN J. AGAUAS and LAURA E. THOMAS, *North Dakota State University* – Previous research provides evidence that people experience visual biases for objects in perihand space (e.g., Brockmole et al., 2013). For example, some work indicates participants show increased sensitivity in detecting changes to simple objects presented near the hands (e.g., Tseng & Bridgeman, 2011). However, a recent study suggests this near-hands advantage may not occur in more complex real-world visual tasks (Andringa et al., 2017). We examined the near-hands advantage in a change detection task using photos of real objects. Across three experiments, we manipulated hand position (near/far), the type of change (orientation/identity), and object type (power/precision/ungraspable) while measuring the time it took participants to identify the changing images visually (Experiments 1 and 2) or by pressing a button (Experiment 3). We found no evidence to suggest hand position influenced performance across these three experiments. Consistent with recent work, these results suggest visual biases in processing simple stimuli near the hands may not scale up to more complex real-world objects. Additional experiments are underway to identify the boundary conditions for a near-hands advantage in change detection tasks.
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12:00-1:30 PM (4081)

Discovering the Spatial Structure of the Soma Cube. ADAM SHEYA and ASHLEY DHAIM, *University of Connecticut* – This research asks about a fundamental aspect of learning: How we discover solutions, new understandings and organizations of behavior through our own activity? The dynamics of discovery involve the coordination of current understanding with exploration through perceiving and acting. Our general hypothesis is that what we do, what we learn and what new solutions we discover emerge from the coupling between internal dynamics and the world. The purpose of the current study is to observe the time course of discovery in a challenging learning task. This task requires a sequence of choices and that has multiple ways of being completed. The Soma Cube has 480 solutions but no obvious way to discover a solution instead solving it requires apprehending a set of spatial relationships through sequential activity. Most participants not only solved the puzzle multiple times but found solutions from different classes of solutions. We will argue that it is through the activities of assembling and dissembling, rotating, and scanning that the solution space is specified.
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12:00-1:30 PM (4082)

The Presence of Real-Time Visual Self-Feedback Detracts from Unrelated Simultaneous Tasks. ELIZABETH D. CASSERLY and BRIGITA KUZMICKAITE, *Trinity College* – Mirrors provide perceivers with real-time visual feedback on appearance, body positioning, and the visual information available to other agents in the environment. That real-time feedback can be used directly (e.g., to guide actions or facilitate coordination), but it can also exert indirect influence. Visual self-feedback has been shown to facilitate pro-social behavior and increase diligence in a repetitive task, for example, but perceivers also show signs of aversion and distraction in response to the feedback itself. The present study examined these indirect influences, specifically testing how the presence of a mirror impacted performance on an unrelated simultaneous task. Participants (N = 32) were asked to memorize and recall two short passages under counterbalanced conditions: in front of a 3" x 3" mirror or in the same location without a mirror. Recall accuracy was significantly lower in the presence of a mirror ($\eta p2 = .300$), and explicit instructions to use the mirror as a practice aid did not impact performance ($\eta p2 = .004$). This evidence suggests that visual cues regarding a participant's physical appearance have a negative effect on their behavior in unrelated domains.
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NUMERICAL COGNITION

12:00-1:30 PM (4083)

Re-evaluating the Role of Context in Probability Distortion. CHENMU XING, ALEXANDRA ZAX, and JOANNA PAUL, *Wesleyan University*, SARA CORDES, *Boston College*, HILARY BARTH and ANDREA PATALANO, *Wesleyan University* – When making quantity judgments, adults overestimate small and underestimate large quantities, a pattern similar to probability distortion in decision making under risk. Distortion patterns for quantity judgments are influenced by context, and there is initial evidence that probability distortion in decision making might also be influenced by context. However, in the present work, new data and reanalyses of earlier data point to a different interpretation. Adult participants (N=137) were assigned to either a full-range (probabilities from 0-100%), an upper-range (50-100%), or a lower-range (0-50%) condition. Participants indicated certainty equivalents for 176 hypothetical monetary gambles, and completed a numeracy measure. Using

a modified cumulative prospect theory model, we found that probability distortion was best modeled as scaled to probability range. However, to our surprise, the most parsimonious interpretation was not a context effect but, rather, that scaling improved fit whenever the probability range was restricted during modeling.
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12:00-1:30 PM (4084)

Gestures for Thinking Promote Learning Space and Action. YANG LIU and MELISSA BRADLEY-ZRADA, *Columbia Teachers College*, BARBARA TVERSKY, *Columbia University/ Stanford University* (Presented by Barbara Tversky) – People alone in a room gesture while they study descriptions of complex environments. Their gestures form spatial-motor maps of the environments. When they gesture, they perform better on tests of knowledge. Will people gesture for problems that are not strictly spatial and will their gestures improve comprehension and learning. Here, students alone in a room studied four kinds of reasoning problems: linear orders, schedules of events, mechanical systems, arithmetic either sitting on hands or hands-free. The majority gestured for most problems and the gestures modeled the situations, often in creative ways. Overall, gesturing at study speeded responses at test suggesting that gesturing helped to consolidate learning. Gestures are actions and improved performance for the mechanical systems, which involve actions. Thus gestures, which are actions in space, seem especially effective for learning about space and about action.
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12:00-1:30 PM (4085)

Does It Add Up? Comparing Arithmetic Processing in Monolinguals and Bilinguals. MONA ANCHAN and FIRAT SOYLU, *The University of Alabama* (Sponsored by Firat Soylu) – With more than 25% of school students coming from immigrant households where the primary language spoken at home is not English, it is problematic to expect this bilingual population to perform at the level of their monolinguals peers. As a result of using competing languages regularly, representation of math knowledge could be different in bilinguals and monolinguals. Hence, it is important to investigate how bilinguals process simple mathematical tasks which form the basis of higher math. This pilot study examines how bilinguals process single-digit and double-digit addition problems in their first language as well as English. Similar arithmetic processing is also examined in monolinguals to check for between-group differences. This paradigm allows subjects to provide a free-recall verbal response which is an ecologically valid demonstration of their addition skills and processing time. In addition to behavioral data (reaction time, accuracy), electroencephalography (EEG) provides time-sensitive information differentiated by language of processing and type of addition. The implications of these results extend well beyond just understanding basic neural mechanisms and can be utilized by teachers to adapt math instruction.
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12:00-1:30 PM (4086)

Differential Item Functioning Between Groups in Two Popular Numeracy Scales. MARK LACOUR and MICHAEL SERRA, *Texas Tech University* (Sponsored by Michael Serra) – Numeracy refers to one's mathematical ability and ability to correctly reason using numbers and probabilities. Numeracy measurements are collected for many studies in the judgment and decision-making literature; many studies compare the decision making of high vs. low numeracy groups and find that higher numeracy is associated with more logical decision making. Some researchers, however, have made questionable inferences by comparing numeracy scores between populations without confirming the absence of differential item functioning between groups. We found that items in the expanded numeracy scale function much differently between an undergraduate research pool and an Amazon Mechanical Turk sample (MTurk). Also, Items on this scale only showed an ability to discern participants who are low on numeracy in both populations, and some of the items are redundant. We examined the Berlin Numeracy Scale between the same populations and found that the MTurk population showed acceptable item response characteristics, but not the undergraduate population.
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12:00-1:30 PM (4087)

Individual Differences in Number Line Estimation Performance: The Left Digit Effect and Standardized Test Scores. JOANNA PAUL, KATHERINE WILLIAMS, ALEXANDRA ZAX, ANDREA PATALANO, and HILARY BARTH, *Wesleyan University* (Sponsored by Andrea Patalano) – Recent number line estimation (NLE) studies have shown that adults and children place estimates of numerals with similar magnitudes but different hundreds digits (e.g., 499 and 502) in very different locations on the line (Lai et al., 2017). These findings suggest a Left Digit Effect (LDE) on NLE performance. While specific digits clearly matter for performance, little is known about the LDE in this context. Here we examine NLE performance and SAT scores to investigate possible sources of individual differences in the LDE. Participants (N = 67 undergraduates) completed a numeracy scale and a speeded 0-1000 NLE task, and provided standardized test scores on record with the University. SAT Reading and Writing, but not SAT Math or numeracy, were correlated with NLE performance. These results suggest that NLE performance may not stem from internal representations of number, or from math ability, but may be more closely related to verbal skills.
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12:00-1:30 PM (4088)

An Explanation of Dyscalculia as a Deficit of Procedure Automatization. SANDRINE MASSON and CATHERINE THEVENOT, *University of Lausanne* – In the domain of numerical cognition, recent studies suggest that the answers of very simple problems such as 3+2 are not retrieved from long term memory, even by expert adult. Rather, they could use very fast and unconscious counting procedures (i.e., 3+2 = 4, 5). If it is the case, the dominant view that difficulties of arithmetic fact retrieval is the main symptom of dyscalculia

has to be questioned. In this poster, we defend the position that dyscalculia correspond to a domain general impairment concerning procedure automatization, especially affecting counting procedures. It turns out that this procedural deficit has already been put forward to explain other learning developmental disabilities, such as dyslexia or dyspraxia, and our explanation could provide a single explanation for learning disorders in general.
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12:00-1:30 PM (4089)

Learning Conditional Probabilities From Frequencies and Proportions. ROGELIO CARRILLO and ROMAN TARABAN, *Texas Tech University* (Sponsored by Roman Taraban) – Probabilities are challenging to understand and interpret, and people are subject to making reasoning errors when interpreting them (Gilovich et al., 2002). According to the natural frequency hypothesis, people understand information better when it is presented in a frequency format as opposed to a probability or proportion format (Moro & Bodanza, 2010). For instance, people find it easier to interpret 10 cases in 100 as opposed to 10% (Butterworth, 2001). Additionally, Gigerenzer and Hoffrage (1995) found that statistically naive participants were better at setting up and solving Bayesian algorithms when the information was in a frequency format. Through two experiments, this project looked at learning conditional probabilities under a frequency format and a proportion format. Results from both experiments demonstrated that performance on a future test was better after studying the frequency format compared to the proportion format.
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12:00-1:30 PM (4090)

Less Really Is More: The Relation Between Estimation Proficiency and Target Number Processing With an Atypical Number Line. MATTHEW G. HUEBNER, ANDREW M. SMITH, and JO-ANNE LEFEVRE, *Carleton University* (Sponsored by Jo-Anne LeFevre) – Number line estimation performance provides a valuable window with which to glean the developing interplay of ordinal- and magnitude-based representations. Indeed, while eye tracking has highlighted adults' strategic use of reference points in target estimation proficiency, little is known how such proficiency relates to the processing of the actual target numbers. Twenty-four participants estimated the values of visually-presented target numbers on an atypical number line (i.e., 0 – 7,000) while their eye movements were recorded. Participants also reported their estimation strategy after each trial. Linear mixed modeling revealed that greater estimation error was associated with more fixations made to the target number. Furthermore, participants were less likely to fixate on all components of the target number for larger target values, suggesting that some estimation strategies (i.e., end reference) require only partial target information. These findings are at odds with current theoretical frameworks that suggest exploratory and holistic integration of numerical stimuli.
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12:00-1:30 PM (4091)

Estimation of Large and Small Number. RACHEL A. MYER and THOMAS F. SHIPLEY, *Temple University* (Sponsored by Thomas Shipley) – Prior work on number estimation with unfamiliar magnitudes using number lines has focused on large numbers. An experiment compared spatial errors in line estimates for large (numbers to be placed on number lines were in the million, thousand, or hundred scale) and small (numbers to be placed on number lines were in the thousandth, millionth, billionth, or trillionth scale) numbers. The scales showed a clear pattern of differences. Absolute error for the hundred scale was significantly less than all other scales. Additionally, while absolute error for the thousand and thousandth scales did not differ, both were significantly lower than the million, millionth, billionth, and trillionth scales (which did not differ). Results expand previous findings that spatial errors for unfamiliar numbers are greater than familiar numbers by showing this applies to small scales and that models of categorical reasoning may apply to small scale reasoning.
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12:00-1:30 PM (4092)

Multiscale Spatial Structure in the Cultural Ecosystem of Written Numerals. TYLER MARGHETIS, DAVID LANDY, and ROBERT L. GOLDSTONE, *Indiana University, Bloomington* – Cultural ecosystems both reflect and shape the way we think. Describing these ecosystems of artifacts and practices is thus critical for understanding how culture and cognition are entangled. Here, we focus on the domain of number: written numerals, as encountered in text (two existing corpora: millions of adult books, and one hundred children's books) and as produced during self-directed mathematical activity (a new corpus of thousands of algebraic expressions). Within both English sentences and algebraic expressions, lesser-value (vs. greater-value) numbers were more likely to appear first. Within multi-digit numbers themselves, individual digits were ordered spatially so that lower-value digits (e.g., 1) appeared relatively more often toward the left, and greater-value digits (e.g., 9) more often to the right ("Benford's Law"). At multiple scales, therefore, numbers were arranged in ascending order, left-to-right, shedding light on the bidirectional causality between numerical cognition (e.g., SNARC effect) and the material culture of mathematics.
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12:00-1:30 PM (4093)

Do the Benefits on Studying Worked Examples Extend to Numerical Magnitude Representation? KAYLA MOREHEAD, CLARISSA A. THOMPSON, and JOHN DUNLOSKY, *Kent State University* – Few math teachers would suggest that students would benefit from studying incorrect worked examples (IWEs) wherein students are shown incorrectly solved problems and asked to explain why the problems are wrong. However, several researchers have demonstrated that studying IWEs improves math performance, sometimes even more so than studying correct worked examples (CWEs) or solving problems. We investigated the benefit of studying IWEs in a previously unexplored mathematical context: numerical

magnitude representation. In two experiments, children (Experiment 1) and adults (Experiment 2) completed a number line task in one of four conditions: studied CWEs, studied IWEs, received feedback on their estimations, or received no feedback (control). Performance improved for those who studied CWEs or received feedback, but did not improve for those who studied IWEs or received no feedback. These initial findings replicate prior research supporting the benefits of feedback and indicate that IWEs will not always benefit student mathematics learning.
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12:00-1:30 PM (4094)

Individual Differences in Fraction Arithmetic Learning. DAVID WILLIAM BRAITHWAITE, *Florida State University*, ELENA LEIB, *University of California, Berkeley*, JAKE MCMULLEN, *University of Turku*, ROBERT S. SIEGLER, *Teacher's College, Columbia University* – Fractions are uniquely important and uniquely challenging in mathematical development. The present study employed a computational model of fraction arithmetic learning, FARRA (Braithwaite, Pyke, & Siegler, 2017), to investigate individual differences in children's fraction arithmetic learning. Based on the model, three types of learners were predicted: high performers (who solve each problem using an appropriate procedure), perseverators (who consistently use a single procedure), and associative learners (who choose procedures based on associations with irrelevant features). Each type matched at least 25% of children in a previous study of fraction arithmetic (Siegler & Pyke, 2013). Latent profile analysis yielded behavior profiles analogous to the predicted types. Varying FARRA's parameters allowed the model to generate each type. The findings shed light on how some children master fraction arithmetic, as well as why different children display different difficulties, and have implications for tailoring instruction to individual students' needs.
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12:00-1:30 PM (4095)

Problem Solving Prerequisites for Bayesian Reasoning. ALAINA N. TALBOY and SANDRA L. SCHNEIDER, *University of South Florida* (Sponsored by Sandra Schneider) – Solving Bayesian reasoning problems requires correctly identifying, computing, and applying values from the problem text to the solution. Identification refers to understanding the intended meaning of the values. Computation refers to the mathematical manipulation of those values. Application goes one-step further by utilizing those identified and/or computed values in the solution. We evaluated performance on eight Bayesian reasoning problems using probing questions that separate out the extent to which uninitiated reasoners can identify, compute, and apply values from problem text to solution. The results suggest that reasoners are generally proficient at identifying the intended meaning of values, but struggle with computation and application.
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SPATIAL MEMORY AND COGNITION

12:00-1:30 PM (4096)

Spontaneous Level-2 Perspective Taking Is Sensitive to Agency Cues and Cognitive Load. CHRISTOPHER BRETT JAEGER and DANIEL T. LEVIN, *Vanderbilt University* (Sponsored by Daniel Levin) – Research demonstrates that people sometimes adopt others' spatial perspectives spontaneously. However, relatively few studies have explored this phenomenon using a single-trial design, which is important because participants can detect and respond to task demands across multiple trials. We report four single-trial studies testing whether spontaneous perspective-taking occurs independent of specific stimulus properties, task demands, and cognitive load, as one might expect of an automatically-triggered cognitive operation. We found that participants spontaneously adopted the perspective of schematic faces at about the same rates as observed in previous research using photographic stimuli, suggesting that perspective taking occurs for a range of abstracted agentive stimuli. We also found that cues designed to prompt consideration of the stimuli's agency facilitated spontaneous perspective taking, while cues designed to prompt consideration of perceptual features suppressed it. Further, both visual and verbal cognitive load suppressed spontaneous perspective taking. Our results suggest that spontaneous perspective-taking is an effortful cognitive process that operates after abstraction of a stimulus.
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12:00-1:30 PM (4097)

Individual Differences in Learning of Configural Prototypes. UMAY SEN and AYSECAN BODUROGLU, *Bogazici University* (Sponsored by Aysecan Boduroglu) – Research demonstrated that the visual perceptual judgments are susceptible to information accumulated within an experimental session. Previous research also demonstrated that individual differences in working memory capacity predict the likelihood that spatial configuration information is processed and utilized. The aim of the present study is to investigate the role of the learned configurations during an experimental session on spatial item representations and to what extent individual differences in working memory and processing speed capacity could influence the facilitation of the previously learned configurations. Viewers studied spatial configurations that were either independent random exemplars or members of a prototype family, then were probed. The results demonstrated that the information accumulated during an experimental session increased the spatial resolution of the item representations. Working memory capacity and processing capacity for visual patterns predicted both how well configurations are learned across trials and how effectively this information is utilized to increase item precision.
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12:00-1:30 PM (4098)

Participants Rely on Both Absolute and Relative Position When Making Inferences About Ordered Lists. TINA KAO, *New York City College of Technology*, CHARLOTTE E.

MICHAELCHECK, VINCENT P. FERRERA, HERBERT TERRACE, and GREG JENSEN, *Columbia University* – Human participants learned 5 different 5-item lists (A1-B1-C1-D1-E1, A2-B2-C2-D2-E2, etc) using a transitive inference (TI) paradigm in which only adjacent pairs were trained. Participants were then tested with pairs from 5 derived lists, in which only one item from each of the original lists was selected (e.g. A2-B5-C4-D1-E3). Participants exceeded chance in selecting the earlier stimulus for each derived list at the start of testing. This result cannot be explained by TI alone, since test pairs came from distinct lists. In a second experiment, a different group of participants was given the same training, but the ordinal positions of items varied systematically in derived lists (e.g. B3-C1-D2-A4-E5). Participants' accuracy was greater than chance to the extent that an item's original ordinal position was retained. These results show that participants make inferences using knowledge of both absolute and relative ordinal position on derived lists. Supported by NIH-MH-081153 and PSC CUNY Research Award.
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12:00-1:30 PM (4099)

Encoding of Certain and Ambiguous Cues in Auditory-Guided Reorientation. DANIELE NARDI and JOSIE CLARK, *Eastern Illinois University*, MARK HOLDEN and ALEXANDRA TWYMAN, *University of Nebraska, Lincoln* – Spatial reorientation, the process of identifying where you are and which direction you are facing, has mostly been addressed with the visual modality. A frequent finding is that both human and non-human animals tend to encode cues that determine a target location with ambiguity (typically geometry) despite the presence of other sources of information that are certain (typically feature cues). Scarce literature has investigated whether this extends to non-visually accessed space, even though this has important implications for understanding blind navigation. In the current study, blindfolded, sighted participants had to encode a target location in a circular search space, and could use two auditory sources: an ambiguous (insufficient) cue and a certain (sufficient) cue. Training trials and subsequent test trials revealed that, just like with visual information, participants encoded both sets of cues. The findings suggest common spatial behavior across visually and auditorily guided reorientation, providing support to the theory of functional equivalence.
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12:00-1:30 PM (4100)

Categorical Bias in Line Angle Judgments: Evidence of Multiple Categories and Hormonal Influence in Spatial Perception. MARK P. HOLDEN, *University of Calgary*, ELIZABETH HAMPSON, *University of Western Ontario* – According to the Category Adjustment (CA) model, estimates of spatial values – estimates of location, from memory, for example – involve Bayesian combination of fine-grained and categorical information, with each type of information weighted by its relative certainty. Although much of the work on the CA model has focused on memory for locations, some research suggests that this combination of fine-grained and categorical information reflects a more general pattern in visuospatial processing. In the current study, we replicate and extend previous work on the CA model by examining bias patterns in a different type of task: a line angle judgment task (JLAP-15). Our results clearly demonstrate that participants' estimates of line angles were biased by multiple, hierarchically-ordered categories (i.e. fine-grained information was combined with at least two levels of categorical information). Furthermore, preliminary data analysis suggests sex differences in the relative weighting of categorical and fine-grained information, and shifts in the relative weighting of these cues based on endogenous variation of estradiol – replicating findings from location memory and suggesting that these are more general phenomena in spatial estimation.
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12:00-1:30 PM (4101)

Does Shaping Sand Help You Understand? Assessing the Impact of Tangible Augmented Reality on Terrain Knowledge Acquisition. AARON L. GARDONY, *US Army Natick Soldier RDEC-SPOD*, MICHAEL W. BOYCE, *Army Research Laboratory HRED-ATSD*, CARLENE A. HORNER, *Center for Applied Brain & Cognitive Sciences*, PAUL L. SHORTER, *Army Research Laboratory HRED-ATSD*, CORTNEE R. STAINROD, *University of Central Florida - IST*, TAD T. BRUNYE, *US Army Natick Soldier RDEC-SPOD*, CHARLES R. AMBURN, *Army Research Laboratory HRED-ATSD* – Tangible user interfaces (TUIs) are intuitive and user-friendly for manipulating 3-D virtual objects (Billinghurst, Clark, & Lee, 2015) and can improve learning in specific subject areas (Schneider 2013). However, little work has examined the impact of TUIs on higher-order cognitive processes, such as conceptual learning and spatial memory. In the present study we used the Augmented REality Sandtable (ARES; Amburn, Vey, Boyce, & Mize, 2015), a TUI designed for terrain simulation and mission planning, to examine how tangibility impacts knowledge acquisition of large-scale 3-D terrains. Dyads created complex terrains by placing a set of pre-defined terrain features (ex. hill, spur, etc.) in ARES. To assess cognitive impacts of tangibility, one individual shaped the sand while the other passively watched. We assessed within-dyad differences in conceptual learning of terrain features (relative to baseline), spatial memory for terrain topography and landmark locations, and related these to individual differences measures. Our findings suggest varied impacts of tangibility; tangible interaction promoted terrain conceptual learning and topographic memory but impaired landmark memory. Implications and future directions are discussed.
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12:00-1:30 PM (4102)

Does Visuospatial Working Memory Affect Wayfinding Using Two- and Three-Dimensional Maps? OLIVIA J. CODY and ALYCIA M. HUND, *Illinois State University* – We investigated the influence of learning experience and visuospatial working memory components on wayfinding. Participants learned about an indoor environment via a two-dimensional map, a three-dimensional map, or exploration. Then, they were asked to find their way to six destinations. During wayfinding, participants

performed two secondary tasks (visual: analog clock judgments or spatial: pointing to cardinal directions) versus control (no secondary task). Overall, wayfinding performance (wayfinding time, pauses) was worst when spatial working memory was taxed and best for the control trials. As expected, secondary tasks interacted with learning experience (and secondary task order), such that wayfinding performance (number of turns) decreased with three-dimensional map, two-dimensional map, and exploration conditions for the control trials, whereas wayfinding performance increased across these conditions for the secondary task trials. These findings confirm that spatial working memory is important for wayfinding and suggest that spatial details available in three-dimensional maps might improve performance.
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12:00-1:30 PM (4103)

Perspective Taking Is Affected by Perspective Shift and Pointing Quadrant. PERI GUNALP, LIZ CHRASTIL, and MARY HEGARTY, *University of California, Santa Barbara* (Sponsored by Mary Hegarty) – Previous research on spatial perspective taking ability has used psychometric tests like the Perspective Taking Test (PTT). The present experiment introduces an experimental task that systematically varies the magnitude of the initial perspective shift and of the pointing response, and examines the effects of the addition of a person in the array. Performance on this computerized PTT indicated that accuracy increased with inclusion of a person in the array compared to a control condition, decreased with increases in initial perspective shift, and was best when pointing to the front in the imaged perspective. These perspective shift and pointing response patterns were consistent regardless of whether a person was included in the task array, suggesting that participants do not modify their strategy when a person is included. Regardless of the size of the initial perspective shift or pointing quadrant, participants seem to be engaging mental transformation and visualization processes to adopt an imagined perspective.
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12:00-1:30 PM (4104)

Does Repetition Help Eliminate Individual Difference in Virtual Route Learning? XIANYUN LIU, JIE HUANG, and BAIHU SUN, *Tianjin Normal University* – Individuals with good sense of direction can accurately complete the routing task, shortcut task which need path integration, and the poor ability ones will suffer great distress in daily life because of lacking a sense of direction. Few studies have explored how to eliminate the differences between them. Two experiments were designed to explore whether individuals with different spatial abilities could achieve the same level of understanding of the spatial environment by short-term repeated learning. Moreover, we also want to explore whether the process of unidirectional route learning and bidirectional route learning will have an impact on individual performance. Experiment 1 adopted one direction rout learning method, and Experiment 2 adopted bidirectional route learning method. The results showed that, after several short-term learning times, the differences between the high and low spatial abilities were eliminated in a certain extent, and the effect is more significant on the complex path. Individual with one direction learning performed better than those with bidirectional learning.
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12:00-1:30 PM (4105)

Retrieval Practice Enhances Learning but not Transfer of Spatial Information. TAD T. BRUNYE and AARON L. GARDONY, *Tufts University & US Army*, SHAINA B. MARTIS, DALIT HENDEL, and HOLLY A. TAYLOR, *Tufts University* – Learning advantages due to retrieval practice have been demonstrated with verbal materials, and more recently with visuospatial materials. However, the extent to which retrieval practice produces spatial memories that successfully transfer remains unknown. In four experiments, participants learned a map of a large-scale urban environment, engaging in either study practice or retrieval practice: study practice involved repeated exposure whereas retrieval practice involved exposure and testing. Across experiments we varied the demands of the final memory test, increasing the breadth of transfer demanded. In Experiment 1, participants drew a map from memory (near transfer), in Experiment 2 they performed judgments of relative direction from an allocentric perspective (near-to-medium transfer), in Experiment 3 they were placed in a virtual version of the map and asked to make pointing judgments from an egocentric perspective (medium-to-far transfer), and in Experiment 4 they were placed in the virtual version and asked to navigate between landmarks (far transfer). Retrieval practice enhanced flexible memory for the map itself, but not the relatively far transfer of spatial knowledge to tasks performed in an unlearned perspective.
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12:00-1:30 PM (4106)

Females and Males Have Similar Abstract Shape Spatial Memory Accuracy. DYLAN S. SPETS and SCOTT D. SLOTNICK, *Boston College* (Sponsored by Hao Wu) – Males generally exhibit an advantage in spatial memory accuracy as compared to females under typical stimulus conditions. We examined whether or not males had a spatial memory advantage when abstract shapes were used as stimuli by analyzing data from four fMRI experiments (N = 18 male and 40 female participants). Across all experiments, during encoding, participants maintained central fixation while viewing abstract shapes in the left or right visual field. During retrieval, old shapes were presented at fixation and participants classified each shape as previously in the "left" or the "right" visual field. There was no significant difference between spatial memory accuracy for females (74.75 ±1.55%; mean ±1 SE, chance = 50%) and males (M = 73.40 ±1.20%; $t < 1$). These findings suggest that spatial memory accuracy is similar for females and males when abstract shapes are employed as stimuli.
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12:00-1:30 PM (4107)

Effect of Testing on Route Learning Using GPS Navigation. ALEX F. LIM, JONATHAN W. KELLY, and SHANA K. CARPENTER, *Iowa State University* – Testing has been shown

to improve learning for verbal materials, but it is unclear whether testing improves learning for spatial domains such as route learning. Two experiments were conducted to examine whether testing would benefit memory for a route learned in a virtual reality driving simulator. Participants were assigned to the study or test condition and learned to navigate a pre-defined route in a novel virtual city. In both experiments, some participants during learning were provided GPS-like directions (study) while others were provided directions once and thereafter navigated the route from memory with feedback (test). At final test after a two-day delay, participants navigated the same route from memory. Overall, results revealed that errors from incorrect turns were not significantly different between study and test, suggesting that testing does not appear to benefit route learning.
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12:00-1:30 PM (4108)

Reorganization of Spatial Configurations in Visual Working Memory. J. DAVID TIMM and FRANK PAPENMEIER, *University of Tübingen* (Sponsored by Markus Huff) – Single objects are not represented individually in visual working memory but spatial configurations have a strong impact. We investigated the reorganization of spatial configurations during memorization. Participants encoded the locations of six or twelve squares. Participants performed a location change detection task for one object probed during retrieval. This object was displaced in half of the trials. We cued the side (left/right) of the object probed, thus allowing for the reorganization of spatial configurations. During retrieval, either a complete (all objects), a congruent (cued objects), an incongruent (non-cued objects) or no (probed object only) configuration was shown. The successful reorganization of the spatial configuration was indicated by a similar level of change detection performance caused by the complete and the congruent condition. While we observed a reliable reorganization of spatial configurations when cued during encoding, the role of configurations including their reorganization when cued during memorization was influenced by eye-movements.
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ACQUISITION OF COGNITIVE SKILLS

12:00-1:30 PM (4109)

Individual Differences Associated With Learning a Complex Task. TARAS KRUPSKYY, AARON WONG, KEVIN BARNES, GARY BRADSHAW, and JARROD MOSS, *Mississippi State University* (Presented by Jarrod Moss) – When learning a complex task, the ability to maintain top-down cognitive control and learning about task features associated with positive/negative outcomes are crucial for success. Previous studies have shown that reinforcement learning occurs independently for negative and positive outcomes, and there are individual differences in sensitivity to positive/negative outcomes. The current study aimed to investigate how interactions between individual differences in cognitive control and sensitivity to negative/positive outcomes affects performance in a complex task called the strategic Abstract Decision Making task (sADM). In this task, there are two components that impact performance: points awarded for sorting objects and penalties accumulated for objects that remain unsorted. These two performance measures are potentially related to individual sensitivity to, respectively, positive or negative reinforcement learning. One of the findings showed that individuals exhibiting low sensitivity to negative outcomes only learn to minimize their penalty score if they have higher top-down cognitive control measures.
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12:00-1:30 PM (4110)

The Role of Feedback in the Adjustment of Attentional Dynamics to Temporal Patterns. ZHUORAN ZHANG and JACQUELINE C. SHIN, *Indiana State University* – How does feedback affect the ability to focus visual attention to temporally predictable stimuli through procedural learning? Participants identified a blue target letter among white distractor letters in a rapid serial visual presentation task during training and transfer blocks. On each trial, the target was presented in one of two fixed serial positions which either matched or mismatched between training and transfer for different participant groups. Also, half of each group received feedback about target identity during training, and the other did not. Temporal learning—indicated by positive transfer for matched conditions or negative transfer for the mismatched conditions—was only found when feedback had been presented during training. Furthermore, in those conditions, a measure of explicit learning for the target positions was positively correlated with measures of temporal learning, suggesting feedback might have enhanced the adjustment of attentional dynamics by facilitating explicit knowledge of target timing.
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12:00-1:30 PM (4111)

Effect of Self-Imagination for Older Adults and aMCI Patients. WANBING ZHANG and HUNTER JOHNDRO, *Brandeis University*, ANDREW BUDSON, *VA Boston Healthcare System*, ANGELA GUTCHESS, *Brandeis University* (Sponsored by Angela Gutchess) – Imagining an event from a personal perspective has been found to be able to enhance memory for words and sentences for healthy adults and brain-injured patients with memory deficits. However, little is known about how people of different ages, as well as with age-related memory impairment, respond to self-imagination. Current study seeks to investigate the effect of self-imagination as a mnemonic strategy for three different populations: younger adults, healthy older adults, and patients with amnestic mild cognitive impairment (aMCI). In each trial, participants looked at an image of an object and were asked to either imagine in rich detail buying that object in a store (the self-imagination condition) or decide whether it can fit in an average shoe box (the baseline condition). Our results revealed that imagining the self shows a mnemonic advantage over the baseline strategy, though this is particularly true for healthy groups. This finding extends the conclusion of previous studies to older adults and suggests limitations to the benefits for aMCI patients.
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12:00-1:30 PM (4112)

Statistical Learning and Matching Performance: The Importance of Diagnostic Features in Match-Making Decisions. BETHANY GROWNS and KRISTY A. MARTIRE, *University of New South Wales* (Sponsored by David White) – Our ability to learn visual statistical information from the environment is an innate and unconscious ability. It may also improve the pattern-matching performance of forensic science examiners who evaluate complex visual evidence (e.g. fingerprints). Knowledge of statistical information may be key to the accuracy of examiners on pattern-matching tasks. The statistical probability of visual features provides information about how likely it is that two samples of evidence 'match.' For example, if two samples share a rare feature they are more likely to 'match' than two samples that share a common feature. However, no research has examined whether matching performance is associated with statistical learning. Across two experiments, participants were exposed to 120 exemplars of complex patterns. We then measured their statistical learning and matching performance. In Experiment 1, statistical learning and matching accuracy were not significantly related. In Experiment 2, we further explored the relationship between the two variables. This is the first research to examine whether statistical learning is associated with matching performance and has important practical applications for the training and selection of forensic examiners.
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12:00-1:30 PM (4113)

Learning and Learning Transfer in Problem-Solving Progressions. JONATHAN S. DANIELS, *Case Western Reserve University*, DAVID MOREAU, *The University of Auckland*, BROOKE MACNAMARA, *Case Western Reserve University* (Sponsored by Robert Greene) – The purpose of this study is to investigate whether individuals learn more effectively when given incremental or variable problem-solving experience, relative to consistent problem-solving experience. All participants took a fluid reasoning ability measure and received practice on Rubik's Cubes before attempting to solve a difficult 5×5×5 cube. One third of the participants were assigned to the incremental condition where they practiced solving progressively more difficult cubes (i.e., 2×2×2 to 3×3×3 to 4×4×4), one third were assigned to the variable condition where they practiced solving cubes of varying difficulty (e.g., 3×3×3 to 2×2×2 to 4×4×4), and one third were assigned to the consistent condition where they consistently practiced on solely 5×5×5 cubes. Von Bastian and Eschen (2016) recently suggested that variable learning is as effective as incremental progression training for non-spatial learning transfer. Thus, we examine whether participants in the variable condition perform similarly to the incremental condition and how learning transfer of these two groups compares with a consistent condition. Implications of our results for effective spatial problem-solving training based on fluid reasoning ability will be discussed.
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12:00-1:30 PM (4114)

Adding Variability to Mental Rotation Skill Training. KATIE BAINBRIDGE and RICHARD E. MAYER, *University of California, Santa Barbara* (Sponsored by Richard Mayer) – Numerous attempts at "brain training" games have proven ineffective at improving cognition (Bainbridge & Mayer, 2018) while action video games, which are not intended to improve cognition, often succeed in doing so (–Benoit, Adams, Mayer, Tipton, Green, & Bavelier, 2017). This study is the first in a series investigating the role that variability may play in the efficacy of cognitive skill training regimens, as action video games have much greater variability than most "brain training" games. Participants were randomly assigned to 4 groups, 3 of which practiced mental rotation with one type of shape, 1 of which practiced mental rotation with all 3 types of shapes randomly interleaved. Preliminary results show a significant effect of training by group on near transfer items but not far transfer items, but data is still being collected.
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12:00-1:30 PM (4115)

Emotional Design of a Task-Switching Game. ASHLEIGH K. WELLS and RICHARD E. MAYER, *University of California, Santa Barbara*, ANDREW MACNAMERA and JAN PLASS, *New York University*, BRUCE HOMER, *City University of New York* (Sponsored by Richard Mayer) – This study examined the effects of varying the emotional design of characters in a computer game (All You Can ET) intended to train task switching. In the game, players shoot milkshakes or cupcakes to descending aliens whose preferences changed based on features (number of eyes, color, etc.), and it increased in difficulty over multiple levels. The emotional design of characters was either hot (i.e., round, red/green aliens with expressive faces) or cool (square, gray-scale aliens with less expressive faces). Eighty-seven undergraduates played the hot version, cool version, or a word search game for active control. Results showed significantly greater improvement on task-switching tasks for both the hot and cool groups compared to the control group ($d = .35$), but no difference between the hot and cool groups. We can conclude that the game improves task switching skills in undergraduates, but emotional design doesn't play a role in that improvement.
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***12:00-1:30 PM (4116)**

Does Verbalization of Perceptual Memory Have Disruptive Effect on Perceptual Category Learning? AYA HATANO, *Kochi University of Technology*, NOBUHIKO GOTO, *Kyoto Notre Dame University*, HIROAKI SHIGEMASU, *Kochi University of Technology* – This study examined how verbalization of perceptual stimuli during category learning affects classification performance. Although previous studies suggest that verbalization of perceptual memory (e.g. face, voice) negatively affects following memory task (verbal overshadowing), few studies examined whether verbalization of stimuli also impairs perceptual learning. In this study, participants were asked to categorize unfamiliar plants (mushroom) into two categories. After one third of all trials, they were asked to describe features

of a mushroom which was presented at the end for 3min. Then, they engaged in remaining trials. Classification accuracies of the verbalization and control conditions were compared. The result showed that the classification accuracy after verbalization (or filler) task was significantly lower in the verbalization condition than the control condition. That is, verbal overshadowing occurred at the categorization task. Thus, verbalization of perceptual memory has possibilities of impairing perceptual category learning.
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12:00-1:30 PM (4117)

Transfer of (Sequence) Learning: The Case of the Hebb Repetition and the Serial Reaction Time Tasks. FRANCOIS VACHON, *Universite Laval*, JEAN SAINT-AUBIN, *Universite de Moncton*, ALESSANDRO POZZI, *Universite Laval*, ISABELLE HARRIGAN, *Universite de Moncton*, ALEXANDRE MAROIS, *Universite Laval* – The application of a learned skill in a novel context—or transfer—is an important outcome of skill learning. The present study examined whether transfer can apply to incidental sequence learning. More specifically, we aimed at testing whether sequence-specific knowledge can transfer to an unfamiliar sequence context. We used two sequence-learning paradigms that are often deemed highlighting distinct memory processes, namely the Hebb repetition and the serial reaction time (SRT) tasks. Subjects performed one task before completing the other task in which the repeated sequence was either the same as in the first task or different. Subjects who started with the SRT task showed that recall of the repeated sequence in the subsequent Hebb task was better as of its first occurrence and remained higher throughout the task when that sequence was previously encountered in the SRT task. However, no evidence of transfer from the Hebb task to the SRT task was found. Such asymmetrical transfer suggests that the two tasks give rise to an abstract serial-order representation of similar nature, pointing to long-term consolidation mechanisms common to both paradigms, but that learning in the SRT task is underpinned by an additional motor component.
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12:00-1:30 PM (4118)

Predicting the Quality of Learning on a Working Memory Training Task. SHAFEE MOHAMMED, *University of California, Irvine*, BENJAMIN KATZ, *University of Michigan*, CHELSEA PARLETT, *University of California, Irvine*, MARTIN BUSCHKUEHL, *MIND Research Institute*, MARK STEYVERS, *University of California, Irvine*, JOHN JONIDES and PRITI SHAH, *University of Michigan*, SUSANNE M. JAEGGI, *University of California, Irvine* (Sponsored by Mark Steyvers) – The idea of training, in a generalized form (education) or specific skills (such as working memory) to enable learning, is not new. Despite our extraordinary ability to learn, the quality of learning often differs among individuals. However, studies seeking to understand the interactions of the past and future events of human learning on a single task to understand cognitive flexibility are rare. Here, we predict final performance occurred on two WM training tasks from initial performance and demographics while establishing a stable 'baseline performance' that is sufficient to accurately predict final performance (a small dataset with 450+ participants and a large dataset with 8000+ participants completing 15 sessions of training.) Our predictive model allows classification of final performance into above or below median with 86% accuracy. After the first 6-8 sessions, non-training features (demographic information & training parameters) carried diminishing value as the information gained from training behavior is more valuable for prediction. This stable baseline performance might indicate the window of cognitive flexibility and/or the peak performance. Our work may allow early identification of high/low performers in learning.
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12:00-1:30 PM (4119)

Item-Specific Improvements in Spatial Skill Acquisition: Algorithmic Speedup or Shift to Retrieval? DAVID J. FRANK, *Texas A&M University, Commerce*, BROOKE N. MACNAMARA, *Case Western Reserve University* – How do people improve their ability to intercept moving targets? People perform better when facing repeated rather than novel trajectories (Frank & Macnamara, 2017). This could result from an item-level or collective shift from algorithmic to retrieval-based strategies, or from item-specific algorithmic speed-up. We present evidence that performance benefits for repeated trajectories are primarily driven by a collective shift from algorithmic to direct retrieval strategies—but only when an early response deadline is used. By contrast, small improvements on repeated trajectories appear attributable to item-specific algorithmic speedup—but only when a late response deadline is used. This suggests that task features (response deadlines and frequency of trajectory repetition) dictate which strategies are employed in visual-spatial tasks. Most interestingly, our finding that retrieval shifts tend to be collective rather than item specific suggests that the accounts of well-known skill acquisition theories (Anderson & Lebiere, 1998; Logan, 1988; Palmeri, 1997; Rickard, 1997) do not hold for dynamic visual-spatial tasks.
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12:00-1:30 PM (4120)

Talking to Myself: Self-Talk and Mindset Interact to Influence Skill Acquisition and Task Performance. SARA G. GOODMAN, *St. John Fisher College*, TRAVIS L. SEYMOUR, *University of California, Santa Cruz* – Existing research suggests that self-focus via self-talk can influence performance. Specifically, highly self-focused language is disadvantageous whereas task-focused language is adaptive (e.g., Senay et al., 2014). This research neglects the influence of self-awareness via mindset, one's individual beliefs regarding success and failure. While engaging in a challenging dual-task paradigm, participants were presented with self-focused "I" goals or task-focused "you" goals, as well as neutral, fixed, or growth mindset-reflective goal framing. Performance improvements were detected when self-focus was emphasized through first-person self-talk for participants who received either fixed or growth mindset-reflective goal framing. Variations in self-talk do not influence performance when participants were asked

to do their best. Task-focused self-talk interfered with skill acquisition for participants reporting fixed mindsets, regardless of mindset-reflective goals. These findings support a nuanced and flexible perspective of the influence of self-focus on task performance, and further support the view of mindset as a flexible phenomenon.
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12:00-1:30 PM (4121)

Does Imperfect Explicit Knowledge on Perceptual-Matching Task Provided by Others Accelerate One's Knowledge on the Task? REIKO YAKUSHIJN, *Aoyama Gakuin University* – Some kind of skill e.g., traditional craftsmanship needs long time to acquire, and the tacit knowledge under the skill seems to be difficult to be transferred between people. At the same time, because starting age of professional skill training tends to be older in the current society than in the past, the way to help the period of training shorten is required. In this study, we investigated the way to shorten the skill acquisition by making use of the explicit but imperfect knowledge about the task acquired by experienced performers. Previous study (Yakushijin, 2017 in psychonomic society) suggested that the explicit knowledge acquired through performing perceptual-matching task in trial-and-error way was rarely correct, and the correctness of the knowledge was not necessarily correlated with the task performance. Moreover, the explicit knowledge often divided into two formats, i.e., heuristic and knowledge about the task world. In this study, we showed that the imperfect heuristics and explicit knowledge about the task world acquired by experienced performers affected the novice's skill acquisition in different way.
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12:00-1:30 PM (4122)

The Divergent Effects of Fixed vs. Random Interleaved Practice for Foreign Language Grammar Skills. STEVEN C. PAN and JARRETT LOVELETT, *University of California, San Diego*, VICKY PHUN, *Michigan State University*, TIMOTHY RICKARD, *University of California, San Diego* (Sponsored by Craig McKenzie) – Interleaved practice, in which learners switch between two or more categories during training, can improve Spanish L2 learners' acquisition of grammar skills relative to conventional blocked practice (Pan, Tajran, Lovelett, Osuna, & Rickard, 2018). In two experiments we investigated whether that benefit would manifest when (a) interleaving between two grammatical tenses involves fixed or random schedules, and (b) interleaving occurs throughout a single training session. In Experiment 1, a fixed interleaving schedule (i.e., presentation of grammatical rules used an alternating pattern that was designed to highlight important differences between tenses) yielded a large interleaving benefit over blocked practice on a 48 hr delayed test. In Experiment 2, a fully random interleaving schedule (i.e., any form of alternation between tenses) yielded no relative benefit. These results suggest that interleaving's benefits for L2 learning require the promotion of meaningful discriminative contrast between categories on successive trials and not simply any type of between-category alternation. That conclusion has implications for theories of interleaving effects and for the practical use of interleaving in educational contexts.
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HUMAN LEARNING AND INSTRUCTION II

12:00-1:30 PM (4123)

Long-Term Memory Consolidation Shares Cognitive Resources With Working Memory. NASEEM AL-AIDROOS, LINDSAY PLATER, KIRA WIENS, SANDRA NYMAN, and AKSHU VALECHA, *University of Guelph* – Consolidation of newly learned information feels like a passive, effortless process. Is it possible that this process is more cognitively demanding than previously thought, and interferes with performance on concurrent tasks? We designed a new methodology to test this question. In the present studies, we manipulated the demands on consolidation by having participants learn a list of 66 words either one or two times, after which participants completed a working memory change detection task (Experiment 1) or a Go/No-go inhibition task (Experiment 2). Working memory performance was worse following one round than two rounds of word acquisition, indicating that when participants had less opportunity to consolidate, consolidation interfered with working memory performance. Yet, there was no equivalent interference for the inhibition task. Thus consolidation and working memory may draw upon the same cognitive resources, which are not shared by response inhibition.
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12:00-1:30 PM (4124)

Enhancing Second Language Learning in the Classroom Through Technology. DAVID HARPER, ANITA R. BOWLES, and LAUREN AMER, *Rosetta Stone*, NICK B. PANDZA and JARED A. LINCK, *University of Maryland* (Presented by Anita R. Bowles) – Educational technology affords language learners various activities that can be used to supplement classroom instruction and enhance learning (Golonka et al., 2014). However, few well-designed longitudinal (pre/post) studies have matched learners on important covariates, such as socioeconomic status (SES), that might be expected to affect group differences in outcomes. We report a study designed to estimate the effect size of gains in second language proficiency after use of Rosetta Stone software. Participants included 880 students from 38 U.S. schools in grades 2-12 — all non-native speakers of English enrolled in English instruction. A subset of learners had access to the software for one school year; the rest did not. Pre/post data from standardized state assessments of English listening and speaking proficiency were collected from all participants before and after introduction of the software. Results indicate that software usage produced measurable gains in both listening and speaking, and gains for speaking scores remained after matching groups on pretest scores and other relevant covariates (e.g., indicators of SES, attendance). We discuss the implications for technology use in second language classroom instruction.
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12:00-1:30 PM (4125)

Prediction vs. Reflection: Where to Put Strategic Pauses in Storybook Reading With Young Children. KIRSTEN READ, *Santa Clara University* – This original study compared the effects of eliciting both predictions and repetitions on children's vocabulary retention from shared reading. Hearing stories featuring 8 novel monsters, 4-year-olds (n=60) were randomly assigned to 3 conditions:1) prediction, in which a reader either silently paused for 3sec or directly asked "What's he called?" prior to naming the monster; 2) reflection, where the reader asked "What's he called?" or silently paused for 3sec after naming; or 3) control, with no strategic pausing or prompting. After hearing the stories twice, children were tested on their recognition of the monster names in a forced-choice picture pointing task. Children correctly identified significantly more novel monsters in the prediction than the reflection condition, which in turn resulted in more identifications than control. There was also an interaction effect. Children identified more monsters when the reader paused rather than prompted before novel monster names, but after naming, children remembered more monsters when prompted than when the reader paused. Thus, pausing before rather than after new words may encourage different routes to learning, but how the child is prompted along each route matters.
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12:00-1:30 PM (4126)

Disfluency and the Need for Cognition: Using Small Test Alterations to Awaken Systematic Thinking in Students. DEREK J. HANSON and VERONICA X. YAN, *University of Texas at Austin* (Sponsored by Andrew C. Butler) – Knowing what to expect and the fluency that comes along with it is highly adaptive—it affords quick decision making and automatic responses. In classroom settings, however, this quickness can lead students into making silly mistakes. Research on disfluency shows that disrupting norms and expectations can shift people out of their associative, heuristic thinking and into a more systematic mode of thinking (e.g., Mourey, Lam, & Oyserman, 2015). In the present study, we examine whether a simple disruption to expectations—stapling the pages of a test packet in the wrong corner—can engage systematic thinking. We gave participants a series of cognitive reflection test (CRT) questions and measured need for cognition (NFC). The packet of questions were either stapled in the top left corner (control, fluent) or in the top right corner (disfluent). Those in the disfluent condition were more likely to answer the questions correctly, but significant differences between conditions existed only for participants with a low need for cognition.
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12:00-1:30 PM (4127)

Creating Drawings Enhances Learning by Teaching. LOGAN FIORELLA and SHELBI KUHLMANN, *University of Georgia* (Sponsored by Reed Hunt) – This study investigated the role of learner-generated explanations and drawings in learning by teaching. College students (n = 120) studied a biology lesson and then taught the contents of the lesson on video to a hypothetical student by either explaining, drawing, or explaining and drawing simultaneously. A control group of students restudied the lesson. All students completed learning outcome measures one week after teaching or studying. Results indicated that all teaching groups outperformed the control group and that the explain-and-draw group performed the best on the learning outcome measures. The benefit of explaining and drawing simultaneously was explained in part by more elaborative inferences in students' explanations compared to the explain-only group. These findings suggest that drawing supports quality explanations and enhances meaningful learning.
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12:00-1:30 PM (4128)

Investigating the Relations Between Metacognitive Study Strategies and Exam Performance in a College Course. CRISTINA D. ZEPEDA and TIMOTHY J. NOKES-MALACH, *University of Pittsburgh* (Sponsored by Christian Schunn) – When preparing for an exam or quiz, students can engage in several types of study strategies, some of which are more effective than others. Prior work has shown that students often do not know which strategies are more effective and tend to use less effective study strategies. Building upon this work, we examined a wide array of students' self-reported study strategies at multiple points during a semester and their relation to exam performance. We categorized the strategies as active or constructive to test the Interactive, Constructive, Active, and Passive (ICAP) hypothesis, which predicts that constructive strategies lead to better performance outcomes than active strategies (Chi, 2009; Chi & Wylie, 2014). Prior to each exam, 330 undergraduates reported their study strategies for the exam via different types of questions (e.g., open-ended and Likert-scale). Students reported using a variety of study strategies. Supporting the ICAP hypothesis, the majority of constructive strategies were positively related to exam performance whereas fewer active strategies were positively related to exam performance. This work provides insight into the measurement of study strategies and can serve as a basis for future intervention work.
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12:00-1:30 PM (4129)

Are Learner-Generated Drawings More Effective Than Instructor-Provided Illustrations? QIAN ZHANG and LOGAN FIORELLA, *University of Georgia* – In two experiments, college students learned from a scientific text about the human circulatory system by studying provided illustrations and/or generating their own drawings. In Experiment 1 (N=132), students studied a provided illustration (study), generated their own drawing (generate), studied a provided illustration and then generated their own drawing (study-generate), or generated a drawing and then studied a provided illustration (generate-study). Results indicated no significant differences across groups on a subsequent transfer test. In Experiment 2 (N=141), some students were provided with additional support to help them process the provided illustration or construct a quality drawing. Students who received support to process the

provided illustration performed best on the transfer test. These findings suggest that provided illustrations can be at least as effective as generating drawings, and that stronger levels of support may be necessary for the benefits of drawing to exceed studying provided illustrations.
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12:00-1:30 PM (4130)

Do Expectations of Study Tasks Affect Memory Performance? Evaluating the Role of Task Expectancy in the Levels-of-Processing Framework. JOSEPH LANDRY SMITH, KYLA COSENTINO, and MARK J. HUFF, *The University of Southern Mississippi* – We examined the role of expectancy processes on free recall using a deep levels-of-processing (LOP) task. Participants initially studied a set of unrelated words using a pleasantness-rating task followed by a free-recall test. Participants were then given group-specific feedback indicating that performance was either above average because pleasantness was a strong study task (pleasantness-good group), below average because pleasantness was a weak study task (pleasantness-bad group), or only provided with the proportion of correct recall (neutral group). Participants then studied and recalled lists of unrelated words alternating pleasantness ratings (deep LOP) and reading words aloud (shallow LOP) to gauge effects of LOP between lists. A crossover interaction was found such that pleasantness ratings increased recall over reading for the pleasantness-good group (standard-LOP effect), but decreased recall relative to reading in the pleasantness-bad group (reversed-LOP effect). Thus, the effectiveness of a deep-LOP task appears to be moderated by the expected effectiveness of that task.
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12:00-1:30 PM (4131)

Can Metacognitive Prompts Reduce Reliance on Inaccurate Information? NIKITA A. SALOVICH and DAVID N. RAPP, *Northwestern University* (Presented by David N. Rapp) – Metacognitive prompts are an instructional tool intended to help people reflect on their abilities and apply useful learning strategies during comprehension. These prompts have demonstrated success in encouraging self-monitoring and evaluation in a variety of domains. This project examined whether metacognitive prompts beneficially reduce the negative influence of exposure to inaccuracies; such exposure can lead readers to rely on false ideas even when they should know better. Participants answered metacognitive questions requiring them to reflect on their past experiences with inaccurate information and how they might avoid its influence. They next read a narrative containing false assertions, during which they intermittently received reminders to consider their prior knowledge. Participants who received the metacognitive prompting showed a numerical reduction in their use of previously-read false assertions to answer questions, as compared to participants who received no prompting. But both groups nevertheless showed a direct influence of having read the inaccurate information.
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12:00-1:30 PM (4132)

A Life Hack for Learning Math: Placement of Math Problems Influences Learning Experience. RACHEL ANNE REDONDO and KIT W. CHO, *University of Houston, Downtown* (Presented by Kit W. Cho) – Previous research shows that placing easier math problems at the beginning or the end of a list creates a more favorable learning experience than if those math problems were placed in the middle of the list. This study extends previous research by determining whether the placement of the easier math problems at both the beginning and end of a list creates an even more favorable learning experience. Participants completed two math tests, one of which had easier problems in the middle of the list (control list), while the other test had easier problems in the beginning, end, or both the beginning and end (experimental lists). Participants were then asked which test format they would like to take for the third test. Our results showed that participants equally prefer the experimental lists over the control list and thought that the experimental lists were less discomforting and shorter. Surprisingly, participants' preference were not guided by their post-hoc assessments of their performance, which were equivalent, on the two lists. These results suggest that educators can create a more pleasant learning experience by strategically administering the to-be-tested items.
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12:00-1:30 PM (4133)

Learning From Errors: Students' Confidence and Instructional Choices. MATTI VUORRE and JANET METCALFE, *Columbia University* (Sponsored by Lisa Son) – We implemented a computerized mathematics tutorial for high school students preparing for the New York State Common Core Algebra 1 Regents test. The tutorial presented students with multiple choice questions, followed by options to view instructional videos. The students were motivated to use the tutorial to help prepare for the Regents test, a high stakes test that is required for graduating New York public high school students. We asked how students' performance and confidence in their answers predicted choices to view instructional videos and thereby learn more about the correct answers or their own errors. Additionally, the impact of video viewing choices on subsequent test performance was assessed.
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12:00-1:30 PM (4134)

Optimizing Cue Use in Student Restudy Decisions. ALISON ROBEY and MICHAEL DOUGHERTY, *University of Maryland, College Park* – It is believed that decisions about what information needs additional study before an upcoming exam are dependent upon metacognitive processes. While a great deal of research has explored these processes, far less work has explored how to optimize restudy decisions. In the present study we examined both what cues are most predictive of future retrieval and test two potential ways of nudging learners to use these cues when making their restudy decisions. Assessment of cue-utilization revealed that pre-judgment recall accuracy and pre-judgment retrieval latency, but not stimulus font size, predicted future retrieval. Additionally, both feedback about

pre-judgment retrieval accuracy and having participants make retrospective confidence judgments led learners to more heavily weigh prejudgment retrieval accuracy when making their restudy decisions. This increase in relevant cue use, however, did not carry over into more accurate restudy decisions. These findings suggest that subtle manipulations can push learners to utilize more appropriate cues when making their restudy decisions.
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12:00-1:30 PM (4135)

The Effects of Religious Practice and Education on Beliefs in Neuromyths. MARCUS LITHANDER and MELTEM KARACA, *University of Massachusetts, Lowell*, MEGAN A. SUMERACKI, *Rhode Island College*, YANA WEINSTEIN, *University of Massachusetts, Lowell* – Neuromyths are common misconceptions about the brain and how we learn, such as the idea that students learn best when they receive information in their preferred learning style, or the idea that we only use 10% of our brains. Neuromyths are problematic since they may lead to ineffective teaching and reduce learning. However, few studies have investigated the predictors of beliefs in neuromyths. We carried out a U.S. population matched (n = 1,000) survey, asking participants to indicate their belief in 6 neuromyths. Other demographic data collected in the survey included religious practice and level of education. Results revealed a significant positive correlation between religious practice and beliefs in neuromyths, $r(754) = .12$, $p < .01$, although the effect size was small (Cohen's $d = .23$). Furthermore, an OLS regression analysis, controlling for income and sex, showed a significant ($p = .02$) interaction effect between education level and religious practice. These results suggest that education may act as a protective factor against beliefs in neuromyths.
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12:00-1:30 PM (4136)

Nature Is Calling and I Might Go: How Outdoor Activity Impacts Generation Z College Students' Academic Performance. JENNA M. POTVIN, *University of Toledo*, JACLYNN V. SULLIVAN, *Mount Mercy University* (Presented by Jaclynn V. Sullivan) – This study examined the characteristics of Generation Z college students (Mage= 19) that contribute to academic performance. 264 undergraduates from a Midwestern University answered questions about their study habits, exercise preferences, work schedules, mindful-awareness, need for cognition, and other demographic variables. Factors expected to impact academic performance (NFC, outside job hours) did not impact GPA in this sample. However, factors seemingly unrelated to GPA, such as activity level and the environment one prefers to be active in, were impactful. Students preferred outdoor activities to indoor activities and nearly 100% of the sample agreed that activity improved cognitive functioning. Yet, only 55% would choose exercise over entertainment when faced with exam stress. The overall findings suggest that Generation Z college students seek experiences that allow them to be in nature, feel relaxed in those environments, perform better academically when they are active daily, yet do not choose activity over passivity to manage stress.
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12:00-1:30 PM (4137)

The Effect of Feedback Modality on Written-Assignment Revisions. FRANCESCA ORTEGREN and KATHERINE DANIELS, *University of Southern Indiana* – Students are often required to update written assignments based on instructor-provided feedback. The ever-growing popularity of computer-based learning-management systems in both traditional and online courses highlights the importance of understanding how this feedback is provided. Previous research focuses primarily on student and instructor preference for hand-written or electronic feedback (e.g., Chang et al., 2012). However, research has not examined whether revision quality is affected by the modality of feedback. As such, participants in the current experiment read an empirical article and were provided a paper copy of a student-written summary of the article with hand-written or typed feedback focused on grammatical, content, and plagiarism errors. The written feedback included underlining, circling, and pointing to areas on the document that required revision, whereas the typed feedback utilized the comment function in Microsoft Word to highlight those same problems and make comments on the document. The content of the feedback was otherwise identical. We assessed participants' revisions of the summary.
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12:00-1:30 PM (4138)

The Effects of Historical Videogames on Retaining Relevant Information Through Empathy. ELIF ECE SOZER, MARIJN MADO, and WILLIAM HIRST, *The New School for Social Research* (Sponsored by William Hirst) – What benefits might videogames contribute to history education? Reading literary fiction (Kidd & Castano, 2013), watching an award-winning TV drama (Djikic, 2013) and playing videogames rich in storytelling (Borman & Greitemeyer, 2015) increases RMET score, a measure of Theory of Mind. Does it also increase the extent to which individuals can put themselves into the mind of those in the past facing historical struggles? We asked participant to play an historical educational videogame, City of Immigrants, featuring a 14-year-old female immigrant in 1907 New York City working in a garment factory and struggling to bring her family to the US. Participants then read a relevant historical text, completed an implicit association task for class and religion and a RMET task, and answered questions about the contemporary relevance of the raised issues. The results are discussed in terms of historical empathy and its effects on subsequent recall.
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12:00-1:30 PM (4139)

When Is Guidance During Exploratory Learning Optimal? PHILLIP M. NEWMAN and MARCI S. DECARO, *University of Louisville* – Exploring a novel problem prior to receiving instruction on the concept has been shown to enhance

conceptual understanding and transfer of learned material. However, exploratory learning places heavy demands on cognitive resources. Using worked examples to guide exploration is one way to reduce these demands. However, providing guidance during exploration leads to mixed results, improving learning in some studies but not others. We tested whether the beneficial effect of providing guidance during exploratory learning selectively occurs when learners also complete a pretest. Participants (N=147) explored the concept of statistical variance by solving a novel problem either with guidance (worked examples) or without (pure invention). Some participants additionally completed a pretest containing an open-ended variance problem. Guidance enhanced learning when combined with a pretest, but not when the pretest was absent. Exploratory learning benefits most from a brief generative activity, followed by a worked example, promoting deeper learning from subsequent instruction.
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12:00-1:30 PM (4140)

Effects of Background Music Familiarity on Math Performance. CAROLINA E. KUEPPER-TETZEL and KYLER D. ABERCROMBIE, *University of Dundee* – People often listen to background music while engaging in cognitive tasks, e.g. while studying or working. Previous research has shown mixed results of background music on target task performance with its benefits and pitfalls depending on various factors. Background music has been argued to be beneficial when it leads to an elevation in mood which increases performance (arousal-emotion/mood-activation hypothesis). On the other hand, background music can be distracting and disrupt attention to the ongoing target task. Distractions can stem from features of the music, but also be a result of intruding memories triggered by the music, particularly when listening to familiar music. In the current experiment, we exposed participants to three conditions while performing math problems: no music, familiar instrumental music, and unfamiliar instrumental music. Accuracy and latency to solve the math problems were assessed. The results show significant detrimental effects in accuracy when listening to familiar music compared to unfamiliar or no music; and faster response times when listening to unfamiliar music compared to the other two conditions. Theoretical and practical implications are discussed.
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12:00-1:30 PM (4141)

Can Instructional Support Mitigate the Negative Effect of Seductive Details? CELESTE PILEGARD, *University of California, Riverside* – Seductive details are attention-grabbing details added to a lesson with the intention of sparking interest, but that are ultimately irrelevant to the instructional goal. These details are "seductive" in that they are often remembered at the expense of the target information (Harp & Mayer, 1998). The current experiment added instructional support in the form of two worksheets designed to help students focus on the instructional goal of a text-based lesson. In a 2x2 design, college students read a lesson about the life cycle of fungi, with the presence of seductive details and the presence of the worksheets as independent variables. Participants then completed a retention test and problem-solving transfer test. The results provide evidence that the harmful effects of seductive details can be reduced with instructional support designed to help students direct and control their cognitive resources during learning.
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12:00-1:30 PM (4142)

Inducing Curiosity: Can Making Students More Curious Enhance Learning? KATHLEEN M. ARNOLD, *Radford University*, CAMILA VARGAS RESTREPO, *Duke University*, LESLI TAYLOR, CRISHAUNA ROLACK, and LAUREN WRIGHT, *Radford University*, ELIZABETH J. MARSH, *Duke University* – Curiosity can be a motivating factor for students, which can enhance learning. Prior work examining the effect of curiosity on learning has largely relied on natural variation in curiosity, showing that learners better remember answers to questions they are intrinsically more curious about (Kang et al., 2009; Marvin & Shohamy, 2016). In this study, we go a step further by examining the effects of inducing curiosity on learning. That is, can we make students more curious and, if so, will this induced curiosity enhance learning? We attempted to manipulate curiosity using Loewenstein's (1994) information gap theory of curiosity, which suggests curiosity results from a perceived gap between what a learner knows and what they want to know. While keeping the learning material constant, we manipulated the perception of a gap, which resulted in significant differences in induced curiosity. Memorial consequences of these differences were then examined.
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12:00-1:30 PM (4143)

Can Instruction Support the Self-Regulated Use of Retrieval Practice in Higher Education? MARLOES BROEREN, *Avans University of Applied Sciences*, PETER VERKOEIJEN, *Erasmus University Rotterdam*, ANITA HEIJLTJES, *Avans University of Applied Sciences*, LIDIA ARENDS and GUUS SMEETS, *Erasmus University Rotterdam* (Sponsored by Peter Verkoeijen) – An important aspect of self-regulated learning is the ability to adequately use effective learning strategies. A recent laboratory experiment revealed that an instructional intervention promoting retrieval practice increased participants' self-regulated use of retrieval practice and subsequent test performance (Ariel & Karpicke, 2017). The present pre-registered field experiment examined whether this finding would generalize to a real-life educational setting. In the experimental condition, students from a higher education marketing course received instructions on the benefits and effective use of retrieval practice, while the control condition received neutral instructions. The intervention included two sessions with and a last session without instructions, followed by students studying key marketing concepts. We hypothesized that explicit instructions would lead to an increased use of retrieval practice during all sessions and an increased self-regulated use of retrieval practice during the last session and would be positively associated with performance on a final

delayed test. The data of the experiment are currently being analyzed and the outcomes will be available at the Annual Meeting.
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12:00-1:30 PM (4144)

Examining the Influence of Memory for Errors in Error Correction. HANNAH HAUSMAN and MATTHEW G. RHODES, *Colorado State University* (Sponsored by Matthew Rhodes) – Making errors while studying can benefit long-term learning. One possibility is that errors serve as "stepping stones." For example, a question may activate a previously-made error, which brings to mind the correct answer in turn (Cyr & Anderson, 2013). By extension, if recalling errors facilitates memory for the correct answer, then making errors more memorable should also make correct answers more memorable. This prediction was tested in 4 experiments. Participants in each experiment learned word stem completions or unrelated word pairs and were either presented with the correct answer (errorless condition) or had to guess an answer before it was presented (errorful condition). Memory for the error was varied via several different manipulations (generation, unique context cues, spacing, and list length). These manipulations had inconsistent effects on memory for the correct answer on a final test, findings that any comprehensive theory of error correction must account for.
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12:00-1:30 PM (4145)

Comparing and Combining Retrieval Practice and Concept Mapping. GARRETT M. O'DAY and JEFFREY D. KARPICKE, *Purdue University* (Sponsored by Jeffrey Karpicke) – Retrieval practice enhances the learning of educational materials, and prior work has shown that practicing retrieval can enhance learning as much as or more than creating concept maps. Few studies have combined retrieval practice with other learning activities, and no prior work has explored whether concept mapping and retrieval practice might produce especially robust effects when the two activities are combined. In two experiments, students studied educational texts and practiced retrieval (by freely recalling the texts), created concept maps, or completed both activities. In the combined activity conditions, students studied and created concept maps prior to practicing retrieval. On a one-week delayed assessment, practicing retrieval enhanced learning relative to creating concept maps. Surprisingly, combining concept mapping and retrieval practice failed to produce any benefit over retrieval practice without concept mapping, even though students in the combined conditions spent substantially more time engaged with the materials than did students in single-activity condition.
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12:00-1:30 PM (4146)

Retrieval-Based Structure-Building: The Effect of Concept Organization and Concept Mapping on Text Learning. JINGYI LIU, ERIN M. SPARCK, and ELIZABETH LIGON BJORK, *University of California, Los Angeles* (Presented by Erin M. Sparck) (Sponsored by Elizabeth Bjork) – Despite structural support provided by concept mapping, no advantage of using it to enhance retention has been found compared to free-recall testing (Blunt & Karpicke, 2014). The present research explored whether requiring learners to reorganize the to-be-learned material in the creation of concept maps would increase the contribution of concept mapping to long-term retention. That is, does requiring learners to retrieve and reorganize information during the creation of concept maps act as a desirable difficulty leading to better performance? Participants read text on normative ethics structured in one of two ways: around concrete concepts (e.g., people) or around abstract themes (e.g., morality). Participants created concept maps as retrieval practice, matching or mismatching, the text's structure before restudying and taking a final test. Mismatched concept mapping requiring reorganization produced higher final test performance. Educational implications include how to encourage effective restudying with techniques that simultaneously promote effective structure building and retention.
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12:00-1:30 PM (4147)

Effects of Repetition on Transfer: Testing the Encoding Variability Hypothesis in an Authentic Learning Environment. JOSEPH W. PIROZZOLO and DONALD J. FOSS, *University of Houston* (Sponsored by Donald Foss) – College students in two sections of a semester-long Methods class (total N = 155) were repeatedly tested on a set of 16 topics (e.g., self-selection as a confound, external validity) across three mid-term exams, a "surprise final exam," and the planned final exam. Half of the test items were in multiple-choice (MC) format and half in short-answer (SA) format. Orthogonal to the test format, half the items were repeated identically across the first four exams (the Constant items), while the other half repeatedly tested a construct (e.g., external validity) but with different exemplars on each of those exams (the Variable items). The Constant and Variable items were counterbalanced across the two sections of the course. The planned final exam tested both old items and, importantly, new exemplars of each of the 16 topics in order to examine whether variable or constant repetition would lead to better performance—that is, to better transfer—and whether the amount of transfer would be influenced by the type of test: recognition (MC items) or recall (SA items).
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12:00-1:30 PM (4148)

Can a Pretest Make Your Google-Search Experience Stick? SASKIA GIEBL, STEFANY MENA, CHANGRUI LI, KATHERINE COOK, ELIZABETH LIGON BJORK, and ROBERT A. BJORK, *University of California, Los Angeles* (Sponsored by Robert Bjork) – Technological advances have increased our reliance on Google and heightened the need to become more sophisticated Internet users. Unfortunately, learners are generally drawn to study strategies that result in rapid improvement during acquisition, unaware that such gains are often short-lived. Thus, when posed with a question for which the solution does not immediately come to mind,

learners immediately turn to the Internet for the solution, rather than first trying to solve it themselves. Research, however, has shown that attempting to generate a potential answer (e.g., on a pretest)—though usually incorrect—can nonetheless enhance subsequent learning of that information. The present research examines whether pretesting—asking participants to attempt a programming task involving both already learned information (e.g., for loops using individual variables) as well as not-yet-learned information (e.g., for loops using grouped variables)—before relying on Google to solve the task, can enhance retention of online educational content.
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12:00-1:30 PM (4149)

Instruction Manipulations During Dual-Memory Retrieval Practice: Can They Eliminate a Retrieval Stage Processing Bottleneck? FRANZISKA ORSCHESCHEK, *MSH Medical School Hamburg*, TIMOTHY RICKARD, *University of California, San Diego*, TORSTEN SCHUBERT, *Martin-Luther University Halle-Wittenberg*, TILO STROBACH, *MSH Medical School Hamburg* (Sponsored by Tilo Strobach) – The study investigated the role of instruction manipulations and the associated cognitive architecture of learned retrieval parallelism in the context of dual-memory retrieval from a single cue. So far, previous research focused on response strategies that subjects naturally adapted during practice. Results indicated the presence of learned retrieval parallelism for a subset of subjects that exhibited a synchronized response strategy. This form of retrieval parallelism is cue-specific, consistent with the set-cue bottleneck model. To extend these findings, subjects in the present study were instructed to apply a synchronized response strategy across three sessions of dual-memory retrieval practice. Following this practice on old cues, the cue-specificity of learned parallelism was investigated with the presentation of another set of new dual-retrieval cues. The results indicate the possibility to instruct learned parallelism and to influence the efficiency of dual-memory retrieval. Further, strategy instructions were not able to eliminate the retrieval stage processing bottleneck.
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12:00-1:30 PM (4150)

The Role of Exploratory Learning in Task Representation Updating. DAVID J. FRANK, *Texas A&M University, Commerce*, ZACHARY PUGH, *North Carolina State University*, MATTHEW L. HUGHES and DAYNA R. TOURON, *University of North Carolina at Greensboro* – In order to perform a task well, one must have an understanding of what the task entails. Following instructions, task representations may be relatively incomplete or contain important errors. Through task experience, it is thought that people correct faulty task representations and adjust their strategies accordingly. Pathfinder networks have recently been used to measure task understanding (Frank & Touron, 2016; Furlough & Gillan, 2018). Frank and Touron (2016) showed strong relationships between task representation accuracy and task performance, but no evidence of task representation updating. It is possible that the majority of task representation updating occurs, not through goal-driven performance, but through exploration (e.g., trial and error). Using a simulated chemistry task paradigm, we measure task representations separately, following instructions, exploration, and goal-directed performance. In doing so, we tease apart task representation updating which occurs through exploratory learning versus goal-directed performance. Theoretical and practical implications are discussed.
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EYEWITNESS IDENTIFICATION

12:00-1:30 PM (4151)

National vs. International Exoneration Cases: Comparing Causes of Wrongful Convictions. MICHAEL P. TOGLIA and ALEXIS N. LOVAAS, *University of North Florida*, DANIELLE M. RUMSCHIK, KRISTINA TODOROVIC, and GARRETT L. BERMAN, *Roger Williams University* – Organizations worldwide exonerate wrongfully-convicted individuals. We compared the frequency of causes of erroneous convictions in the U.S. (N = 351), Western (N = 900) and Non-Western (N = 595) countries to pinpoint leading factors responsible for convicting the innocent. Eyewitness misidentification was the main reason for wrongful convictions (71%) in the U.S. (innocenceproject.org). When reasons were provided, the principal cause of conviction in Western cultures was misidentification (23%), and while eyewitness misidentification was also frequent in Non-Western countries (27%), government misconduct was the leading cause for erroneous convictions (38%). Interpretations necessitate a caveat: Compared to complete case histories contained in the U.S. database, there were surprising amounts of missing data regarding wrongful conviction causes in both Western (58%) and Non-Western (34%) countries. Implications include pleas for systematic methods for recording variables that influence memory/identification procedures and for promoting best practice standards in judicial systems to reduce miscarriages of justice.
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12:00-1:30 PM (4152)

What Did the Eyewitness See? Mock Juror Perceptions of Eyewitness Evidence. BRITTANY N. NESBITT, KARENNA F. MALAVANTI, and CHARLES A. WEAVER, III, *Baylor University* (Presented by Karenna F. Malavanti) – Eyewitness testimony has been implicated in ~70% of DNA exonerations (Innocence Project, 2018). In order to reduce eyewitness errors, jury members in New York state criminal cases are now permitted to view the lineups used by eyewitnesses to make their identifications (Blain, 2017). Many previous efforts to improve the evaluation of eyewitness evidence increase skepticism of jurors but does not necessarily improve decision making (Jones et al, 2017). We investigated whether presenting jurors with a lineup may bridge the gap between broad skepticism and discrimination with regard to the reliability of eyewitness identifications. Mock jurors read a case vignette with or without access to a fair or biased lineup that the eyewitness utilized. Jurors that viewed the fair photo array rated the eyewitness as more credible than those who viewed a biased lineup. Additionally, jurors who viewed a biased lineup rated

the eyewitness identification as less reliable when receiving juror instructions, and more reliable when receiving expert testimony. This effect did not occur in the fair lineup condition. Thus, lineup viewing improved juror decision making when jurors were also given instructions, particularly in instances of a biased lineup.
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12:00-1:30 PM (4153)

Why Are Lineups Better Than Showups? A Test of the Filler Siphoning and Enhanced Discriminability Accounts. MELISSA F. COLLOFF, *University of Birmingham*, JOHN T. WIXTED, *University of California, San Diego* – Presenting the police suspect with similar-looking people (a lineup) results in more accurate IDs than presenting the suspect alone (a showup). But why are lineups better than showups? The diagnostic-feature-detection theory suggests that lineups enhance witnesses' ability to discriminate between innocent and guilty suspects, because facial features can be compared across lineup members. Filler siphoning posits that the presence of other lineup members siphons some of the IDs that would otherwise land on the innocent suspect. To test these two accounts, over 3,600 subjects watched a mock crime and were presented with either a simultaneous showup (a novel procedure), a showup, or a simultaneous lineup. Subjects in the simultaneous showup condition saw the suspect and five similar-looking faces, but, unlike a lineup, were prevented from identifying the other faces. In three experiments, presenting similar-looking faces alongside the suspect (simultaneous showup & lineup) enhanced subjects' ability to discriminate, compared to presenting the suspect alone (showup) as measured by pAUC and fitting a signal-detection model. These results are predicted by the diagnostic-feature-detection hypothesis, but not the filler siphoning account.
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12:00-1:30 PM (4154)

Does Prior Knowledge of a Police Suspect Influence Interpretations of Eyewitness Confidence Statements? JESSE H. GRABMAN and CHAD S. DODSON, *University of Virginia* (Sponsored by Chad Dodson) – When an eyewitness identifies a suspect from a lineup, it is important to know how certain they are about the decision. Even though eyewitnesses are likely to express certainty with words, past research shows that verbal confidence statements (e.g., "I'm pretty sure") are prone to systematic misinterpretation. Until now, no one has examined how an evaluator's prior knowledge, such as which lineup member is the police suspect, influences their interpretation of eyewitness confidence about a lineup identification. Experiments 1 and 3 show that participants perceived the identical statement of confidence as meaning a higher and lower level of certainty, respectively, when the eyewitness's selection either matched or mismatched the police's suspect. Experiment 2 shows that these effects generally persist when the bias manipulation is manipulated between-subjects. Finally, Experiment 3 finds that clarifying the witness's statement with numeric information (e.g. I'm 80% sure) does not eliminate the influence of biasing information.
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12:00-1:30 PM (4155)

Using Data to Estimate the Utility of Hits, Correct Rejections, Misses, and False Alarms in the Justice System. GRIFFIN COLAIZZI and NATE KORNELL, *Williams College* (Presented by Nate Kornell) – When an eyewitness makes a mistake, it can contribute to either a guilty person going free (a miss) or an innocent person being convicted (a false alarm). Researchers typically make the simplifying assumption, when analyzing eyewitness data, that misses and false alarms are equally bad. Similarly, correct rejections and hits are assumed to be equally good. We tested these assumptions. US residents read a description of each of these four outcomes and rated it from very bad to very good. Hits were rated as highly positive, false alarms as highly negative, and the other two outcomes were in between. Accurate responses were unfailingly better than errors; nevertheless, we believe existing analysis techniques could be supplemented by integrating data like these and attempting to maximize utility. When one is choosing among procedures for handling eyewitnesses, doing so can make a difference in which procedure comes out on top.
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12:00-1:30 PM (4156)

Different Versions of Silver Alerts: Text vs. No Text, Single vs. Multiple Photos, and Voiceover vs. No Voiceover. VICKI S. GIER, *Mississippi State University, Meridian*, DAVID S. KREINER, *University of Central Missouri* – The current study addressed several important questions regarding the efficiency of the different type of Silver Alerts viewed by the public on television. Does it matter if the audience views a single photo of the missing person, or do multiple photos enhance face recognition? Additionally, does viewing Silver Alerts with or with voiceover information, and/or, having the script available for viewers to read along with the newscaster have any benefits in better recognizing the person in the Silver Alert? Using a between-subjects research design we found no significant differences in the type of version (14 versions of a Silver Alert) of a Silver Alert viewed by 535 participants, including no significant gender, age, or race effects. Additionally, the proportion of false alarms, prospective confidence, and target confidence had no significant differences. We failed to reject the null hypothesis that there would be significant differences between the Silver Alert versions.
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12:00-1:30 PM (4157)

Comparing the Dud Effect in Simultaneous and Sequential Lineups. DANIEL M. BIALER and CHARLES J. BRAINERD, *Cornell University* (Sponsored by Charles Brainerd) – It is known that adding dissimilar foils to a lineup increases eyewitnesses' confidence in incorrect identifications, which is known as the dud effect (Charman, Wells, & Joy, 2011). This suggests that confidence ratings may be relative judgments, but absolute judgments have also been found to affect confidence. Fuzzy-trace theory predicts that people use both strategies when assessing confidence, relying on absolute judgment more with similar-foil lineups and relative judgment more with dissimilar-foil lineups. The aim of the current study is to test this hypothesis

by comparing dud and non-dud confidence with simultaneous lineups versus sequential lineups. As sequential lineups promote absolute judgment, the addition of dissimilar foils is expected to have much smaller effects on confidence than when dissimilar foils are added to simultaneous lineups. An additional aim is to determine whether these effects are modulated by individual differences in working memory capacity and suggestibility.
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12:00-1:30 PM (4158)

Cross-Race Interactions and the Social Contagion of Memory. LEAMARIE T. GORDON, *Assumption College*, CHRISTINA HARVEY and SAMUEL R. SOMMERS, *Tufts University*, JOHN B. BULEVICH, *Stockton University*, AYANNA K. THOMAS, *Tufts University* – Prior to giving testimony, eyewitnesses may be exposed to misinformation from outside sources, such as other witnesses. After exposure to such misinformation, witnesses may conform to outside reports and provide inaccurate details when asked to report on their own memories. Roediger, Meade, and Bergman (2001) coined this phenomenon the social contagion of memory. The present study explored whether the race of the person providing misleading information impacts the social contagion of memory effect. Specifically, we compared measures of social contagion resulting from same-race interactions and different-race interactions. We found that white participants who learned misinformation from black individuals demonstrated greater social contagion than those who learned misinformation from same-race individuals. The presence of a different-race individual may constrain executive resources, and reduce efficient response monitoring in white participants.
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12:00-1:30 PM (4159)

The Comprehensive Narrative Elaboration Technique Increases Accurate Recall and Resists Misinformation. JENNIFER L. BRIERE, *St. Thomas More College University of Saskatchewan*, HAOTONG WANG and KATHRYN DREVER, *University of Saskatchewan*, TAMMY A. MARCHE, *St. Thomas More College University of Saskatchewan* – An interviewing technique termed the Comprehensive Narrative Elaboration Technique (CNET) taps into a number of autobiographical memory components (i.e., sensory/somatosensory, cognitive, affective/emotional, behavioural, procedural, contextual), which may increase the quantity of details reported from memory. However, no research has examined its effectiveness in increasing accurate information or resisting misinformation. To examine how effective the CNET, the modified cognitive interview (mCI), and standard free recall (FR) were at increasing accurate recall and combating misinformation, participants (Ps) unknowingly witnessed a staged event, received neutral or misinformation 3 days later, and were interviewed with either the CNET, mCI, or FR 4 days later. Ps recalled significantly more accurate details with the mCI and the CNET than with FR, and more with the CNET than the mCI for the cognitive, sensory, and emotional components. The type of memory components that were vulnerable to misinformation depended on the interview protocol used. Future research should apply misinformation to each memory component to thoroughly examine how memory is affected with each protocol.
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12:00-1:30 PM (4160)

The Effects of Lying and Modality Congruency on Eyewitness Testimony. GABRIELLE AKERS-GOODWIN and ELISABETH J. PLORAN, *Hofstra University* – Deception has previously been shown to have an enhancing effect on an individual's memory accuracy. Separately, the modality congruence of the stimulus itself to the method an individual is asked to recall their memories of said stimulus has also demonstrated a beneficial effect on memory. In criminal justice, understanding how the modality of the testimony (e.g., verbal account versus written deposition) and possible use of deception is critical to the overall validity of eyewitness testimony. The present study examined the effects of both lying and modality congruency on repeated eyewitness testimony. Participants were asked to partially lie or tell the truth during either verbal or written testimony immediately after watching a crime. Participants then repeated their testimony one week later to test for memory accuracy. The results suggest that testimony modality may not affect forgetting rate of content, but intentional deception potentially enhances memory for the actual event.
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12:00-1:30 PM (4161)

When Less is More: Showing Masked Faces in a Lineup Enhances Identification of a Masked Face. KRISTA D. MANLEY (Graduate Travel Award Recipient), JASON C.K. CHAN, and GARY L. WELLS, *Iowa State University* (Sponsored by Jason C.K. Chan) – Perpetrators often wear disguises like ski masks to hinder subsequent identification. In cases involving a masked perpetrator, the decision of how to administer a lineup rests on the investigating officer. However, no evidence-based recommendations currently exist for this type of lineup decision. Based on the principles of transfer appropriate processing, we believe that administrating a masked-face lineup may facilitate identification. In three experiments, we examined identification performance by factorially manipulating encoding (studying a full face vs. a masked face) and retrieval conditions (identifying a target from a full-face lineup vs. a masked-face lineup). Results showed that when participants had encoded a masked face, identification accuracy increased when the lineup contained masked faces rather than full faces. Our data suggest that presenting a transfer-appropriate lineup (a masked-face lineup for a masked target) can enhance identification performance — even if the lineup presents less visual information (i.e., the eyes only) than the alternative (a full-face lineup that presents the eyes along with other facial features).
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12:00-1:30 PM (4162)

The Effect of Prior Familiarity and Conceptual Knowledge on Face Recognition Accuracy. MELISA AKAN (Graduate Travel Award Recipient) and AARON BENJAMIN, *University*

of Illinois at Urbana-Champaign (Sponsored by Brian Ross) – Eyewitnesses are often faced with the task of identifying a suspect that they are familiar with. This is especially common in small towns or circumscribed communities. We examined the effect of prior familiarity with and knowledge of a suspect on recognition of faces. In Experiment 1, we manipulated familiarity by varying the number of exposures of a face (from 0 to 6) prior to study. This experiment revealed an increase in both hit and false alarm rates, and a decrease in discriminability (d'), with increasing familiarity. In Experiment 2, we included a condition that required learning unique name labels associated with some of the faces ("known" faces), along with a condition that involved exposure to faces presented without any conceptual information ("familiar" faces). In line with Experiment 1, familiarity alone reduced discriminability, and increased both hit and false alarm rates. However, having name labels led to an increase in hit rates and a reduction in false alarm rates, eliminating the deleterious effects of familiarity on recognition accuracy. These experiments constitute initial attempts at understanding how prior knowledge and familiarity affect eyewitness identification.
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12:00-1:30 PM (4163)

The Relation Between Confidence and Accuracy With Verbal and Verbal Plus Numeric Confidence Scales. WENBO LIN, EYLUL TEKIN, and HENRY L. ROEDIGER, III, *Washington University in St. Louis* (Sponsored by Leonard Green) – Numerous eyewitness identification studies have examined the relationship between eyewitness confidence and accuracy using numeric confidence scales with a large range of confidence levels (e.g., 100-point); however, police departments tend to use verbal confidence scales with fewer confidence levels and verbal expressions of confidence rather than numeric ones (e.g., sure, less sure). In the present study, we compared the confidence-accuracy relationship between verbal and verbal + numeric confidence scales across 2 levels and 4 levels of confidence using confidence-accuracy characteristic plots. Participants saw two videos. Following each video and a 10-min filler task, they were given either a target-present or target-absent lineup. We found strong positive relationships between confidence and accuracy for both 2-point and 4-point confidence scales. Furthermore, verbal and verbal + numeric confidence scales produced similar confidence-accuracy relations. In all comparisons, high confidence was associated with greater than 90% accuracy.
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12:00-1:30 PM (4164)

Using a Pre-identification Procedure to Improve Showup Identifications. CHARLES A. GOODSELL, *Canisius College*, RYAN M. MCADOO and SCOTT D. GRONLUND, *University of Oklahoma* – Showups (a one-person eyewitness identification procedure) result in poorer identification performance compared to lineups (Neuschatz et al., 2016). We conducted an experiment testing the idea that showup performance could be improved by asking witnesses to evaluate known-innocent faces prior to the identification. This pre-identification procedure resulted in better diagnostic decisions. We utilized the computational model WITNESS (Clark, 2003), in conjunction with receiver operating characteristic (ROC) curves, to explore three competing explanations of these data (and two extant studies by Gronlund et al., 2012; Wetmore et al., 2015). Instantiations of the competing explanations were explored, including one first proposed by Goodsell et al. (2010) that allowed the model to match the data. Implications for the competing explanations will be discussed.
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12:00-1:30 PM (4165)

A Systematic Evaluation of Lineup Fairness: Preliminary Tests of the Diagnostic Feature-Detection Hypothesis. ALYSSA R. JONES, CURT A. CARLSON, ROBERT F. LOCKAMYEIR, and MARIA A. CARLSON, *Texas A&M University, Commerce* (Sponsored by Curt Carlson) – Studies have shown that fair lineups produce higher discriminability than single-suspect showups (e.g., Key et al., 2016; Wetmore et al., 2015). Wixted and Mickes (2014) proposed the diagnostic feature-detection (DFD) hypothesis to explain this pattern. We conducted two experiments with highly controllable computer-generated faces (FACES 4.0) to test this hypothesis and to see if it breaks down at upper limits of fairness (i.e., highly homogenous faces and features). Experiment 1 compared showups with two types of lineups containing highly similar foils. Experiment 2 compared three levels of fair lineups that varied in featural overlap. ROC analysis for E1 did not support the DFD hypothesis, which could be due to a limitation with our lineups; results for E2 were mixed. Overall, our results indicate that both the homogeneity of foils and of their facial features are important indicators of diagnosticity when making identification decisions.
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12:00-1:30 PM (4166)

Crime and Punishment: An Investigation of Systems and Estimator Variables in the Innocence Project Cases. AMANDA M. CLEVINGER and HEATHER M. KLEIDER-OFFUTT, *Georgia State University* (Sponsored by Heather Kleider-Offutt) – Eyewitness memory error is the most frequent cause of wrongful conviction in the U.S. Myriad studies have tested factors contributing to this recognition error, but one area left under-explored is characterizing who is most likely to get misidentified from a lineup. Witnesses may use criminal face bias when choosing a suspect from a lineup, especially in cross race identifications, thus leading them to choose the most criminal-looking option. To test this, participants rated the perceived criminality of actual mugshots of misidentified persons and perpetrators from Innocence Project cases. We tested the relationship between criminality ratings for exonerates and perpetrators and if the racial match/mismatch between the rater and the person in the mugshot had an effect on criminality ratings. Results suggest exonerate faces are perceived as more criminal compared to perpetrators' faces and that race mismatch between the rater and the face rated exacerbates this difference.
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12:00-1:30 PM (4167)

The Cross-Race Effect: A Reinvestigation of the Confidence-Accuracy Relationship. JESSE N. ROTHWEILER and CHRISTIAN A. MEISSNER, *Iowa State University* (Sponsored by Christian Meissner) – The cross-race effect (CRE) is a robust finding in which same-race discrimination accuracy is superior to other-race discrimination accuracy. However, when reassessing datasets that initially confirmed these results, Nguyen, Pezdek, and Wixted (2017) determined that the CRE is not always observed when examining accuracy across different levels of confidence. Specifically, at high levels of confidence, same-race and other-race accuracy was indistinguishable and had significantly greater accuracy compared with low levels of confidence. Previously, the CRE has been found at high confidence recollection judgments (Meissner, Brigham, & Butz, 2005) and in a perceptual matching task (Meissner, Susa, & Ross, 2013). This poster examines data from these and other published and unpublished datasets to further assess Nguyen et al.'s confidence-specific accuracy approach and compare such findings with alternative metrics (Over/Under, Calibration, Confidence-Specific Accuracy).
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12:00-1:30 PM (4168)

Making Theoretical Sense of Sequential Lineups. BRENT M. WILSON, KRISTIN DONNELLY, NICHOLAS CHRISTENFELD, and JOHN T. WIXTED, *University of California, San Diego* – Even though ~30% of law enforcement agencies in the United States have adopted the sequential lineup procedure, it is still not well understood at a theoretical level. The sequential lineup presents a unique signal detection problem because the exact criterion used affects whether or not an eyewitness has an opportunity to make a suspect identification. With other signal detection tasks, if responding becomes more liberal, the hit rate necessarily increases. However, with the sequential lineup, if responding becomes more liberal, the hit rate can actually decrease because the eyewitness is likely to make a foil identification prior to seeing the suspect. This structural constraint of the sequential procedure can create situations where empirical discriminability (area under the ROC curve) decreases despite underlying discriminability (d') increasing.
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12:00-1:30 PM (4169)

Reducing the "Illusion of Memory Knowledge": Improving Jurors' Understanding of Factors That Influence Eyewitness Memory. COURTNEY A. KURINEC and CHARLES A. WEAVER, *Baylor University* (Sponsored by Charles Weaver) – People often feel they have a good understanding of how memory works despite possessing only limited knowledge. This Illusion of Explanatory Depth (IOED) can be challenged by asking people to explain what they know about a topic. Although the weakening of this illusion has been explored in domains like devices, it is unclear if memory knowledge operates similarly. To explore this question, we asked participants to rate their understanding of memory concepts or devices before and after explaining as well as after reading an expert's explanations. Although the effect was stronger for devices, participants in both conditions reported a decrease in understanding after providing explanations, demonstrating that memory is susceptible to an IOED. Importantly, both groups showed an increase in understanding after receiving the expert information, suggesting that weakening the illusion may improve later learning. Future research will investigate whether changes in reported understanding reflect actual increases in memory knowledge.
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12:00-1:30 PM (4170)

The Guilty Apple: Ensemble Processing of Visual Memory Test Foils. CARRICK C. WILLIAMS and HOLLY GILZOW, *California State University San Marcos* – Using "ensemble processing" in eyewitness lineups leads to better discriminability by focusing on diagnostic features of the face and ignoring common features present in all test stimuli (Wixted, Vul, Mickes, & Wilson, 2018). This idea has the counterintuitive prediction that a studied apple being tested among other apples will be easier to discriminate than when it is tested among non-apples. We investigated test foil similarity to examine ensemble processing in visual long-term memory. Participants studied 64 objects from 64 categories, and in a six-alternative choice test (along with not present), they selected studied objects among foils that were matched on color and category, category, color, or neither. Discriminability for studied objects was higher when they were tested with foils sharing their category than when tested with foils not sharing their category. In other words, trying to identify a "guilty" apple, like in eyewitness memory, is easier among other apples.
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AUTOBIOGRAPHICAL MEMORY

12:00-1:30 PM (4171)

Using Resting State Functional Connectivity to Predict Performance on Two Different Measures of Episodic Memory. OLIVIA C. REYNOLDS, *Wake Forest University*, ROBERT G. LYDAY and PAUL J. LAURIENTI, *Wake Forest University School of Medicine*, DALE DAGENBACH, *Wake Forest University* (Presented by Dale Dagenbach) – Models based on human brain functional connectivity have been used to successfully predict fluid intelligence and attention performance in participants whose data did not contribute to the model development. The present study uses resting state functional connectivity to predict two different forms of episodic memory in a population of young adults using data from the Human Connectome Project. One measure involves visual stimuli and recall, while the other involves verbal material and recognition. The resulting models are, for the most part, able to successfully predict performance in novel participants. However, the degree of overlap between the particular functional connectivity edges that drive the predictions for the two forms of episodic memory is minimal. Implications of this for understanding of episodic memory and functional connectivity models of cognition are considered.
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12:00-1:30 PM (4172)

How Intention to Retrieve a Memory and Expectation That a Memory Will Come to Mind Influence the Retrieval of Autobiographical Memories. KRYSTIAN BARZYKOWSKI, *Jagiellonian University*, SØREN RISLØV STAUGAARD, *Center on Autobiographical Memory Research*, AGNIESZKA NIEDŹWIEŃSKA, *Applied Memory Research Laboratory, Jagiellonian University*, GIULIANA MAZZONI, *Hull University* – Involuntary autobiographical memories come to mind effortlessly and unintended. We hypothesize that involuntary retrieval depends on memories that are highly accessible, while the elaborate search that characterizes voluntary retrieval also produces memories with low accessibility. Previous research provides some evidence for this 'threshold hypothesis'. These two studies aimed to investigate the effects of retrieval intentionality (i.e., wanting to retrieve a memory) and selective monitoring (i.e., instructions to report only memories) on the phenomenology of autobiographical memories. Participants were instructed to (1) intentionally retrieve autobiographical memories, (2) intentionally retrieve any type of thought (3) wait for an autobiographical memory to spontaneously appear, or (4) wait for any type of thought to spontaneously appear. The results support the prediction that highly accessible memories mostly enter awareness unintended and without selective monitoring, while memories with low accessibility rely on intention and selective monitoring.

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12:00-1:30 PM (4173)

Age-Related Positivity Effects in Memory Predictions and Recall for Future Autobiographical Events. ELVIRA GARCÍA-BAJOS, MALEN MIGUELES, and ALAITZ AIZPURUA, *University of the Basque Country UPV/EHU* – The objective of this study was to investigate age differences in memory predictions and recall of future positive and negative autobiographical events. Young and older adults were presented with positive and negative future events as a model and the corresponding cues to generate their own positive and negative future events. For each imagined event, participants were instructed to rate their confidence that they would later be able to remember that event. Memory predictions were higher than recall scores. Memory predictions were higher for positive than for negative events only in the older adults. Young and older participants showed a positivity bias in recalling future imagined events, although this effect was higher in the older participants, who recalled much more positive than negative events than the younger participants did. Valence changes in recall from negative to positive events were more pronounced in the older than in the younger adults. Our findings show age-related positivity effects in both memory predictions and recall of imagined future events.

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12:00-1:30 PM (4174)

The Integration of Memories in the Human Brain. ALEXANDRA GEORGINA TREMBLAY-MCGAW and DANIEL PETERSON, *Skidmore College* – Shohamy and Wagner (2008) propose that the hippocampus integrates different memory episodes that are similar, resulting in a large and linked network of mnemonic associations in the human brain. Therefore, it is important to establish if clinicians might be able to use this mnemonic process occurring during the integration of memories in a clinical setting to help patients change the way they remember traumatic events. We implemented a repeated measures design to assess the impact of seeing a positive version of a negative event. Most importantly, the Negative-Positive condition had more positive Likert Scale ratings compared to the Negative-Negative condition, indicating that an exposure to a positive version of a negative event can reduce the negative affect associated with the scene. Additionally, we contend that the fact that the Negative-Positive condition was significantly less accurately recalled compared to the other three conditions demonstrates that the memories of the negative and positive scene were successfully integrated, and therefore not as salient in the participants' minds. This could have significant clinical implications and serve as a basis for the development of trauma interventions.

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12:00-1:30 PM (4175)

The Effect of Homesickness on First-year Students' Autobiographical Memories. MARYJANE WRAGA, SYLVIE LEDNICKY, and JESSIE CHEN, *Smith College* – Homesickness, the emotional distress caused by separation from home (Thurber & Walton, 2012), is prevalent on college campuses, particularly with first-year students who may be living away for the first time. We were interested in whether homesickness might influence autobiographical memories. Sixty first-year students viewed 20 word prompts, 10 of which came from top-ten lists of items that college students miss, and 10 of which were more neutral. For each prompt, participants described an autobiographical event and indicated whether it had occurred at Home, College, or Other locations. They then rated each memory on several dimensions and completed a homesickness survey. We hypothesized that higher ratings of homesickness would color all autobiographical memories. The results supported our hypotheses. Regardless of the type of word prompt, participants tended to remember more memories of Home in general, and the more homesick they were, the more they exhibited this tendency. We also found that memories of Home were rated more strongly along several dimensions than non-home memories. Taken together, our findings indicate that the "out of sight" location of home is clearly not "out of mind" for first-year college students.

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12:00-1:30 PM (4176)

Cognition and Emotion in Narratives of Redemption: An Automated Analysis. EYAL SAGI and BRADY K. JONES, *University of St. Francis* – Redemptive narratives are stories of challenge, failure, or adversity that in some way acknowledge the goodness or personal growth that came of the recounted difficult event. In this paper we use a corpus-statistic based approach to explore the role of cognition and emotion in these narrative arcs. In particular, we trace the shift from negative to

positive sentiment (a change in the emotional valence) and vice to virtue (evidence of cognitive, moral processing) within the narrative and compare these with similar narratives that do not present a redemptive arc. Our results suggest that the shift to goodness and growth that is at the core of redemptive narratives is driven by prior cognitive processes more so than emotional ones. We believe this type of analysis can also be used to trace and classify similar narrative arcs and assist with the coding of autobiographical narratives in general.
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12:00-1:30 PM (4177)

Investigating Memory for Neutral Events Using Recall of Defined Experiences in Virtual Reality. ELAINE H. NIVEN and RACHEL MILLER, *University of Dundee* – Ability to recall specific, detailed memories is often investigated via positive, negative, or neutral cue words prompting individuals to retrieve events from autobiographical memory. This approach has characterised patterns of response to positive and negative cues in different affective disorders; however, it has been unsuccessful in establishing either recall of neutral memories, or patterns of response to neutral cues. We instead used a virtual environment to create a defined, neutral experience about which we later interviewed participants with different levels of depression. Participants navigated a detailed, virtual reality museum exhibit, and returned a week later to recall their experience. Autobiographical Interview (Levine et al., 2002) scoring was used to assess degree of episodic information present in recall, and how this changed over the course of a week in relation to levels of depression. Results suggest virtual environments afford suitably episodic-rich recall to support research about specific neutral memories.
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12:00-1:30 PM (4178)

Do Autobiographical Memories Build Intimacy? ALI TEKCAN and ÖYKÜ EKINCI, *Bogazici University* – Sharing autobiographical memories can aid individuals initiate and increase intimacy with others. Previous research mostly focussed on the evaluations of the person sharing the memory. The present study examined the characteristics and impact on others of autobiographical memories told with the express purpose of increasing intimacy. Forty-nine young adults reported a self-defining memory that they would tell to increase intimacy with a person they just met. They also identified the theme/content and provided ratings regarding the quality and functions of the memory. Another group of participants also evaluated these memories as well as the memory owner. Unexpectedly, memories told to increase intimacy tended to have negative content (e.g. stressful events). Moreover, memory-owners attributed higher quality ratings to their memories than the memory listeners. Finally, perceived quality of a memory affected listeners' perception and liking of the owner of the memory.
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12:00-1:30 PM (4179)

Probability of Simulated Episodic Events: Impact of Scripts. DENIZ HACIBEKTASOGLU and AYSECAN BODUROGLU, *Bogazici University* – People often engage in future thinking (EFT); however, it is now known how they determine the probability of a simulated event actually happening. Integrating findings from the EFT and critical thinking literatures, we investigated the contributions of event characteristics and individual differences in cognitive miser tendencies to assigned probabilities of future events. Participants generated episodic future events to cue words and rated them on plausibility, phenomenological characteristics, temporal distance and personal significance. A principal components analysis endorsed a 4 component solution and regression analyses carried out on these factors determined that only compliance of the events to general plausible scripts, their relationship with one's personal past and objective temporal distance predicted probability of simulations. Contrary to our expectations cognitive miser tendencies did not moderate the relationship between plausibility and probability of simulated events. These findings suggest that as with autobiographical events, future simulations may be strongly guided by available scripts.
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12:00-1:30 PM (4180)

How Distinct Are Characteristics of Memories Classified as "Voluntary" and "Involuntary"? MEVAGH SANSON, *University of Waikato*, MELANIE K.T. TAKARANGI, *Flinders University* (Sponsored by Maryanne Garry) – People can deliberately bring "voluntary" memories to mind, and people experience "involuntary" memories spontaneously coming to mind. Often, subjects must make a dichotomous classification of their memories. But how distinct are voluntary and involuntary memories? We showed subjects emotionally arousing photos, then instructed them to press a key any time they remembered any of the photos while they read an article. Upon the first key press, we asked subjects to rate that memory on retrieval intent and effort, and to classify their memory as voluntary or involuntary. In two studies, subjects reported involuntary memories that, on average, involved less intention and less effort to retrieve than voluntary memories—but there was a large degree of overlap in the distributions of these ratings across memory types. Our results suggest involuntary and voluntary memories may not be clearly distinct phenomena, and fit with the idea that their classification relies upon a variety of factors.
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12:00-1:30 PM (4181)

Episodic Simulation and Prosocial Intentions in Medial Temporal Lobe Epilepsy. CASPIAN M. SAWCZAK and MORRIS MOSCOVITCH, *University of Toronto*, MARY PAT MCANDREWS, *Krembil Research Institute* (Sponsored by Morris Moscovitch) – Recent work shows imagining oneself helping others in situations of need (episodic simulation; ES) increases one's willingness to help. The underlying mechanisms are unclear, but it is known that ES relies on the brain's autobiographical memory network which includes the

medial temporal lobe (MTL). Our lab previously found medial temporal lobe epilepsy (mTLE) patients do worse than healthy controls (Cs) on an imaginative problem-solving task, and this impairment is linked to their memory deficits. Using similar logic in the present study, we predicted that people who had MTL tissue surgically excised as treatment for mTLE would show a reduced effect of ES on willingness to help (vs. Cs). We tested 16 mTLE patients post-surgery at a Toronto hospital as well as Cs matched on key demographics. Subjects read stories describing individuals in situations of need, and after each either imagined themselves helping the person or performed a filler task. Later, they used rating scales to answer questions about each scenario. ES significantly boosted willingness to help only in Cs – tentative evidence that the effect of ES on prosocial intent relies on the MTL, which may have implications for quality of life in those with MTL excision.
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12:00-1:30 PM (4182)

The Content, Correlates, and Consequences of Real-World Off-Task Thinking. RAMSEY R. WILCOX, *University of Arizona*, JOANNA J. ARCH and LINDSAY IVES, *University of Colorado*, JESSICA RENGER, SYDNEY FRIEDMAN, and JESSICA R. ANDREWS-HANNA, *University of Arizona* – The last decade has brought a growing appreciation that the human mind has a propensity to escape from the present moment. Although it is well-regarded that the capacity for off-task thinking has both costs and benefits for our cognitive and emotional well-being, it remains unclear how the content and processes characterizing "real-world" thinking patterns can influence these costs and benefits. In an attempt to better characterize the content, correlates and consequences of real-world thinking patterns, we developed a smartphone app to survey mental experience in a large sample of adults in their everyday daily lives. Although off-task thoughts were generally associated with more negative characteristics and traits than on-task thoughts, the costs and benefits of off-task thoughts depended heavily on their controllability, temporal specificity, and their emotional and temporal content. Overall, these findings highlight the utility of mobile assessment approaches for understanding predictors of cognitive and emotional well-being.
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12:00-1:30 PM (4183)

Over-Claiming Responsibility in Fictitious Countries: The Effects of Country Size and Context on Estimates of Historical Contributions. ADAM L. PUTNAM, *Furman University*, MORGAN Q. ROSS and OLIVIA A. STERLING-MAISEL, *Carleton College* – Recent research has shown that Americans massively over-claim responsibility for how much their home state has contributed to U.S. history, a finding called collective narcissism (Putnam et al. 2018). The current study examined two factors thought to contribute to collective narcissism. To do so, we had participants estimate how much a territory in a fictitious country contributed to the country's history. Experiment 1 examined support theory by varying how many territories were in the country. As predicted, people provided higher estimates of responsibility for the target territory when it was in a large country rather than small. Experiment 2 tested the availability heuristic by varying how much information participants had about the fictitious territory. As predicted, providing more information led to higher estimates of responsibility. The experiments suggest that the large over-claiming effects seen in collective narcissism studies are at least partially explained by support theory and the availability heuristic.
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12:00-1:30 PM (4184)

The Malleability of Memory of Love in Childhood Toward Mothers. LAWRENCE PATIHIS, MARIO E. HERRERA, CORAI JACKSON, and JADE ALEXANDER, *University of Southern Mississippi* – Does reappraising or reevaluating our parents in the present change important aspects of childhood memory? Reappraisal of parents can occur during psychotherapy, divorces, when we obtain new information about a parent, etcetera. Past research has indicated that memory of past felt emotions may change in accordance with shifting current appraisals of the target event or person. We experimentally investigated the malleability of memory of love and affection felt in childhood toward mothers. We found that manipulating current appraisals of participants mothers caused systematic changes in memory of love felt in childhood toward mothers—and this replicated with a pretest posttest experiment. We found these shifting appraisals have potential consequences in terms of shifts in planned future visits and support for the mother. Reevaluating parents during therapy—or in other aspects of life—should be done with caution: the side effect may be the alteration of treasured aspects of autobiographical memory.
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12:00-1:30 PM (4185)

The Effect of Photos on Judgments About the Past and Future. JOSEPH CLARENCE WILSON, REBECCA LURIE, and SAMIRA DODSON, *Binghamton University, State University of New York* (Sponsored by Deanne Westerman) – Photographs have been found to promote false memory creation. Past studies have used guided imagery and suggestion, in addition to photos. We investigated whether the mere presence of a photograph, without suggestion or instructions to imagine the events, would lead to false memories for a variety of life events. In Experiment 1, participants studied a list of life events, followed by a recognition memory test. We found that events presented with a related photo were more likely to be called "old" on a recognition test. In Experiment 2, the same life events and photographs were presented (without a study phase), and participants indicated whether they thought the events had occurred during their own childhoods (autobiographical memory) or would likely occur in the next five years (future projection).The results showed that photographs enhanced confidence that the events would occur in the future, but did not affect autobiographical memory judgments.
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12:00-1:30 PM (4186)

Picture This: The Influence of Schematic Processing and Mental Context Reinstatement on Alibi Generation. STEPHANIE AURORA CARDENAS, WILLIAM E. CROZIER, and DERYN STRANGE, *John Jay College of Criminal Justice* (Sponsored by Deryn Strange) – Research has illustrated the dangers of inconsistent alibis, but little work has looked at cognitive factors that may reduce such inconsistencies. Time-cue questioning, often employed by law enforcement, promotes schematic processing and is ineffective for retrieving discrete event details. In contrast, mental context reinstatement (MCR; key to the cognitive interview), promotes use of retrieval cues for autobiographical events based on encoding context, improving the retrieval process. Here, we apply MCR to alibi-elicitation to examine whether questioning techniques and the schema-consistency of the to-be-remembered event influence the accuracy of alibi generation. We used a 2 (schema: consistent, inconsistent) X 2 (technique: time-cue, MCR) within-subjects design. In a novel paradigm that establishes ground truth, participants described their weekly routine activities (T1), reported (via text message) real-time information for 40 events each (T2), completed a memory test for 4 events (T3), and generated corroborating evidence (T4). We are coding for differences in accuracy and phenomenological quality across the 4 events, N=59. We will discuss implications for alibi-elicitation techniques and boundary conditions of MCR.
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12:00-1:30 PM (4187)

The Effect of Ease-of-Retrieval on People's Ratings of Autobiographical Memory Functions. RYAN BURNELL and MARYANNE GARRY, *University of Waikato* (Sponsored by Elizabeth Loftus) – Memories for our personal past serve a range of functions—we share these memories with other people, they inform our sense of self, and guide our behavior. But much of what we know about these functions comes from people's ratings, and treats functionality as a property of the memory. An alternative possibility is that functionality is—at least in part—attributed in the moment, a consequence of how easy it feels to bring to mind occasions in which a memory served certain functions. We used an ease-of-retrieval manipulation (Schwartz et al., 1991) and asked subjects to bring to mind either few or many occasions in which a memory served a specific function. Then, everyone rated the extent to which the memory served that function. Our results have implications for understanding how people construe the functions of their memories.
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12:00-1:30 PM (4188)

Manipulating Retrieval Fluency Affects How Coherent People Say Their Memories Feel. ANDREA TAYLOR and MARYANNE GARRY, *The University of Waikato*, RACHEL ZAJAC, *The University of Otago*, MELANIE K.T. TAKARANGI, *Flinders University*, KAYLA JORDAN, *The University of Waikato* (Sponsored by D. Stephen Lindsay) – There is a persistent belief among the general public, and some practicing clinicians, that memories for traumatic experiences are not "coherent," but uniquely jumbled—recalled in bits and pieces. Yet the scientific evidence suggests traumatic memories are no less coherent than other emotional memories. One possible cause of this discrepancy between belief and scientific research is that coherence is an attribution people make during recall. We hypothesised that by asking questions to promote, or disrupt, a feeling of retrieval fluency we could increase, or decrease, how coherent people judge their memories to be. Accordingly, we asked people to bring to mind an emotional memory, and then to simply describe, or answer many questions about, that event. People who described the event rated their memories as more coherent than people who answered many questions, suggesting coherence is not a stable property of memory, but an attribution made during recall.
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12:00-1:30 PM (4189)

Autobiographical Memory of Khmer Rouge Survivors. STEPHANIE A. BERGER and LINDA SAPHAN, *College of Mount Saint Vincent*, NORMAN R. BROWN, *University of Alberta* – During the Khmer Rouge era, the Cambodian people experienced collective transitions — extreme fundamental changes in daily life which should, according to Transition Theory (Brown, Schweickart & Svob, 2016) become landmark events for organizing autobiographical memory. We tested the Living in History effect with 24 Khmer Rouge survivors (M = 67 years old) using Brown's cued-memory and dating procedure. Specific, personal memories at least 2 weeks old meet the criteria for the LiH effect when they are dated based on the historical event of interest. Only 43% of 480 memories met the criteria for specificity. Participants justified dates of 123 memories (26%) with only 7% justified based on events occurring under the Khmer Rouge or the Pol Pot regime, indicating little evidence of the LiH effect. Our participants had difficulty recalling and dating specific memories. However, many recalled recurring events and described extended time periods based on historical events. Implications of these findings for Transition Theory will be discussed.
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12:00-1:30 PM (4190)

Characteristics of Previously Disclosed and Undisclosed Memories. NAZIKE MERT and ALI TEKCAN, *Bogazici University* (Sponsored by Ali Tekcan) – Previous studies revealed that disclosed and undisclosed memories may differ in significance, emotionality and linguistic features. The present study investigated effects of disclosure and valence on phenomenological properties, centrality and self-event connections of autobiographical memories. University students were randomly assigned to one of the four memory conditions based on disclosure and valence (i.e., disclosed vs. undisclosed and positive vs. negative) and asked to recall an autobiographical memory. Analyses showed that disclosed memories were more vivid, accessible, emotionally intense and had clearer time perspective than undisclosed negative memories. Disclosed memories were also rated as more central to participants' lives than undisclosed memories. There was a valence effect with regard to self-event connections; whereas negative undisclosed

memories were associated with negative personal characteristics and change, positive undisclosed memories were not associated with a corresponding positive characteristic or change.
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12:00-1:30 PM (4191)

The Role of Sleep in Memory Acquisition. LOGAN JAMES FICKLING and MICHAEL JACOB KAHANA**, *University of Pennsylvania* (Sponsored by Michael Kahana) – The benefits of sleep on episodic memory likely stem from two processes: homeostasis, reflecting a population-wide normalization of neuronal synapses, and memory consolidation, reflecting the gradual redistribution of memory traces from "short-term" hippocampal storage to "long-term" neocortical storage resulting in a more stable trace. Neocortical slow-waves, thalamocortical spindles and hippocampal sharp-waves are thought to be biomarkers of these processes. Using intracranial electroencephalography, we examined the extent that slow-waves, spindles, and sharp-wave ripples the night prior to a free recall task explained variability in free recall performance on the subsequent day. We additionally examined the night following the free recall task to examine the frequency of neural replay, reactivation of patterns associated with learning. Our findings contribute to the understanding of episodic memory by characterizing intracranial neuronal activity in humans during the nights surrounding learning, and the extent to which variability in this activity explains variability in memory acquisition.
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12:00-1:30 PM (4192)

Fiction as Autobiography: Phenomenological Characteristics of Memories of Fiction. BRENDA W. YANG, *Duke University*, SAMANTHA A. DEFFLER, *Rollins College*, ELIZABETH J. MARSH, *Duke University* (Sponsored by Elizabeth Marsh) – Autobiographical memory extends beyond remembering one's personal past: it includes projections into one's future, memories that happened to other people (vicarious memories; Pillemer et al., 2015), and memories that are known to never have occurred (non-believed memories; Otgaar, Scoboria, & Mazzoni, 2014). Little work, however, has addressed the relationship between memories from works of fiction and autobiographical memory. Memories of fiction are defined here as memories of events that occurred in novels, films, television shows, etc. In two studies, we utilize memory cueing paradigms to examine reported qualities of personal memories and memories of fiction. We find that memories of fiction are perceptually rich, although typically less so than memories of lived experiences. Overall, we report results which suggest that differences between personal memories and memories of fiction are of degree rather than kind, and supporting the idea that memories of fiction are event memories which may be considered part of the autobiographical record.
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12:00-1:30 PM (4193)

The Comprehensive Narrative Elaboration Technique: New Interview Protocol to Increase the Quantity and Quality of Reports. JENNIFER L. BRIERE and TAMMY A. MARCHE, *St. Thomas More College University of Saskatchewan* – The Comprehensive Narrative Elaboration Technique (CNET) was designed to pictorially cue multiple components of autobiographical memory (sensory/somatosensory, procedural, contextual, temporal, emotional/affective, cognitive) in order to increase the quantity and quality (i.e., breadth of memory component) of information reported without compromising accuracy or requiring direct questioning. To determine whether the CNET increased the quantity and quality of memory reports, children (n = 82) recalled two emotional memories, one at a time. Children first freely recalled all they could ("Tell me everything you remember… Is there anything else?") and then reported any additional details through the CNET pictorial cues ("Does this card remind you to talk about anything else?"). For both memories, significantly more details were reported with the CNET portion of the output protocol than with the free recall portion, and the quality of the information elicited in each portion of the protocol differed. The CNET appears to increase both the quantity and quality of children's reports beyond that obtained with free recall but an evaluation of whether or not it compromises accuracy is still required.
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12:00-1:30 PM (4194)

Memory Over the Course of one Semester: Findings From a Memory Journal Project With Undergraduate Students. CLINTON MERCK and WILLIAM HIRST, *The New School for Social Research* (Sponsored by William Hirst) – Over the course of one semester, undergraduate students kept a memory journal in which they recorded events using specific cues (e.g., what, where, when, and who was involved). Various characteristics of each memory were also recorded. After three months, students completed a survey in which they attempted to recall each event using two randomly selected cues previously recorded. The findings discussed include which cue combinations are most effective, how the emotional intensity of an event impacts recall, the effects of the uniqueness of the event, and patterns of recall over time. Also discussed are the ways in which memory journal methods can be incorporated into the classroom both as an effective teaching tool and as a means to further understand the workings of human memory.
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12:00-1:30 PM (4195)

Remembering the Past and Imagining the Future: Effect of Remembering Episodic Memory With Nostalgia on Delay Discounting. JUN KAWAGUCHI, *Nagoya University*, HIROKO NAKAMURA, *Aichi Shukutoku University* – Nostalgia refers to a sentimental longing for one's past. Recent studies suggest that nostalgia influences varieties of psychological aspects, prosocial behaviour, desire for money, and so on. It is also known that people recollect episodic details when they feel nostalgia. On the other hand, episodic memory research showed that mental time travel, remembering or imaging of

episodic details, is considered as the key of episodic memory. In recent research, episodic future thinking has shown to increase delay discounting, reflecting envisioning processes. In this study, we examined whether remembering episodic memory with nostalgia influences delay discounting. In an online study, participants were asked to remember nostalgic or ordinary memory, followed by delay discounting task and questionnaires on vividness, re-experience, and self-continuity. The results showed the influence of remembering episodic details on the delay discounting task and a sense of re-experience affected the amount of delay discounting.
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12:00-1:30 PM (4196)

Temporal Distance Effects on Emotionality in Autobiographical Memory of Immigration. YULIYA BUQUOI and LUDMILA ISURIN, *The Ohio State University* – While it is widely accepted that ABM changes with time to adopt a more positive gloss, relatively little research has been done that attempts to capture how memories and attitudes morph as temporal distance from an event increases. This study investigates the emotional intensity of autobiographical memories associated with the time of immigration in recent immigrants (n=30): (n=10, 2-7 years post immigration), settling immigrants (n=10, 10-18 years post immigration) and established immigrants (n=10, over 25 years post immigration). The results of the quantitative and qualitative analyses show that emotionality of reminiscence decreases with time. However, interesting patterns emerged within each of the three groups. The most recent group's attitudes reflected apprehension and excitement, the settling group's – frustration and deliberate indifference, and the established group displayed the most sadness and introspection. Furthermore, this study noted interesting trends concerning the factors of multiple immigrations, discrimination prior to immigration, and gender.
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12:00-1:30 PM (4197)

The Bad Old Days: A Negativity Bias in the Collective Memory of America's Past. SUSHMITA SHRIKANTH and KARL SZPUNAR*, *University of Illinois at Chicago* (Sponsored by Karl Szpunar) – We recently demonstrated that despite being positive about their own future, people expect more negative than positive things to occur in the future of their country. However, it is unclear whether this collective negativity bias is unique to how people imagine the future of their country, as opposed to being more broadly characteristic of collective cognition. The present studies tested whether the collective negativity bias extends to the collective past. In Experiments 1 (N = 50) and 2 (N = 100), participants were asked to remember personal and collective events that have occurred within the past ten years (Experiment 1) or that have ever occurred in the personal and collective past (Experiment 2). In both cases, participants remembered more positive than negative personal events, and more negative than positive collective events. In Experiment 3 (N = 100), we directly compared the collective past to the collective future. Participants listed more negative than positive events in relation to both the collective past and future, but showed a stronger negativity bias about the collective past than the collective future. Implications for a cognitive dissociation between personal and collective cognition are discussed.
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WORKING MEMORY II

12:00-1:30 PM (4198)

Working Memory for Complex Objects: Effects of Explicit Stimulus Regularities. PERI GUNALP and ZOE RATHBUN, *University of California, Santa Barbara*, HAUKE MEYERHOFF, *Leibnitz Institut fur Wissensmedien*, MIKE STIEFF, *University of Illinois at Chicago*, STEVEN FRANCONERI, *Northwestern University*, MARY HEGARTY, *University of California, Santa Barbara* (Presented by Mary Hegarty) – Visual working memory research has established a capacity limit of 4 ± 1 items, but little extant research utilizes complex realistic stimuli. Here we examine capacity limits for complex objects made up of varying numbers of components (colored cubes) using a change-detection task. In Experiment 1, change detection (d') decreased with increases in object complexity, but not with object dimensionality (extension in 1, 2 or 3 dimensions). Capacity limits were consistent with established limits for simple stimuli. In Experiments 2 and 3 structures sometimes contained color pairs (chunks) that were explicitly communicated and changes occurred either within or outside of the chunks. Change detection was better for in-chunk than for out-of-chunk changes and chunk presence did not affect change detection for out-of-chunk changes. When chunks were present, participants used primarily piecemeal rather than holistic strategies. These results suggest that the presence of learned chunks altered participants' strategies rather than enabling them to construct more efficient memory representations.
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12:00-1:30 PM (4199)

Age Differences in the Effects of Processing on Storage in Working Memory: A Meta-Analysis. AGNIESZKA J. JAROSLAWSKA, *University of Edinburgh*, STEPHEN RHODES, *University of Missouri* – The evidence regarding age-related differences in the ability to manage concurrent storage and processing requirements in working memory remains inconclusive. Methodological differences across studies are considered critical factors responsible for the variability in the magnitude of the reported age effects. Here we synthesized comparisons of younger and older adults' performance on tasks combining storage and processing of information (extracted from 48 reports comprising 103 unique single task and 155 dual task observations). We also considered the influence of task-related moderator variables. Hierarchical meta-analysis models revealed a small but disproportionate effect of processing on older adult's memory performance. Moderator analysis indicated that equating single task performance across age-groups and the nature of the stimulus material were important determinants of memory accuracy. Neither titration nor task domain interacted with age, suggesting that the same cognitive

mechanisms underpin task performance across the lifespan. These results were corroborated by supplementary Brinley analyses.
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12:00-1:30 PM (4200)

Working Memory Training Reduces Neural Recruitment in Older Adults: Support for the Compensation Related Utilization of Neural Circuits Hypothesis. ALEXANDRU D. IORDAN and KATHERINE A. COOKE, *University of Michigan*, KYLE D. MOORED, *Johns Hopkins University*, BENJAMIN KATZ, *Virginia Tech*, MARTIN BUSCHKUEHL, *MIND Research Institute*, SUSANNE M. JAEGGI, *University of California, Irvine*, THAD A. POLK, SCOTT J. PELTIER, JOHN JONIDES, and PATRICIA A. REUTER-LORENZ, *University of Michigan* – Functional neuroimaging studies have documented greater, more widespread activation in older (OA) than young adults (YA) at the same level of task demand. According to the Compensation Related Utilization of Neural Circuits Hypothesis (CRUNCH), additional neural resources are recruited with increasing demand regardless of age, however OA over recruit at lower levels of demand than YA, and reach capacity sooner causing activation decline at higher loads (quadratic CRUNCH curve). We tested whether adaptive training on a verbal working memory (WM) task would improve performance and reduce age-related over-activation. Pre-training, OA showed greater WM network recruitment than YA across all loads with decline at the highest load. Ten days of training improved WM performance in both groups. At the neural level, OA showed a CRUNCH curve shift indicating reduced recruitment at medium loads and greater recruitment at the highest load. Training may improve the dynamic range of neural recruitment in OA.
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12:00-1:30 PM (4201)

Learning to use Evidence From Working Memory: A Cognitive Measurement Model for Age Differences Before and After Extensive Practice. HANNA B. FECHNER, KLAUS OBERAUER, HENRIK SINGMANN, and PETER SHEPHERDSON, *University of Zürich*, JOACHIM VANDEKERCKHOVE, *University of California, Irvine*, FLORIAN SCHMIEDEK, *German Institute for International Educational Research* – In working memory tasks, people can rely on two sources of evidence from memory: evidence due to recent presentation (familiarity) and evidence from binding memories to the current context (recollection). Whereas recollection tends to decline with age, familiarity is assumed to be largely preserved. In a large-scale age-comparative study, we investigated how 101 younger and 103 older adults used these sources of evidence in a spatial 3-back task before and after extensive practice (approx. 100 daily sessions). Older adults performed worse, especially for intrusion probes (i.e., probes matching recent stimuli at lags other than 3). However, both age groups improved with practice. With a cognitive measurement model, embedded in a Bayesian-hierarchical framework, we estimated the contribution of familiarity and recollection to individual and age differences in retrieval probability. Our modeling approach separates age-related and practice-induced changes in the contribution of the different sources of evidence to working memory performance.
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12:00-1:30 PM (4202)

Using the Alpha Span Task to Measure Working Memory: Visual Presentation Reduces the Estimate of Working Memory. HANNE WILBURN, RICHARD METZGER, DANIELLE GERSHMAN, NICHOLAS MEHIEL, EMMA LITCHMAN, and JOSHUA SILANG, *Stevenson University* (Presented by Richard Metzger) – The study reported here explored the nature of the alpha span task as a measure of working memory. The alpha span is measured by reading a list of words to a participant, and then asking them to report the words in alphabetical order. The presentation of leg, house, boat, would require the response, boat, house, leg. All of the research to-date appears to have relied on the use of auditory presentation of the word lists. In the study presented here, we compared the outcome of alpha span performance when the stimulus list was presented with Auditory, Visual, or both Combined modes. Groups of undergraduate participants were assigned to one of three conditions, Auditory, Visual, or Combined presentation mode. The alpha span, the longest list accurately reported, did not differ as a function of mode. The alpha score, a more refined measure of memory function, was significantly lower for the visual than the auditory or combined. The results clearly demonstrate that the modality of presentation effects the level of performance on the Alpha Task. We will discuss the implications, and the outcome of additional research, attempting to further isolate the executive operations associated with working memory.
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12:00-1:30 PM (4203)

Removal of No-Longer Necessary Items From Visual Working Memory After Task Accomplishment. HIROYUKI TSUBOMI, *University of Toyama*, KEISUKE FUKUDA, *University of Toronto, Mississauga*, ATSUSHI KIKUMOTO and ULRICH MAYR, *University of Oregon*, EDWARD K. VOGEL, *The University of Chicago* – Visual working memory (VWM) is a capacity-limited workspace to represent task-relevant visual information for a short period of time. What happens to the VWM representations when the task goal is accomplished? VWM might remove the no-longer necessary representations, or the representations might remain in VWM as unattended until being pushed out by new task-relevant information. Here, by measuring the contralateral delay activity (CDA), an electrophysiological index of the number of items currently held in VWM, as well as behavioral performance, we found that VWM representations are completely removed within 1 second after its use without necessitating the encoding of new visual input when they are deemed no-longer necessary. Critically, this was not observed when participants expected the re-use

of the VWM representations. Our results show that working memory representations can be completely removed without requiring encoding of new visual input.
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12:00-1:30 PM (4204)

Distraction Biases Visual Working Memory for Complex Stimuli. REMINGTON MALLETT, *University of Texas at Austin*, ANURIMA MUMMANENI, *Westwood High School*, JARROD A. LEWIS-PEACOCK, *University of Texas at Austin* – Working memory for low-level visual features is vulnerable to interference from visual distraction, where responses in a continuous-report paradigm are systematically (and subtly) biased towards the distractor. It is unknown whether memories for complex visual stimuli are similarly susceptible to such interference. To address this, we used a continuous-report working memory task with distraction for a set of computer-generated face stimuli (80 faces) that vary continuously along two dimensions of age and gender. A single target face was held in memory and was to be chosen from a probe wheel of faces after a short delay. Midway through the delay period, we presented a distractor face that was near the target in 2D "face space" (either clockwise or counterclockwise along the wheel). Here, we show that responses were reliably biased towards the task-irrelevant distractor, indicating that a single higher-order visual representation held in working memory is vulnerable to systematic distortion.
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12:00-1:30 PM (4205)

The Impact of Working Memory Capacity and Tool Design on Cognitive Offloading. SANDRA GRINSCHGL and FRANK PAPENMEIER, *University of Tuebingen*, HAUKE S. MEYERHOFF, *Knowledge Media Research Center Tuebingen* (Sponsored by Hauke S. Meyerhoff) – Cognitive offloading (i.e. externalization of cognitive processes) is supposed to overcome limitations of working memory capacity by temporarily storing relevant information into external devices. The degree of offloading varies with situational cost-benefit considerations. In two experiments, we tested how individual differences in working memory capacity as well as the responsivity and the intuitivity of the control of a tablet computer alters offloading. Our participants completed a pattern copy task exceeding working memory capacity (thus requiring offloading) as well as measures of working memory capacity. In Experiment 1 (n=172), we observed an increasing amount of offloading when the tablets responded immediately rather than after a brief delay and when the tablets were controlled using the more intuitive touch functionality rather than a computer mouse. In Experiment 2 (n=80), we measured offloading, working memory capacity, and metacognitions regarding memory performance. We observed that working memory capacity was a much stronger predictor for offloading than metacognitions. Our experiments therefore provide first systematic insights into the impact of internal resources and tool design on cognitive offloading.
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12:00-1:30 PM (4206)

How Do Individual Differences in Working Memory Capacity Predict Learning With and Without Gesture? MARY ALDUGOM, *University of Iowa*, KIMBERLY M. FENN, *Michigan State University*, SUSAN WAGNER COOK, *University of Iowa* (Sponsored by Susan Cook) – Hand gesture at instruction has been shown to facilitate mathematical learning. Individual differences in working memory capacity (WMC) also predict mathematical learning. Here, we investigated the relationship between individual differences in WMC and learning a mathematical concept with or without hand gesture. Participants in two studies (n = 128) observed a videotaped lesson in a novel mathematical system that either included instruction with speech and gesture or instruction with speech alone. After instruction, participants solved novel problems and transfer problems in a related system. Verbal, visuospatial, and kinesthetic working memory spans were then assessed. Planned and exploratory analyses revealed a positive relationship between visuospatial WMC and math learning when gesture was present, and no relationship between visuospatial WMC and math learning when gesture was absent. Gestures at instruction may be especially beneficial for those with high visuospatial WMC, revealing that gesture may be processed in visuospatial working memory.
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12:00-1:30 PM (4207)

Proactive Interference in Visual Working Memory. EDA MIZRAK and PETER SHEPHERDSON, *University of Zurich* – Proactive interference (PI), interference of previously learned information, is a major cause of forgetting in working memory (WM). PI has been studied with WM paradigms that either manipulate categorical similarity (i.e., items presented belong to the same category over several trials), or episodic similarity (i.e., a previously studied yet irrelevant item is presented during retrieval). Both categorical and episodic similarity negatively impact WM performance on tasks with verbal stimuli. However, studies using visual stimuli show interference effects from episodic, but not categorical similarity, unless the latter is manipulated semantically. In this study, we manipulated both non-semantic categorical (shapes vs. colors) and episodic similarity in a single-probe change detection paradigm. Our results showed categorical similarity did not impact task performance whereas episodic similarity impaired accuracy. We conclude that visual WM is unaffected by inter-trial categorical similarity unless the categories are semantically organized, whereas episodic similarity has a consistent effect on performance. PI effects in WM, regardless of stimulus type, might depend on the utility of information retained in LTM for task performance.
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12:00-1:30 PM (4208)

Dopamine Transporter (DAT1) Gene Modulates Individual Differences in Visual Working Memory Capacity. ANDRIA SHIMI, *University of Cyprus* – Visual working memory (VWM) capacity, the ability to retain visual information in mind briefly is highly limited. Given that VWM is essential for successful

everyday performance, it is important to understand the nature of its limitations. Here, we examined the effect of a common polymorphism of the dopamine transporter gene DAT1 on VWM. Specifically, we examined whether the genetic variation in DAT1 is associated with individual differences in VWM capacity. Participants were administered a VWM task, in which they were asked to encode four visually-presented items in WM and subsequently report whether a probe item was part of the previously presented memory array. DNA samples were also obtained and participants were divided into 3 groups according to their genotype: 9-repeat carriers (9/9), 9-repeat/10-repeat carriers (9/10), and 10-repeat carriers (10/10). Results showed that the 9/9 carriers had lower accuracy scores in the VWM task than the 9/10 carriers, whereas no differences were observed between 9/10 and 10/10 carriers. These findings showed a significant association of DAT1 with VWM performance and demonstrate that allelic variation in DAT1 modulates individual differences in VWM capacity in healthy young adults.
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12:00-1:30 PM (4209)

Variations in Working Memory Ability in Sighted and Unsighted Individuals. KAREN ARCOS, SUSANNE M. JAEGGI, and EMILY D. GROSSMAN, *University of California, Irvine* (Sponsored by Susanne Jaeggi) – When identifying words in noise, older adults often experience greater benefit from the presence of supporting semantic context than do younger adults. When context is misleading, however, older adults falsely perceive the contextually predicted word more often than do young adults, and frequently do so with high confidence. In past studies, context has always preceded the target word, introducing bias before the target word is presented. We used sentences that could be reorganized to place most of the context either before (They served soup in a bowl) or after (In a bowl, they served soup) the target word in noise (bowl). To investigate context-based misperceptions, one phoneme in the predicted target word was changed to form a word that was not predicted by context (They served soup in a hole). Younger and older adults identified words in noise using individually determined signal-to-noise ratios to equate audibility. We investigated the effects of age, target word frequency, and phonological neighborhood density on veridical and false perceptions across context conditions. The results and their implications for models of speech perception will be discussed.
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12:00-1:30 PM (4210)

How Spontaneous Cumulative Rehearsal Contributes to Children's Complex Span Performance. SEBASTIAN POLOCZEK and CHRIS JARROLD, *University of Bristol* – Several cognitive processes are thought to contribute to complex span performance. The current study aims to examine the role of cumulative rehearsal in developmental improvements of complex span performance. Primary school children (N = 94 for 10-11-year-olds, N = 97 for 6-9-year-olds) completed a complex span task combining elements of a word span and a counting task. Before and after assessing complex span, processing times for the counting subtask were measured in isolation. Additionally, short-term memory (STM) capacity was separately assessed via a fast-paced word span procedure that blocked rehearsal. First, the variance in processing times was decomposed with Mixed Effects Models. Second, random effects residuals and STM capacity were taken as predictors of complex span performance. The analyses in both samples yielded comparable results leading to the same conclusions. Both STM capacity and baseline processing times were independent predictors of complex span. The degree of position-independent slowing of processing during the complex span was unrelated to recall. In contrast, the rate of slowing with serial position explained additional variance in complex span, indicating a beneficial effect of cumulative rehearsal.
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12:00-1:30 PM (4211)

Is Consolidation in Visual Working Memory an All-or-None Process? CLARA S.R. OVERKOTT and ALESSANDRA S. SOUZA, *University of Zurich* (Sponsored by Alessandra Souza) – Consolidation is assumed to be an all-or-none process. Evidence for this assumption comes from forward serial recall of sequentially presented spatial orientations: recall improved with more consolidation time for all serial positions but the first one (Ricker & Hardman, 2017). This finding was interpreted as implying obligatory consolidation of the first item, with an attentional blink of items presented in the meantime. This demonstration is limited in three regards: (a) only forward serial recall was used; (b) memoranda comprised only orientations; and (c) verbalizations were not prevented. The goal of the present project was to provide a more throughout test of the all-or-none consolidation assumption by varying the type of test (forward serial recall vs. random probed recall) and memoranda (spatial orientations vs. colors), while verbalizations were suppressed. The immunity of the first item to manipulations of consolidation time was replicated in both types of recall tests for spatial orientations, but only in forward serial recall for colors. Hence, type of test and stimulus material predicts if consolidation occurs in an all-or-none fashion.
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12:00-1:30 PM (4212)

The Organization Effect in the Reading Span Task: When and How It Occurs? SHO ISHIGURO and SAITO SATORU, *Kyoto University* (Sponsored by Satoru Saito) – Working memory (WM) supports the maintenance of information in a variety of cognitive and social activities. We have previously investigated how person-based information is retained in WM. As a broad range of research, such as the human associative memory theory and impression formation studies, implies that information can be organized in a person-based manner (i.e., person-based organization), it is possible that person-based organization of information prevails in WM. Our previous experiments with the reading span task, in fact, suggested the presence of the person-based organization in WM. The aim of the current research is to test whether the organization effect observed in the previous experiments is specific to person information by using object information. The results of the current experiment did not demonstrate the organization effect.

We discuss the underlying process for the organization effect and why person information causes the organization effect while object information does not.
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12:00-1:30 PM (4213)

Dual-Task Costs for Visual and Verbal Memory and Processing Tasks: An Adversarial Collaboration. JASON M. DOHERTY, *The University of Edinburgh*, CLÉMENT BELLETIER, *University of Fribourg*, STEPHEN RHODES, *University of Missouri*, AGNIESZKA J. JAROSLAWSKA, *The University of Edinburgh*, VALÉRIE CAMOS, *University of Fribourg*, PIERRE BARROUILLET, *University of Geneva*, NELSON COWAN and MOSHE NAVEH-BENJAMIN, *University of Missouri*, ROBERT H. LOGIE, *The University of Edinburgh* – There exists a number of competing theories regarding the structure and capacity limit(s) of working memory. Here we present new data from an adversarial collaboration that aims to test the predictions of three competing models of working memory (Multiple Component, Time-Based Resource Sharing, and Embedded Processes) in pre-registered experiments. Our studies to date have investigated dual-task costs to verbal memory (letters) and verbal processing (arithmetic verification), and found large dual-task costs to memory accuracy but not to processing performance (Doherty et al., submitted). A follow up experiment investigating the effect of a newly designed visuospatial 'Rotating Man' task (adapted from Logie & Baddeley, 1985) revealed perfectly shared dual-task costs to verbal memory and visuospatial processing. This finding motivated the final experiment presented here, investigating how dual-task costs to verbal and visual memory and processing tasks change according to the modalities of paired tasks.
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12:00-1:30 PM (4214)

Memory Retrieval During an Auditory Sternberg Task: Effect of Recency and Response Confidence on the P3. AMOUR SIMAL and PIERRE JOLICOEUR, *Université de Montréal* (Sponsored by Martin Arguin) – In EEG research on memory retrieval, increasing memory load decreases the amplitude of the P3 component, a posterior positivity peaking around 300ms after stimulus presentation. Using an auditory Sternberg task with different memory loads (0, 2, 4, or 6 tones), we studied the ERP activity elicited by a probe, either absent or present in the memory set. For probe present trials, the P3 was larger in amplitude when the probe matched the last tone of the memory set than when it matched any other tone, along with more accurate performance for the last tone. The P3 amplitude decrease described in previous studies could be explained by this result: the last tone contributes more weight in smaller memory sets compared with larger sets. Probe absent trials showed a significant decrease in P3 amplitude with increasing memory load, indicating that the P3 observed is also modulated by response confidence.
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12:00-1:30 PM (4215)

Forgetting Distractors: Evidence of Inhibition and Decay in Working Memory Depends on Test Type. LAURA WERNER (Graduate Travel Award Recipient) and COLLEEN M. PARKS, *University of Nevada, Las Vegas* (Sponsored by Colleen Parks) – Research on forgetting irrelevant information in working memory has supported two conflicting theories, inhibition (Oberauer & Lewandowsky, 2016) and decay (Dagry et al., 2017). However, these conflicting results may be due to the fact that different methods were used to assess each model. We combined those methods to create a distractor span task that allows for a direct comparison of the models. Participants processed words that were to be remembered (targets) and others that were to be forgotten (distractors); the amount of free time after each distractor varied, with total trial time held constant across conditions. There were more distractor intrusions on a recognition test when less free time was available, supporting an inhibition model. However there was no difference between conditions on a free recall test, supporting a decay model. Thus, task demands at retrieval play a particularly important role in the evaluation of these models.
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12:00-1:30 PM (4216)

Testing Effects in Visual Short-Term Memory: The Case of an Object's Size. TAL MAKOVSKI, *The Open University of Israel* – In many daily activities, we need to form and retain temporary representations of objects size. Typically, such visual short-term memory (VSTM) representations follow perception and are considered reliable. Here, participants were asked to hold in mind a single object for a short duration and to reproduce its size. Five experiments revealed two powerful inflation effects: first, participants overestimated the size of open objects - ones with missing boundaries - relative to the same-size fully closed objects. Second, even the size of the closed objects was largely overestimated. Follow-up experiments used a different testing procedure and found that while the overestimation of the open objects was repeated, the overestimation of the closed objects was not. These findings suggest that only the size of open objects is inflated in VSTM. Importantly, they demonstrate the considerable impact of the testing procedure on VSTM and question the use of reproduction procedures for measuring VSTM.
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12:00-1:30 PM (4217)

Changes in Error Patterns During N-Back Training. WENG-TINK CHOOI, *Universiti Sains Malaysia*, ROBERT LOGIE, *University of Edinburgh* – Training on an adaptive task produces improvements only in the trained task, or only near transfer effects are detectable. No studies in the contemporary cognitive training literature have systematically explained the mechanism behind improved performance on the n-back. In this study, we first investigated how improvements in the n-back task occurred by evaluating error distributions for each memory load, n, of the task over training sessions. 20 participants trained for 20 sessions over five weeks. We observed a reduction in false alarms to both non-target and fewer missed or rejected

targets, but the proportion of false alarms due to phonologically similar words did not decrease over time. Second we evaluated if strategies developed during n-back training transferred to tasks that relied on serial order memory using simple span tasks. Participants trained on either n-back (N=23) or operation span (N=16) for 15 sessions over four weeks. Participants who trained on the n-back improved recall on backward digit span, while participants who trained on the operation span did not improve on any of the outcome tasks. Results suggest near transfer effects as only the n-back participants improved on recalling items in backward order.
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12:00-1:30 PM (4218)

General Intelligence Explained (Away). KRISTÓF KOVÁCS, *Eötvös Loránd University*, JEAN-PAUL SNIJDER, HAN HAO, and ANDREW R.A. CONWAY, *Claremont Graduate University* – For over a century, the standard view of human intelligence has been that there is a "general intelligence" that permeates all cognition. This general cognitive ability is supposed to explain the positive manifold, the finding that cognitive tasks with different content correlate strongly. Yet there is a lack of consensus regarding the psychological or neural basis of such an ability. A recent account, Process Overlap Theory (POT), explains the positive manifold without proposing general intelligence (Kovacs & Conway, 2016). Instead, a general factor emerges as a consequence of domain-general and domain-specific processes being sampled by tasks in an overlapping manner with the constraint that domain-general processes are sampled with greater frequency. Here we present a mathematical model of POT and a simulation study demonstrating a higher-order general factor model without positing a unitary ability. IQ is therefore redefined as an emergent formative construct rather than a reflective latent trait.
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12:00-1:30 PM (4219)

Training Recognition Memory Is Insufficient to Improve Visual Working Memory. WILLIAM X.Q. NGIAM, KIMBERLEY L.C. KHAW, and ALEX O. HOLCOMBE, *University of Sydney*, PATRICK T. GOODBOURN, *University of Melbourne* (Sponsored by Alex Holcombe) – Visual working memory (VWM) is limited in capacity for storing visual information and the rate that information is encoded. First, we examined whether stimulus familiarity enhances VWM performance. Observers performed a change-detection task with both familiar English letters and the unfamiliar Brussels Artificial Character Set (BACS), which matches the number of junctions, strokes, and terminations in English letters. We found a higher encoding rate and capacity for English letters relative to the BACS, suggesting an effect of familiarity. We then trained observers to recognize some of the BACS letters using a procedure that had previously been found to produce enhanced change-detection performance for random polygons. Although observers had high recognition accuracy following training, indicating some familiarity, encoding rate and VWM capacity were no different between trained and novel BACS letters. This suggests a boost to memory performance requires substantial experience with the stimuli, beyond the level sufficient for recognition memory.
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12:00-1:30 PM (4220)

Bias in Confidence: A Critical Test for Discrete-State Models of Visual Working Memory. SAMUEL WINIGER and HENRIK SINGMANN, *University of Zurich*, DAVID KELLEN, *Syracuse University* (Sponsored by Henrik Singmann) – Ongoing discussions on the nature of storage in visual working memory have mostly focused on two theoretical accounts: On one hand we have a discrete-state account postulating that information in working memory is supported with high fidelity for a limited number of discrete items by a given number of "slots," with no information being retained beyond these. In contrast with this all-or-nothing view, we have a continuous account arguing that information can be degraded in a continuous manner, reflecting the amount of resources dedicated to each item. It turns out that the core tenets of the discrete-state account constrain the way individuals can express confidence in their judgments, excluding the possibility of biased confidence judgments. Importantly, these biased judgments are expected when assuming a continuous degradation of information. The present study demonstrates that biased confidence judgments can be reliably observed, yielding a dismissal of discrete-state accounts of visual working memory.
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12:00-1:30 PM (4221)

The Capacity and Time Course of Visually Masked Information. MARSHALL L. GREEN and MICHAEL S. PRATTE, *Mississippi State University* (Sponsored by Michael Pratte) – Presenting a mask after a stimulus effectively disrupts iconic memory. However, several studies suggest that some form of information can continue to be consolidated following a mask. We examined the nature of this information by presenting an array of visual stimuli. One stimulus was replaced with a mask that also served as a cue, drawing attention to a target in the same moment it was masked. Remarkably, we found that only a few items were available in memory after the mask, even when the stimuli were presented for an entire second before masking. However, shortening the stimulus duration to as little as 50 ms had only marginal effects on the available information. These results suggest that although the visual information available after masking is severely capacity limited, immediately attending to a stimulus at the time of masking allows for items to be successfully consolidated even with extremely short stimulus durations.
Email: Michael S. Pratte, prattems@gmail.com

12:00-1:30 PM (4222)

Symmetry and the Visual Buffer. ERIC HENDERSON, KRISTEN HARRELL, KENTRELL COOPER, TAI YANCEY, MALLORY REED, and JESSE Q. SARGENT, *Francis Marion University* – Spatial span (how many sequentially presented locations can be recalled in order) is greater if the locations together form a symmetrical pattern. Does this benefit

manifest in the visual or the spatial component of visuo-spatial working memory? Participants viewed a 5x5 grid of squares on a computer screen. Three to seven of the squares lit sequentially for 1 s. each, then there was a 10 s. delay after which participants clicked on the remembered locations in order. The delay was filled with either visual (dynamic visual noise) or spatial (tapping) interference tasks. The memory advantage for symmetrical patterns was smaller after visual interference. Apparently, the relative imageability of symmetrical patterns manifests in the visual buffer and thus was disturbed more by visual than spatial interference. Within the visual buffer, integration over time of sequentially presented information may operate by grouping (e.g., Gestalt) principles similar to those acting in visual perception.
Email: Jesse Sargent, jsargent@fmarion.edu

12:00-1:30 PM (4223)

Effects of Strategy Instructions on Overt and Covert Visuospatial Rehearsal. LINDSEY LILIENTHAL, *Pennsylvania State University, Altoona* – Lilienthal, Myerson, Abrams, & Hale (in press) found that although the presence of environmental support (i.e., whether the array of possible locations remains visible) during retention intervals significantly affected memory for locations when participants could engage in overt rehearsal (i.e., move their eyes), this was not the case when participants were required to fixate and thus limited to covert rehearsal. This was taken to suggest that the two strategies may differ in their effectiveness, but it is also possible that participants were simply less likely to engage in covert rehearsal even with environmental support, and so the present experiment investigated the effects of explicit rehearsal instructions, both overt and covert, on visuospatial memory. Consistent with the previous research and interpretation, participants in the present experiment had significantly larger memory spans in the overt rehearsal condition than in the covert condition, even with the addition of explicit strategy instructions.
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COGNITION AND TECHNOLOGY

12:00-1:30 PM (4224)

Training With NeuroTracker (Multiple Object-Tracking) Transfers to Improvements in Attention for Children and Adolescents Diagnosed With a Neurodevelopmental Condition. DOMENICO TULLO, *McGill University*, JOCELYN FAUBERT, *Université de Montréal*, ARMANDO BERTONE, *McGill University* (Sponsored by Debra Titone) – We conducted a school-based randomized controlled trial (RCT) with a cross-over design to examine if NeuroTracker (NT), a Multiple Object-Tracking paradigm, can train attention for students diagnosed with a neurodevelopmental condition (NDC). 96 participants (Mage=13) were randomly assigned to either the NT (n=32), 2048 (active control; n=32), or wait-list condition (WL; passive control; n=32). The Connors Continuous Performance Task 3rd Ed. (CPT-3) was administered prior to 15 condition specific training sessions. A post-test assessment of CPT-3 was measured after the training period and then the NT and 2048 groups switched conditions. There was a significant interaction between condition and post-test interaction. Results demonstrated that training with NT improved performance on the CPT-3 and these results were replicated once groups switched conditions. Participants training with 2048 or those in the WL condition did not improve on the CPT-3 task at any post-test. Also, results revealed that training gains for those that trained with NT persisted for 5 weeks. This school-based study is the first implement a RCT cross-over design to suggest that training attention with NT is beneficial and accessible to students with a NDC.
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12:00-1:30 PM (4225)

Tracking Bias: Using Eye-Tracking to Measure the Effects of Cognitive Control in Hiring Situations. RICHARD B. WAGNER, CHRISTOPHER A. DICKINSON, KENNETH M. STEELE, and SHAWN M. BERGMAN, *Appalachian State University* (Sponsored by Christopher Dickinson) – We used eye tracking to examine whether people can use cognitive control in a simulated hiring situation to avoid looking at information that cannot legally be used in hiring decisions (i.e., protected-class information). All participants were asked to make hiring recommendations based on only information contained in mock Facebook profiles, which all contained some protected-class information (e.g., race, marital status, sexual orientation). In addition, individuals in the cognitive-control condition received a cognitive-control message indicating that protected class information cannot be used in their final decisions, and that they should avoid looking at this information. Compared to the baseline group, individuals in the cognitive-control condition made significantly fewer fixations and had significantly shorter mean fixation durations to profiles' biographical information section and the profile picture. We found similar results for posts containing protected-class information across trials, consistent with the use of cognitive control.
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12:00-1:30 PM (4226)

The Impact of Social Media on Information Processing: Is Caring Sharing? MELISSA WAER and ROBRECHT P. VAN DER WEL, *Rutgers University* – Recent advances in technology have fundamentally changed the landscape in which information processing takes place. For example, people automatically activate concepts related to search engines when they face difficult trivia questions. Here, we examined whether processing of odd or noteworthy information activates concepts related to social media, in such a way that experiences are partially processed in terms of how they could be shared on social media. To examine this possibility, we conducted two studies. In a first study, 60 participants read either control stories that were fairly boring or they read noteworthy stories similar to what one may find on social media. Then, participants completed a Stroop conflict resolution task that included social media words and control words. The second study was identical except that participants viewed either control images or "share-worthy" images before completing the Stroop task. We hypothesized that noteworthy experiences would activate social media concepts, as evidenced by slower color-naming

reaction times for social media words than control words for the experimental condition versus the control condition. Results of both studies will be presented.
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12:00-1:30 PM (4227)

iBlindness: Restoring Situational Awareness to Distracted Walkers Using Smartphones. JOSHUA J. NEW and NECHAMA KAISER, *Barnard College, Columbia University* – Smartphones have been implicated in the rapid increase of injuries and deaths of pedestrians: not only by distracting drivers, but also pedestrians who are using (e.g. texting) and/or listening to smartphones (e.g. headphones) around traffic. These studies are part of a project developing technology for detecting oncoming vehicles and alerting distracted walkers. We used a spatial cuing task to evaluate 1) how deleterious smartphone use is to observers' awareness of surrounding events, 2) how much auditory alerts can restore such awareness, and 3) what types of alerts can most effectively warn users of oncoming threats. Participants in the baseline experiment – when allowed to browse on their silenced smartphones – were significantly slower to report (via footpedal) that targets appeared from their right or left side. However, this response delay was virtually eliminated when targets were accompanied by an alerting, nondirectional tone – as this technology could provide. Further experiments revealed that valid directional alerts were not relied on, verbal alerts were particularly ineffective, and participants were only marginally slower when asked to report the direction opposite of the target – as one might to avoid a hazard.
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12:00-1:30 PM (4228)

Perceptual Representation of Phishing Emails. POOJA PATEL, DAWN SARNO, JOANNA LEWIS, MARK NEIDER, and COREY BOHIL, *University of Central Florida* (Sponsored by Corey Bohil) – In two experiments, observers rated similarity for each pair of phishing emails in two conditions. In one condition, the 30 emails contained company logos and urgent actionable links while in the other condition none of the 30 emails contained these features (in Experiment 2 participants also gave trust ratings for each email). Separately, 41 participants rated the same 60 emails regarding presence of 5 other features (downloadable content, account deletion, collecting personal information, ads, and large images). These ratings were regressed onto multidimensional scaling (MDS) spaces derived from the pairwise similarity ratings. MDS results were largely consistent across experiments (between participants) and across conditions (within-participants). Presence of ads consistently characterized mental representations, as did the feature collecting personal information when in presence of urgent actionable links/company logos. Trust ratings were significantly lower when urgent links/logos were present. We conclude that presence of urgent links moderates attentional focus for phishing emails.
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12:00-1:30 PM (4229)

ReTUNE: Restoring Through Urban Nature Experience. KATHRYN E. SCHERTZ, OMID KARDAN, and MARC G. BERMAN, *University of Chicago* (Sponsored by Marc Berman) – Research has shown that exposure to natural environments can increase working memory, mood, and positive thoughts as well as improving physical and mental health. Building off of this research, our goal was to build a mobile app to use walking as a way to maximize exposure to natural elements, to counter some of the disadvantages of urban living (such as noise, traffic and stress) while completing daily errands. Starting with an OpenStreetMaps network of Hyde Park, Chicago, IL we created input maps in ArcGIS which quantified greenspace (LiDAR data), sound (SoundScore data for local noise levels), and crime (all "visible" crimes in one year period from the City of Chicago data portal) for each edge in the network. Each edge was assigned a Restoration Score (RS) by weighting these three input values. Routes were generated throughout the network using an impedance model with Length/RS as the cost attribute. In summary, our app has the ability to generate the most restorative routes between two points, which could lead to improved psychological outcomes by exposing individuals to the most restorative environments.
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12:00-1:30 PM (4230)

Emoji Use in Social Contexts Exaggerates Perceived Emotion of Texts. NAFISEH FAGHIHI, OMAR GARCIA, and JYOTSNA VAID, *Texas A&M University* (Sponsored by Jyotsna Vaid) – An increasingly prevalent, yet understudied, aspect of computer-mediated communication involves the use of emojis. To study how emoji use affects text processing, we solicited humor judgments for an identical set of sentences presented under three response conditions: use of a numerical judgment scale, use of an emoji scale, and use of an emoji scale in a social context (in which participants were to imagine that a friend sent each sentence to them). No difference in perceived humorousness of the items was found for the numerical and emoji conditions; however, for the emoji scale presented in social context participants selected more extreme humor-related emojis than they did for the emoji condition with no social context. This effect occurred regardless of the level of funniness of the sentences. Our findings thus provide the first empirical demonstration that use of emojis in a social context exaggerates judgments of a text's affective content.
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12:00-1:30 PM (4231)

You Should Hate This Movie! Detecting Concealed Attitudes of Online Persuaders. NICHOLAUS P. BROSOWSKY, *The Graduate Center, City University of New York*, MATTHEW J.C. CRUMP, *Brooklyn College, City University of New York* (Sponsored by Matthew Crump) – There is considerable evidence that people hold implicit attitudes that may conflict with their explicit or expressed beliefs and influence their actions in measurable ways. In particular, implicit or suppressed attitudes can produce uncontrollable behavioral tells in laboratory tasks (IAT). We ask whether these tells are infused

into measurements of typewritten language production when people are engaged in the act of persuasion. 300 participants completed a movie-review task and persuaded their readers to go or not go see a movie. Importantly, participants wrote reviews that conflicted or did not conflict with their true attitude about the movie. We created a cognitive-behavioral feature space for each review by combining semantic vectors for each word with records of keystroke dynamics. We demonstrate that concealed attitudes can be detected at well above chance rates, and that typist's attitudes about their written statements are embedded into the structure of their language production.
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12:00-1:30 PM (4232)

Snap Judgments: The Effect of Photo Taking on Recognition and Recall. REBECCA LURIE, JOSEPH CLARENCE WILSON, SAMIRA DODSON, and DEANNE L. WESTERMAN, *Binghamton University, State University of New York* – Does taking a photograph of an item improve or impair memory? The literature is currently mixed, with some studies showing that storing information in the form of photographs impairs memory (Henkel, 2014), and other studies showing improved memory (Barasch, Diehl, Silverman, & Zauberman, 2017). Three experiments were conducted to test the hypothesis that photographs help memory when the test is perceptually-driven but hurt memory when the test is conceptually-driven. The perceptually-driven test required participants to identify a target among perceptually similar items, and free recall was used as a conceptually-driven test. Results showed impairment on both perceptually-driven and conceptually-driven memory tests. However, the negative effects of photo-taking were reversed when participants took a photo during the perceptual discrimination test, consistent with transfer-appropriate processing. When a photograph was taken at test, items photographed during study were remembered better than non-photographed items.
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12:00-1:30 PM (4233)

Coloring Our Memories? The Impact of Editing Photos on People's Memories. ANNA L. MILLIKEN and LINDA A. HENKEL, *Fairfield University* (Presented by Linda A. Henkel) – Many people doctor their photos before sharing them on social media platforms. Two experiments examined the impact photo editing has on people's memory for the details of the original scene that was photographed and memory for the editing process. People took photos of different scenes and then later edited some of those photos. In Study 1, memory for the objects and colors did not differ as a function of the type of edit they applied to their photo (e.g., cropping, applying a black and white filter), but subjects were less accurate at remembering how they edited the photo when they applied a color-changing filter than when they cropped the photo. In Study 2, subjects reviewed the edited and unedited photos in a separate session. Results showed that memory for the color of objects in the original scenes was lower for non-reviewed photos than for reviewed photos. However, having reviewed edited (now black-and-white) photos slightly impaired memory for the color of the objects in the original scene but not memory for the content. This suggests that viewing edited photos may have more of an impact on memory than does just the act of editing the photos.
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12:00-1:30 PM (4234)

Learning More With Laptops: Class-Related Laptop Use Is Related to Higher Exam Scores. ALISON DAY, KIMBERLY FENN, and SUSAN RAVIZZA, *Michigan State University* (Sponsored by Susan Ravizza) – Internet use during class is negatively related to learning, but it remains unresolved whether course-relevant computer use also relates to learning. We examined course-related and unrelated computer use to investigate how these distinctive forms of laptop use related to performance. We assessed computer use during lecture in an introductory psychology course using RescueTime—software that tracked the use of all computer applications. For each student, we coded all activity as either related to the course (e.g. note taking) or unrelated to the course (e.g. online shopping). We assessed class performance using exam scores. Data analysis revealed that viewing lecture slides on a laptop predicted better exam scores. A negative relationship between unrelated use and exam scores approached significance. This is the first study to show that laptop use is related to better learning, and it challenges the belief that laptops do not belong in the classroom.
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12:00-1:30 PM (4235)

Retrieval in the Information Age: How Interface Design Can Affect Long-Term Memory. GEOFFREY L. MCKINLEY and AARON S. BENJAMIN, *University of Illinois at Urbana-Champaign* (Sponsored by Aaron Benjamin) – Testing oneself on studied material often improves memory relative to restudying. However, learners do not appreciate the long-term benefits of initial or persistent retrieval, and so underutilize retrieval. The ready availability of information on personal devices like smartphones may further exacerbate such retrieval aversion. The current study examines whether characteristics of the device interface can promote or deter reliance on retrieval from memory. A series of experiments were conducted using a task in which participants can either look up queried information in a grid, or retrieve the information from their memory. The cost of looking up information was manipulated by varying a delay in access or by varying the density of the search grid. A cued recall test was given after a 1-day retention interval. Conditions with slower access or denser displays led to more reliance on retrieval from memory during learning, and superior retention of the material one day later. These results suggest that small design characteristics can affect the tradeoff between the use of internal and external forms of memory, and that these choices have consequences for long-term learning.
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12:00-1:30 PM (4236)

Cognitive-Science-Based Training for Healthcare Workers Can Improve Patient Outcomes. MATTHEW JENSEN HAYS and CHARLES SMITH, *Amplifire* – Mistakes made by healthcare workers kill 250,000 people per year in the United

States alone. That number places medical error as the third-leading cause of death, behind only heart disease and cancer (Makary & Daniel, 2016). Medical mistakes are most commonly caused by caregivers' "cognitive failures" (Joint Commission, 2015). Our training software, Amplifire, is designed to mitigate cognitive failures by harnessing the testing effect, the spacing effect, interleaving, delayed feedback, and other conditions that accelerate learning and impede forgetting. We deployed Amplifire to 4,674 nurses with the aim of reducing central-line-associated bloodstream infections (CLABSIs) and catheter-associated urinary tract infections (CAUTIs). Compared with the 28 months before Amplifire was deployed, CLABSIs decreased by 48% and CAUTIs decreased by 32%. These results suggest that Amplifire helped reduce medical errors, thus illustrating the value of applying the principles of cognitive science to healthcare workers' training.
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12:00-1:30 PM (4237)

Did You Look That Up? Source Memory for Smartphones. JESSICA SILER, KRISTY HAMILTON, and AARON BENJAMIN, *University of Illinois at Urbana-Champaign* (Sponsored by Aaron Benjamin) – The ready availability of Internet-connected smartphones means that our knowledge and memory exist in a transactional relationship with our devices. Because we see our phones as extensions of ourselves, it may be difficult to attribute the origin of knowledge appropriately. In two experiments, we examined whether people were more likely to confuse prior access to information on a phone with accessing their own knowledge when they were using their personal phone. Subjects were experimentally assigned to answer some trivia questions from memory and others from a phone. Memory for the trivia answers and source memory for the origin of the information were tested 1 week later. People exhibited poorer source memory when they used their own smartphones to look up answers to trivia questions than when they used a smartphone provided by the lab. These results indicate that the intelligence of our personal phones is not entirely differentiated from our own knowledge.
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12:00-1:30 PM (4238)

Volitional Photography Inflates Metamemory Confidence but Still Causes an Impairment in Memory. JULIA S. SOARES (Graduate Travel Award Recipient) and BENJAMIN C. STORM, *University of California, Santa Cruz* (Sponsored by Ralph Miller) – Taking a photo of an object can make someone less likely to remember the details of that object than simply observing it, a phenomenon known as the photo-taking-impairment effect (Henkel, 2014). Recent research has suggested, however, that at least under certain conditions, volitional photo-taking can benefit memory (Barasch, Diehl, Silverman, & Zauberman, 2017). In the current study, participants either chose which objects to photograph (Volitional Condition), or were instructed to take photos of some objects but not others (Assigned Condition). Participants in the two conditions were yoked in such a way that they took photos of the exact same selection of objects. Although volitional photo taking led participants to become more confident in their memory for photographed objects than observed objects (an effect not observed in the Assigned Condition), it did not eliminate the photo-taking-impairment effect.
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12:00-1:30 PM (4239)

Cell Phone Presence Disrupts Attention and (to a Lesser Degree) Memory. CONSTANCE R. SCHMIDT and STEPHEN R. SCHMIDT, *Middle Tennessee State Unviersity* – In three experiments, participants recalled lists of animate and inanimate words with their cell phones either on the desk beside them or in a nearby closet. In the first two studies, participants rated word animacy and recalled the words immediately following each list presentation. In the third study, participants either rated word animacy or simply read the words in each list, solved math problems for a minute, and then recalled list words. In all three studies, animate words led to faster animacy decisions and higher levels of recall than inanimate words, and decisions slowed across lists. Importantly, animacy decisions were faster in the closet condition than in the desk condition, providing evidence that the presence of cell phones interferes with attention. Self-report measures of cell phone dependence and distraction predicted animacy response time, response accuracy, and recall performance. However, the negative impact of cell phone presence on memory was limited to recall of animate items following instructions to simply read the words. Participants may have had more difficulty devoting extra cognitive resources to the important animate items when their cell phones were on the desk than when they were in the closet.
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12:00-1:30 PM (4240)

Assessing Human Response to Collocated UAVs. CHRISTOPHER J. WIDDOWSON, HYUNG-JIN YOON, RANXIAO FRANCES WANG, and NAIRA HOVAKIMYAN, *University of Illinois at Urbana-Champaign* (Presented by Ranxiao Frances Wang) – A central issue to the integration of flying robotic systems into human populated environments is how to improve the level of comfort and perceived safety for people around it. The present study examined how people respond to the presence of a flying robot under various operating conditions. Across three experiments participants passively observed quadrotor trajectories in a simulated virtual reality environment. Quadrotor flight paths were manipulated in terms of velocity, altitude, and acoustic profile to examine their effect on physiological arousal and head motion kinematics. For all three experiments, arousal was greater when the quadrotor was flying at higher speed, with the audio on, and at eye-height than overhead, but decreased across subsequent trials. In addition, head motion accelerated in the direction away from the quadrotor on its approach, indicating avoidance behavior. In general, the human discomfort function increases with drone speed and decreases with exposure. To minimize anxiety for humans in the surrounding, quadrotor flight should maintain a flight path characterized by lower velocity, higher altitude, and a quieter acoustic profile.
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12:00-1:30 PM (4241)

Gaze Patterns During Skype Survey Interviews. SHELLEY FEUER and MICHAEL F. SCHOBER, *New School for Social Research* – In videomediated survey interviews, how does the small self-view window alter interactional dynamics? 133 laboratory respondents answered questions from ongoing US national surveys either with or without a self-view while their gaze was tracked. This study replicates and expands on previous research by (a) tracking where video survey respondents look on the screen—at the interviewer, at the self-view, or elsewhere—while answering questions and (b) examining how gaze location and duration differ for sensitive vs. nonsensitive questions and for more and less socially desirable answers. The results show that self-view respondents looked more at the interviewer during questions about sensitive topics, and they averted their gaze more when giving socially undesirable answers. Respondents who looked more at the self-view window reported greater comfort and less self-consciousness. The self-view window also increased disclosure for a subset of sensitive questions. The findings demonstrate that gaze patterns can be informative about respondents' experience and response processes and that the self-view creates a distinct interactional dynamic, increasing respondents' engagement with the interviewer and reducing self-presentation concerns.
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12:00-1:30 PM (4242)

Learning From Online Lectures. TRISH L. VARAO-SOUSA, *University of British Columbia*, HALEY LERAND, ROBERTO ALEMAN, and KARL SZPUNAR*, *University of Illinois at Chicago*, ALAN KINGSTONE, *University of British Columbia* (Sponsored by Alan Kingstone) – While attending lectures, students report mind wandering (MW) upwards of 50% of the time. Because MW has been found to negatively influence retention of lecture content, ways to reduce MW during lectures is an important avenue for research. The goal of the present study was to investigate factors that may influence MW during online lectures. In a 2x2 between-subjects design, we manipulated whether viewers could interact with the lecture content and whether they received interpolated tests or study sessions. Contrary to previous research, multiple-choice testing did not reduce MW, but did improve initial learning of the end of the lecture. Providing participants with the opportunity to interact with lecture content did not influence MW rates or memory test performance. Participants who could interact with the material (i.e., pause, rewind, fast forward) did so at a very low frequency, contrary to rates reported from massive open online courses (MOOCs).
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12:00-1:30 PM (4243)

Learning in Immersive Virtual Reality Environments. JOCELYN PARONG and RICHARD E. MAYER, *University of California, Santa Barbara* (Sponsored by Richard Mayer) – The use of immersive virtual reality (IVR) technologies to deliver academic information is becoming increasingly popular. Theories based on state affect and motivation, such as interest theory, predict that as students overwhelmingly report liking IVR, it should increase positive affect and motivation towards the lesson and therefore increase learning outcomes compared to conventional instructional platforms. However, cognitive load theory would argue that the inherent designs of IVR lessons (e.g., more immersive graphics) cause more extraneous cognitive load than conventional methods and should decrease learning outcomes. This experiment examined learning outcomes from lessons in either an IVR format or a conventional desktop computer format (i.e., slideshow). Additionally, this study determined whether adding a generative learning strategy to the original lessons improved learning outcomes. In two experiments, participants viewed a science or history lesson either in an IVR or desktop format, with or without practice test questions during the lesson, and then completed retention and transfer tests. Preliminary results suggest that learning outcomes are higher after desktop lessons and after lessons with a practice test.
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12:00-1:30 PM (4244)

Outsmarting the Test: Evaluating the Quality of Introductory Psychology Test Banks. GARY L. BRADSHAW and DANIEL ROBERSON, *Mississippi State University* – Commercially available multiple-choice test banks offer an easy method to produce tests, yet scant evidence exists speaking to their validity. 222 undergraduates enrolled in a general psychology course were given questions from two different test banks covering either emotion or abnormal psychology, with two distinct tests from each topic. Across all eight tests, students performed significantly higher than expected by chance ($p < .001$), with an average score of 51%. Tests on abnormal psychology produced higher scores than tests on emotion (53% vs. 48% respectively). Additionally, participants who had previous exposure to the material performed no better than those who were unfamiliar with the topic. Individual differences were large and correlated with GPA ($r=.337$), implying that 'better' students are more sophisticated at guessing correct answers. Commercial test banks may be significantly overestimating student learning by including questions that can be answered correctly even in the absence of learning.
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12:00-1:30 PM (4245)

Informal Translation Practices and Divergent Thinking: Does Language Brokering Experience Make You More Creative? PAUL D. COCKRUM and BELEM G. LÓPEZ, *University of Texas at Austin* (Presented by Belem G. López) (Sponsored by Zenzi M. Griffin) – Does speaking more than one language or previous language brokering experience enhance divergent thinking? Prior bilingualism research has demonstrated that speaking more than one language enhances nonverbal creative ability when compared to individuals who only speak one language (Kharkhurin, 2010). However, Vaid et al. (2015) have demonstrated that prior brokering experience enhanced verbal creativity only in a bilinguals' first language (Spanish). The purpose of the current study is to extend this previous work by examining how variability in brokering experience affects divergent thinking as measured by the Abbreviated Torrance

Test for Adults (ATTA). It is hypothesized that brokering experience will impact divergent thinking ability. ATTA verbal and nonverbal responses from 100 Spanish-English bilinguals were analyzed. Results indicate that prior language brokering experience affects divergent thinking in Spanish-English bilinguals. These findings extend previous work by examining the combined effects of bilingualism and language brokering experience on divergent thinking.
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SPEECH PERCEPTION

12:00-1:30 PM (4246)

Listener Adaptation to Native and Non-Native Voice-Onset-Time Distributions. TIFANI BIRO, *Penn State University*, SEULGI SHIN, YUYU ZENG, and ANNIE TREMBLAY, *University of Kansas* – Eye tracking, a continuous spoken-word recognition measure, has revealed limitations on foreign-accent adaptation: Trude et al. (2013) found that English listeners display little adaptation to a second-order phonological constraint in Quebec-French accented speech. This study investigates whether foreign-accent adaptation is less limited when higher-level inferencing is not required to interpret an accented word. English listeners heard a French and an English talker in an eye-tracking experiment. Target and competitor words began with a voiced or voiceless stop and were temporarily ambiguous (e.g., timber and dimple). All stops were resynthesized: the French talker's stops were prevoiced (voiced) and short-lag (voiceless), and the English talker's stops were short-lag (voiced) and long-lag (voiceless). Preliminary results suggest an effect of voicing only for the French talker, with voiceless-stop targets generating more competition than voiced-stop targets. Importantly, this effect decreased only slightly from the first to the second half of the experiment, suggesting weak foreign-accent adaptation.
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POSTER SESSION V

Saturday Evening
Elite A
Viewing 4:00-7:30, Author Present 6:00-7:30 PM

VISUAL PERCEPTION

6:00-7:30 PM (5001)

Differences Between Self-Perspective and Others' Perspectives in Assessing One's Own Perceived Facial Attractiveness. YUKI MIYAZAKI, *Fukuyama University*, JUN I. KAWAHARA, *Hokkaido University* – The present study examined the differences between self-perspective and others' perspectives in assessing the perceived attractiveness of one's own face or of another person's face. One group of participants (n = 20) photographed a self-portrait with a neutral facial expression and subsequently evaluated their own perceived attractiveness on a 100-point scale regarding eight features: eyebrows, eyes, hairstyle, skin, nose, cheeks, mouth, and jaw. A second, unacquainted group (n = 20) separately evaluated each portrait according to the same criteria. A principal component analysis for the self-scores revealed focus upon three components (global features: skin, cheeks, hairstyle, and eyebrows; upper face area: eyes and nose; and lower face area: mouth and jaw). A principal component analysis for the scores by others revealed focus only upon one component. The findings suggest that others do not observe the same details of one's own face that an individual does when assessing facial attractiveness.
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6:00-7:30 PM (5002)

Investigating the Role of Mid-level Features in Image Memorability: A New Image Set. LORE GOETSCHALCKX and JOHAN WAGEMANS, *KU Leuven* (Sponsored by Johan Wagemans) – Images differ in their memorability in consistent ways across observers. What makes an image memorable is not fully understood to date. Most of the current insight is in terms of high-level semantic aspects, related to the content. However, research still shows consistent differences within semantic categories, suggesting a role for factors at other levels of processing in the visual hierarchy. We present a large, new image set constructed to investigate this role. The set consists of five memorability-relevant semantic categories (animals, sports, food, landscapes, vehicles), with 2K exemplar images each, allowing for the variability within them to be studied separately. The images were sourced from existing image sets (e.g., ImageNet). Care was taken to avoid major influences of more high-level image aspects (e.g., recognizable places, text). To quantify the set on memorability, we use a repeat-detection task on mTurk. So far, we have collected 53 responses per image. The results show high consistency of memorability scores even within categories (mean split-half ρ from .44-.64). We will present the results of an SVR trained to predict memorability based on mid-level features (e.g., balance) for each category separately.
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6:00-7:30 PM (5003)

Cortical Control of Eye Movements in Natural Tasks. JESSICA E. GOOLD, *University of California, Davis*, WONIL CHOI, *Gwangju Institute of Science and Technology*, JOHN HENDERSON, *University of California, Davis* – Active vision requires fine-grained management of eye movements. How does the brain control these eye movements? The present study investigates whether areas involved in eye movements, including frontal eye fields (FEF), supplementary eye field (SEF), and intraparietal sulcus (IPS), activate differently during scene viewing, reading, and two pseudo-reading conditions. Participants in an MRI scanner with eyetracking freely viewed the scenes, read naturally in the text condition, and moved their eyes as if they were reading in the pseudo-reading conditions. Univariate and multi-voxel pattern analysis was used for analysis of the fMRI signal. We found that activation in all regions of the network differentiated between natural reading and scene viewing and critically only the lateral FEF, SEF, and IPS differentiated between reading conditions. These results suggest that the eye movement network reflects more than simple saccade generation and are consistent with previous findings differentiated activity in the medial and lateral FEF.
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6:00-7:30 PM (5004)

Examining Perceptual Warping in Virtual Reality. JOSHUA E. ZOSKY, *University of Nebraska, Lincoln*, TIMOTHY J. VICKERY, *University of Delaware*, MICHAEL D. DODD, *University of Nebraska, Lincoln* (Presented by Michael D. Dodd) – Object-based warping studies have shown a strong effect of bounding objects on perception, which in turn influences measurement of distance between two locations. In the present study, we utilized virtual reality to determine whether depth perception interacts with object-based warping. Participants estimated distances between two stationary reference dots in a VR environment. One of five objects were presented behind the reference dots to induce warping: no-object (control), rectangle, split rectangle, rectangle with emergent occluder (closer to viewer than the rectangle), rectangle with flat occluder (on same plane as rectangle). The first three conditions replicated previous studies. Standard warping effects were observed in the non-occluder conditions though there was a strong influence of depth: When the occluder was emergent there were no warping effects; when the occluder was flat there were warping effects. The results provide new insights into how warping may occur in 3D space relative to previous 2D demonstrations.
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6:00-7:30 PM (5005)

Are Face Identity and Expression Perceived Separately? A Study Controlling Stimulus and Decisional Factors. FABIAN A. SOTO and CLAUDIA WONG, *Florida International University* – Many studies have asked whether face identity and

emotion are perceived separately, with contradictory results that may be due to a general lack of control for stimulus and decisional factors. An ideal experiment should control for stimulus factors such as low-level changes correlated with identity, strength of expressions, and discriminability of the two dimensions. The experiment should also dissociate perceptual from decisional processes. Without such control, any observed interaction can be explained by stimulus and decisional factors, rather than perceptual processing. We created three-dimensional face models and expression pose models that allow for tight control of stimulus factors. We obtained two sets of stimuli, each resulting from the combination of two emotions (neutral and angry) and two identities, with both dimensions having equal discriminability. Participants were asked to complete an identification task involving the resulting stimuli, and the data were analyzed using a general recognition theory model (GRT-wIND) that dissociates perceptual from decisional factors. Under such tight experimental control, the dimensions were found to be perceptually separable.
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6:00-7:30 PM (5006)

Distance Judgments Are More Precise on an Axis Orthogonal to the Expected Axis. STEPHEN DOPKINS, and DARIN GALYER, *The George Washington University* – Under a prevalent view the distance between two frontal points is assessed from the number of 'distance units' falling between representations of the points. Attention has been thought to guide the configuration of distance units. For example, it has been proposed that distance units become smaller under focused attention. This has been taken as explanation for the reduction in assessed length that accompanies the focus of attention on a line (Tsal and Shalev, 1996). We offer further evidence of the role of attention in the configuration of distance units and the assessment of distance. Participants made discrimination judgments of horizontal and vertical distance in the same context. One kind of judgment (horizontal or vertical) was relatively frequent (75%) and the other was relatively infrequent (25%). Precision was greater for the less frequent judgments. Further results suggested that this pattern reflected an advantage for the infrequent judgments rather than a disadvantage for the frequent judgments, and that this advantage accrued to judgments on an axis orthogonal to the expected axis rather than simply to judgments on an expected axis. A model of distance-unit configuration is proposed.
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6:00-7:30 PM (5007)

Effects of Traditional Culture on Color Preference. KAZUHIKO YOKOSAWA and TAKUYA NOBUTA, *The University of Tokyo*, MICHIKO ASANO, *Rikkyo University* – Color preferences are driven by preferences for objects associated with certain colors (Palmer & Schloss, 2010). We examined the effects of the context in which objects are located on color preference—specifically, the effects of Japanese traditional culture. Japanese participants were asked to rate the extent to which they preferred a specific object such as a throw pillow to have a specific color, either in a traditional Japanese style room (traditional context condition) or a Western-style room (non-traditional context condition). The results indicated that the participants preferred dark colors and not saturated and light colors in the traditional context compared to the non-traditional context. Another rating task revealed that the participants tended to regard darker and/or less saturated colors as more traditional. These results suggest that object context, such as tradition, modulated color preferences.
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6:00-7:30 PM (5008)

Correlation Between Other Race Bias in Identity and Expression Recognition: Perceived Anger Enhances Categorization not Individuation. CINDY M. BUKACH, SARAH LASKOWITZ, ANA DEUTSCH, and ZACHARY J. COLE, *University of Richmond*, JANE W. COUPERUS, *Hampshire College*, CATHERINE L. REED, *Claremont McKenna College* – White participants show both an OWN-race advantage (ORA) for identity recognition and an angry black bias (ABB): they are more likely to perceive anger in both angry and neutral black faces relative to white faces. The relationship between these effects is unclear: Some studies show reduced ORA for angry faces in memory tasks, suggesting that ABB increases attention to individuating features during encoding, while other studies show increased ORA suggesting ABB increases attention to features related to categorization. Here, we examine correlations between ORA in identity and the ABB during one-back visual discrimination tasks (N = 18). Those who showed the greatest ABB during the one-back emotion task also showed the largest ORA during the one-back identity task ($r = .50$, $p = .04$). These results suggest that increased attention related to ABB is more likely to benefit features related to categorization than individuation during visual discrimination.
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6:00-7:30 PM (5009)

How the Peak Shift Principle Acting on Reciprocally Antagonistic Facial Muscles Could Explain the Evolution of Facial Expressions and Emotions (Darwin's Principle of Antithesis). CHAIPAT CHUNHARAS, OMAR J. AHSAN, LARA HAGOPIAN, and VILAYANUR S. RAMACHANDRAN, *University of California, San Diego* (Sponsored by Timothy Brady) – Our question is if a particular facial expression conveys a highly specific emotion (e.g., guilt), do the opposite facial expression (activating antagonistic muscles) automatically convey the opposite emotion even when it is the never-seen-before facial expression? Photos of neutral faces were morphed away from a corresponding sad or happy face photo by placing dots at key features of the faces. Faces morphed away from sad and happy are referred to as anti-sad and anti-happy respectively. Subjects rated anti-emotion faces compared to neutral ones on a zero to ten scale for six emotions: anger, fear, disgust, happiness, sadness, and surprise. Applying these techniques to sad and happy, we illustrated Darwin's law of antithesis (opposite emotions are evoked by antagonistic muscles) as subjects perceived anti-sad faces as happy and anti-happy faces as sad. We are investigating if this is true of more complex emotions.
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6:00-7:30 PM (5010)

Duplication Effect in Perceived Group Attractiveness. XINGE LIU, JIANLING TANG, and GUOMEI ZHOU, *Sun Yat-sen University* (Sponsored by Guomei Zhou) – Several rules of the beauty perception have been identified by the facial attractiveness literature, including symmetry, averageness and secondary sexual characteristics as well as the Mere Exposure Effect, the Cheerleader Effect, and the Group Attractiveness Effect. Across three experiments, this study found evidence of another rule: The Duplication Effect, namely people perceive groups of duplicate stimuli as more attractive than an isolated stimulus. In Experiment 1A, participants rated the attractiveness of a group of homogeneous faces/flowers within set sizes of 1, 2, 4, or 6. The results showed that attractiveness of faces/flowers increased linearly with set size. Experiment 2A sequentially displayed identical stimuli, finding a comparable sequential Duplication Effect with the Mere Exposure Effect. Experiment 3A found the Duplication-effect size was comparable with the Cheerleader Effect and the Group Attractiveness Effect. Experiment 1-3B manipulated the exposure time of stimuli, and ruled out its possible contribution to the Duplication Effect. In sum, we found the Duplication Effect and this effect is comparable with other effect mentioned above in group attractiveness perception.
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6:00-7:30 PM (5011)

Visual Word Recognition as a Means of Addressing Top-Down Feedback. SIMON M. KAPLAN, CHUNYUE TENG, and DWIGHT J. KRAVITZ, *George Washington University* (Sponsored by Dwight Kravitz) – Top-down feedback is an important yet poorly understood aspect of visual processing, due to an ambiguity between high- and low-level information in complex stimuli. For example, an apparent categorical difference may be derivable from a feed-forward process based on simple visual statistics. Here, we present the first steps in a series of studies aimed at disentangling top-down and bottom-up effects in the context of visual word recognition. Words afford excellent control of their low-level characteristics, unambiguous involvement of non-visual information, and a high degree of localization of their cortical processing. To begin, we examined the word superiority effect (WSE) wherein top-down feedback informs letter identification. We hypothesized that frequency should modulate the strength of connections between every high-level system and the ventral temporal locus of letter recognition. As predicted, we found a strong correlation between word frequency and the strength of the WSE. Individual differences in exposure to regionally specific words were also found to modulate the WSE. These results demonstrate the potential utility of studying top-down feedback in the context of visual word recognition.
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6:00-7:30 PM (5012)

The Flushtration Count Illusion: Attribute Substitution Tricks our Interpretation of a Simple Visual Event Sequence. CYRIL THOMAS and ANDRÉ DIDIERJEAN, *Université de Bourgogne-Franche-Comté*, GUSTAV KUHN, *Goldsmiths University of London* – When faced with a difficult question, people sometimes work out an answer to a related, easier question without realizing that a substitution has taken place (e.g., Kahneman; 2011). In two experiments, we investigated whether this attribute substitution effect can also affect the interpretation of a simple visual event sequence. We used a magic trick called the "Flushtration Count Illusion," which involves a technique used by magicians to give the illusion of having seen multiple cards with identical backs, when in fact only the back of one card (the bottom card) is repeatedly shown. In Experiment 1, we demonstrated that most participants are susceptible to the illusion, even if they have the visual and analytical reasoning capacity to correctly process the sequence. In Experiment 2, we demonstrated that participants construct a biased and simplified representation of the Flushtration Count by substituting some attributes of the event sequence. We discussed of the psychological processes underlying this attribute substitution effect.
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6:00-7:30 PM (5013)

The Effect of the Ground Plane on the Estimation of Angular Declination. UMI KEEZING and FRANK H. DURGIN, *Swarthmore College* – It has been observed that verbal estimates of angular declination show a gain of approximately 1.5 relative to actual visual direction (Durgin & Li, 2011). Judgments of azimuthal direction are also exaggerated in the presence of a ground plane (with a gain of ~1.25), but this exaggeration is eliminated in the absence of a ground plane (Durgin & Keezing, 2018). Here we assess the effect of the ground plane on estimates of angular declination. In two experiments using virtual outdoor environments and two experiments in real outdoor environments, the presence of a ground plane was found to produce much higher gains for small declinations, leveling out at a 1.5 gain for larger declinations. In the absence of a ground plane, the gain was simply 1.5. To test whether the high gain for small declinations was a product of contamination from changes in distance along the ground, we occluded the far ground plane immediately behind the target, so that ground distance was not salient in the angular interval under consideration. Although the scene included a ground plane, the angular gain returned to 1.5 when the far ground plane was occluded. Conscious estimates of angular direction can apparently be contaminated by perceived ground distance.
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6:00-7:30 PM (5014)

Detailed Visual Long-Term Memory of Meaningless Objects Could Be Retained for Three Weeks. TOMOE MASUOKA, *Hyogo University of Teacher Education*, MEGUMI NISHIYAMA, *University of Human Environments*, TAKAFUMI TERASAWA, *Okayama University* (Sponsored by Takafumi Terasawa) – This study investigated whether a detailed visual long-term memory could be retained without verbal-encoding using meaningless objects through the indirect recognition procedure (Terasawa & Ohta, 1993). This procedure consisted of two sessions. In the first session, each object was presented twice in the incidental learning task. After three weeks, in the second session,

participants were asked to perform the same task as the first session and then were given a surprise recognition test. In this test, a total of 40 objects were presented once sequentially and participants were asked to indicate whether it had appeared in the second session. To investigate the effects of exposure in the first session, 20 objects corresponded to the targets but half of these were also presented in the first session. The other 20 corresponded to the distractors but half of these were presented in the first session as well. The results showed that the recognition rates of objects that were presented in the first session were significantly higher than that of the objects that were not presented. This study showed that detailed visual long-term memory of meaningless objects is robust without verbal-encoding.
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6:00-7:30 PM (5015)

Canonical Items Are Seen Longer: Statistical Regularity Predicts Perceptual Duration. EVAN G. CENTER and DIANE M. BECK, *University of Illinois at Urbana-Champaign* (Sponsored by Diane Beck) – Recent investigations of time perception find opposing effects of predictability on subjective duration, whereby bottom-up or top-down influences are thought to determine the direction of subjective timing effects. However, much of these data are limited by a confounding presence of both bottom-up and top-down influences within a design as well as large discrepancies between standard and comparison stimuli in terms of predictability. We address these limitations in two experiments using stimuli comprised of objects or natural scenes that vary in terms of their statistical regularity, learned over a lifetime, to isolate top-down expectancy effects. The items never repeat and there are no oddball stimuli. Nonetheless, we observed that statistically regular, and thus more perceptually fluent stimuli produced longer subjective durations. Our results further extend predictive coding accounts of time perception to include learned statistical regularity in addition to repetition-based expectancy; a result consistent with broader top-down expectancy based time dilation.
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6:00-7:30 PM (5016)

Item Integration in Simultaneous and Sequential Averaging Tasks. KE TONG and CHAD DUBÉ, *University of South Florida, Tampa* (Sponsored by Chad Dubé) – The ability of subjects to reproduce the mean value of a feature across multiple visual stimuli has been extensively reported. However, the mechanism of item integration is still unclear. In the current study, we presented subjects with eight vertical lines varying in length simultaneously and asked them to reproduce the mean line length by adjusting a probe. We used multiple regression to estimate the relative contributions of stimuli at different horizontal locations and found that the centrally-located items contributed more than the peripherally-located items, in many but not all subjects. Interestingly, in the current study using simultaneous averaging tasks, the central-prioritized claim was confirmed by predictive tests, in which the estimated weighting scheme was tested in predicting new data against an equal-weighted scheme. By contrast, in our previous study using sequential averaging tasks, the estimated non-equal weighting scheme did not outperform the equal-weighted scheme in the same predictive test. The different results in these two studies suggested that the simple weighted average model of item integration may be more suitable for modeling simultaneous averaging tasks than sequential averaging tasks.
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6:00-7:30 PM (5017)

Veiling Color, Facial Expression, Culture, and What They Mean for Hollywood Film. KACIE L. ARMSTRONG and JAMES E. CUTTING, *Cornell University* (Sponsored by James Cutting) – A cognitive link between color and emotion is well established. However, the influence of color on the perception of facial expression has not been fully explored. This topic carries practical applications in the realm of cinema, as filmmakers are thought to manipulate color to drive the mood of a scene. Given the global influence of film, we started by investigating a critical question: Is the link between color and emotion consistent across cultures? We first asked participants in the US, Africa, South Asia, and East Asia to "match" colors to six basic facial expressions. People across all four regions consistently linked anger and disgust to red, and happiness to yellow. In a second study, we found that red and yellow filters superimposed over disgusted and happy facial expressions, respectively, resulted in higher perceived intensity of emotion. In a third study, we explored whether color filters serve to disambiguate morphed expressions. Because films are essentially about the emotional reaction of characters to various situations, our findings suggest that the use of color in film may contribute to emotional engagement among viewers.
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6:00-7:30 PM (5018)

Inducing Time Dilation by the Beat Frequency of Combinative High-Frequency Flickers: An EEG Study. LUHE LI, SHOGO ITO, and YUKO YOTSUMOTO, *The University of Tokyo* (Sponsored by Ryosuke Niimi) – When a visual stimulus flickers periodically and rhythmically, the perceived duration can exceed its physical duration. Regarding the mechanism of the flicker-induced time dilation, the neural entrainment of the exogenous visual stimulus has been proposed to be the most critical factor, marked by the presence of steady state visual evoked potential (SSVEP). On the other hand, it is being debated whether the subjective and conscious perception of the flicker is indispensable. To preclude the saliency of flicker changes from neural entrainment, this study uses the combination of two high-frequency flickers (both above 50 Hz) that is perceived as static, while its beat frequency still theoretically arouses SSVEP at a low frequency. Results of two duration comparison tasks did not reveal the perceived time dilation induced by such combinative flickers. We will further discuss the neural correlates of temporal processing that explain these behavioral results.
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6:00-7:30 PM (5019)

Egocentric Bias in Perception of Another Person's Point of Gaze. ELIZABETH K. STERLING and JAN BERKHOUT, *University of South Dakota* (Sponsored by Jan Berkhout) – Research by Jenkins, Beaver and Calder (2006) examined whether or not the human visual system could adapt to a particular angle of another's face. Jenkins et al. found their participants had difficulty discerning whether a face's gaze was five degrees to the right or to the left, especially after the participant had been adapted to that side. The participant would indicate the face was actually looking straight at them. This experiment examines if humans have an egocentric bias, and a tendency to think another person is gazing directly at them, when the person isn't looking them straight in the eyes. This experiment's apparatus includes a one-way mirror with an eight by eight grid on it. A gazer was directed to look at different intersections on the grid, in a random order. The participant then estimated where they believed the gazer was looking, and how confident they felt about their judgment.

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6:00-7:30 PM (5020)

Independent Processing of Optic Flow and Biological Motion in Dual Task Experiments. MARKUS LAPPE, KATJA MAYER, and HUGH RIDDELL, *University of Muenster* – Optic flow and biological motion are distinct types of complex visual motion but they often occur together as we navigate in environments populated by other people. We investigated dual-task interactions between biological motion and optic flow. Participants viewed a point-light walker embedded in an optic flow field that simulated observer translation. Participants had to identify whether the walker walked forwards or backwards and to estimated the direction of heading of the optic flow. In different experiments we varied either the difficulty of the optic flow task or the difficulty of the biological motion task. We found that varying the difficulty of either task had no effect on the performance in the other task. This suggests that the two tasks, although both related to visual motion, do not interfere at the sensory processing level, and hence argues for independent mechanisms. Reduced performance in comparison to single task experiments showed a cost of concurrence.

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6:00-7:30 PM (5021)

The Effect of Stimulus Positions on Statistical Learning. SHOGO ITO and YUKO YOTSUMOTO, *The University of Tokyo* (Sponsored by Michiko Sakaki) – The ability to find temporal or spatial regularities is called statistical learning, and it enables efficient information processing. Previous studies have shown that when there are systematic temporal patterns embedded in the stream of visual stimuli, reaction times became shorter for the predictable elements than the unpredictable ones. However, since stimuli were presented one by one in the same location of the visual field, they did not explore whether the spatial information could have an effect on the temporal statistical learning. Therefore, the aim of this study was to see if participants can implicitly learn the regularity in the order of stimulus presentation when presented at different locations using the target detection task. Results showed that participants responded faster to the predictable targets than to the unpredictable targets, without realizing temporal regularities in the stream. We will further investigate neural activities using fMRI.

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VISUAL SEARCH AND SCENE PROCESSING

6:00-7:30 PM (5022)

Distributed Attention Improves Perception of Facial Expression Ensembles. YOSHIYUKI UEDA, *Kyoto University* – We can instantly extract summary statistics such as average and variance from multiple objects. It is called ensemble perception. Although people can summarize both simple features such as size, and complicated features such as facial expressions, the latter are strongly biased by some objects located in the central vision (Ueda, 2016). A previous study provided evidence that ensemble recognition is easier when a concurrent task requires distributed attention than focused attention (Chong & Treisman, 2005). In line with this evidence, the current study examined whether distributed attention has an advantage of reducing the bias and improving accuracy of facial expression ensemble perception. Twelve faces with happy/angry expressions were simultaneously presented to participants and they identified the expression that appeared more frequently. Participants' judgments were affected by some faces in the central vision, but this bias reduced when they performed a spot detection task with the main task. These results suggest that distributed attention also facilitates statistical processing of facial expression. Based on this, our perceptions are often inaccurate in the context of the group when our attentional resource is less.

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6:00-7:30 PM (5023)

Does Temporal Predictability Affect Attention and Memory? KHENA M. SWALLOW, BOHAN G. LI, and ROY MOYAL, *Cornell University* – The ability to predict what will happen and when may play an important role in how people attend to and remember events. These experiments investigated whether regularity in the timing of image onsets affects how well they are later remembered. On every trial of a continuous encoding task participants memorized a briefly presented image and pressed a button whenever a coinciding tone was a target pitch. The interval between trials was either regular (e.g., 1000 ms) or irregular (e.g., 800-1200 ms). If temporal regularities affect event processing they should influence later image memory as well as the effects of target detection on image encoding. Our data provided mixed support for these possibilities: recognition confidence was greater for images encoded with a target and during regular blocks. Recognition accuracy yielded similar, but inconsistent results across experiments. Encoding mechanisms therefore may be sensitive to the regularity with which events occur over time.

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6:00-7:30 PM (5024)

Modeling Posner's Validity Effect Reveals Fewer Guesses, but Not Enhanced Precision. TOMER SAHAR (Graduate Travel Award Recipient) and DOMINIQUE LAMY, *Tel-Aviv University*, TAL MAKOVSKI, *The Open University of Israel* (Sponsored by Tal Makovski) – This study examined the underlying components of the Posner's validity effect. By using a continuous-response task and mixture-modeling analysis, we were able to separately estimate the guessing rate and perceptual precision for validly and invalidly cued stimuli. Specifically, participants were instructed to adjust the orientation of a probe to match the orientation of a briefly presented target that appeared either at a validly or invalidly cued location. The data from four experiments replicated the classical validity effect, in that participants were more accurate in the valid than in the invalid condition. Importantly, the results consistently revealed that valid cues mainly reduced the guessing rate, suggesting that participants were more likely to detect and report targets appearing at cued locations. However, valid cues did not improve the precision of the perceived target representation. These results challenge the view that attention alters the appearance of a stimulus.
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6:00-7:30 PM (5025)

Attentional Selection and Subsequent Memory in Political Videos: Top-Down Effects of Prior Beliefs and Belief Superiority. JOHN P. HUTSON, *Kansas State University*, TIM J. SMITH, *Birkbeck, University of London*, DONALD A. SAUCIER and STUART S. MILLER, *Kansas State University*, MEGAN L. STRAIN, *The University of Nebraska at Kearney*, MARIA PALAVAMÄKI, *Birkbeck, University of London*, LESTER C. LOSCHKY, *Kansas State University* (Sponsored by Lester Loschky) – Do we each, literally, look at things differently, or in much the same way? The study investigated how eye-movements while watching political videos and subsequent memory are influenced by attitude congruence with the information presented and belief superiority. Competing hypotheses tested if 1) video stimuli guide participants to have similar eye-movements and memory regardless of attitude, 2) eye-movements differ and memory is better for attitude-congruent information, or 3) belief superiority interacts with attitude congruence. Participants watched pro-life and pro-choice advertisements and an abortion debate with eye-tracking. Participants next completed verbal and visual recognition and recall memory tests. To a first approximation, the eye-movement and memory results indicated participants attended to and remembered similar information. However, participants also showed an attitude by belief superiority interaction for eye-movements and memory independent of attitude congruence. Thus, participant attentional selection and memory were guided by the video stimulus, but there were also subtle, yet reliable, top-down effects on attention and memory.
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6:00-7:30 PM (5026)

Turning the (Virtual) World Around: Saccade Biases and Head Rotation When Looking at Natural Scenes in a Virtual Environment. NICOLA C. ANDERSON, WALTER F. BISCHOF, and ALAN KINGSTONE, *University of British Columbia* – Observers are generally biased to make horizontal saccades in line with the image horizon in standard, lab-based, natural scene viewing tasks. Here we tracked both the eyes and head while observers looked at natural scenes in a virtual reality environment. We examine the extent to which image rotation and image content (landscapes vs. fractal images) influenced eye and head movements. In line with previous work, we found that saccade directions are predominantly horizontal relative to the orientation of the scene. Interestingly, when viewing landscapes (but not fractals), observers rotated their head in line with the image rotation, presumably, in order to more easily make saccades in cardinal, rather than oblique, directions. We discuss our findings in relation to current theories on eye movement control, embodied cognition, and perception in virtual reality.
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6:00-7:30 PM (5027)

How Hands and Faces Guide Visual Selective Attention. RYOSUKE NIIMI, *Niigata University* – Visual selective attention is guided by ecologically relevant stimuli. Face images often draw attention, and eye gaze affects attentional orienting. It has been shown that hands modify attention in similar ways, though such effects are relatively weaker than those of faces and seem controversial. To understand the role for hands in attentional mechanism, it might be critical to test the effects of hands and faces simultaneously, as hands usually appear in combination with face in daily visual experiences. Here I approach this issue in two ways: eye-tracking study on scene perception, and spatial cueing experiments using face/hand images. Results showed that hands do affect observers' attention, while the hand effects are relatively weaker and even absent if simultaneously-present faces dominantly guide attention (e.g., the initial stage of scene perception). I will further discuss the possible role of face-hand interaction in person/scene perception.
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6:00-7:30 PM (5028)

Effects of Object Correspondence and Visual Transients on Saccade Target Displacement Detection. DEBORAH A. CRONIN AND DAVID E. IRWIN, *University of Illinois at Urbana-Champaign* – The visual system is relatively insensitive to transsaccadic change. Deubel and colleagues (1996) found that transsaccadic displacements of the saccade target object were detected much more frequently if the object disappeared briefly after the saccade. They argued this 'blank' breaks the visual system's assumption of stability and recruits precise oculomotor information to localize the change. Several investigators have proposed recently that the assumption of stability is maintained by object correspondence: Blanking the saccade target object breaks object correspondence, allowing the viewer to detect changes to the object's position. Alternatively, Matsumiya and colleagues (2016) suggested the transient from the onset of the saccade target object, rather than object correspondence

per se, is what breaks the assumption of stability. In three experiments we investigated the relative benefits of broken object correspondence and visual transients to performance on a saccade target displacement detection task.
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6:00-7:30 PM (5029)

Visual Search When Features Arrive Dynamically. SAMUEL M. HARDING and RICHARD M. SHIFFRIN, *Indiana University* (Sponsored by Robert Nosofsky) – The processes responsible for the guidance of visual attention have been extensively studied within the context of visual search tasks, which require that subjects examine a large number of objects in order to determine if any of the items are "targets", or if the display consists entirely of distractors. By leveraging a novel, sequential presentation paradigm, we sought to explore the dynamics of visual search for well-learned items, when information about their identity was slowly made available during the course of each trial. We presented individual features of simple geometric objects in a sequential fashion, such that features containing diagnostic information about the object's identity were shown either first or last, with varying amounts of delay between successive features. The results revealed a strong effect of the earliest features on both accuracy and response times, and we propose a dynamic model based on one reported in Cox & Shiffrin (2017), which accounts for these patterns via continuous interactions between feature sampling and memory search. Bayesian estimation of model parameters produced good fits to both response proportions and reaction time distributions.
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6:00-7:30 PM (5030)

Interaction of Perceptual Priming and Visual Salience in a Naturalistic Visual Search Task. MARY L. STILL, JOHN M. HICKS, and JEREMIAH D. STILL, *Old Dominion University* – Visual searches can be completed more quickly for targets with high visual salience and for those that have been perceptually primed, but how do these factors interact? Can perceptual priming be used to improve searches for low salience targets? We investigated this question using a naturalistic search task. To instantiate perceptual priming, participants viewed products and rated their familiarity with each. After the rating task, participants searched e-commerce webpages. The targets were products that had high or low relative visual salience. Further, the targets were unprimed, primed (target rated for familiarity), or unprimed with distractor (nontarget rated for familiarity). During the search task participants were shown a picture of the target, then the webpage where they were to find the product price as quickly as possible. Eyetracking data reveal that higher salience products were found more quickly than lower salience products. The impact of perceptual priming was minimal in comparison.
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6:00-7:30 PM (5031)

Looking for the one: Passive Strategies Improve Guidance and Object Recognition in Single-Target Search. JESSICA MADRID and MICHAEL C. HOUT, *New Mexico State University* – Previous research on the use of cognitive strategies during visual search has found that asking observers to adopt a passive strategy leads to faster, less accurate, but more efficient search. This has even been shown during hybrid visual memory search for a large number of categorical targets. However, the nature of mental representations used during hybrid search remains unclear, obfuscating interpretation of eye-movement data. This study investigated whether efficiency improvements would remain when observers had only one categorical target to search for. We found that in comparison to both uninstructed and active search, adopting a passive strategy led to more efficient performance, characterized by improved attentional guidance, and an improved ability to identify items as targets or distractors. Passive search was also associated with fewer recognition failures, despite shorter inspection times. This indicates that passive search leads to consistent search benefits across both guidance and object recognition.
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6:00-7:30 PM (5032)

Using Combinations of Cognitive Aspects of Numbers in Visual Search. PATRICK CONLEY, PADMANABHAN SUDEVAN, ALEXANDER DOERING, and DANIELLE WHEATON, *University of Wisconsin, Stevens Point* – Most visual search tasks obviously focus on the visual qualities of the stimuli being examined, especially those qualities that differentiate the target from a set of distractors. Our previous work has demonstrated that more abstract qualities of numbers, specifically the magnitude and parity of these number targets, can also be used as a basis for discrimination between target and distractor in a visual search task, a result we have demonstrated in both between- and within-subjects designs. The current research extends these findings by demonstrating that when visual search participants are required to search for a target based on both magnitude and parity (e.g. finding the high and even digit target amidst low and odd distractors) they actually respond more quickly than when searching based on a single numerical quality (e.g. finding the low digit amidst high distractors), with no reduction in accuracy. These results further support our hypothesis that the abstract qualities of numbers can guide visual search, and that considering both parity and magnitude of numbers can actually improve performance in visual search relative to either parity or magnitude alone.
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6:00-7:30 PM (5033)

Object-Related Sounds Processed Differently Than Words During Visual Search. DONALD J. TELLINGHUISEN and PAUL MOES, *Calvin College* – Studies showing impacts of task-irrelevant auditory stimuli on RTs to identify visual targets in search tasks have typically presented words that could be congruent (naming the target presented), incongruent (naming an item from the target set, but not target presented), or neutral (naming something not from the target set) relative to the

target. Words, as verbal stimuli, are likely processed more by the left hemisphere. In the study we report, participants searched visual arrays for images of a dog or a car while simultaneously presented with either words (e.g., "dog" or "car") or object-related sounds (e.g., a dog bark or a car horn) varying in compatibility. Auditory stimulus compatibility effects on RTs to identify visual target identification were larger for words than object-related sounds. In addition, hemispheric differences in Event Related Potential (ERP) responses were found as a function of auditory stimulus type. Results are discussed relative to inattentional deafness.
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6:00-7:30 PM (5034)

Attentional Requirements Modulate the Effect of Multiple Targets During Pop-Out Visual Search. JAMES WILMOTT and JOO-HYUN SONG, *Brown University* (Presented by Joo-Hyun Song) – When searching for a pop-out target, the spatial scope of attention is allocated according to task needs. Detecting a target presence suffices with a broad scope of attention, while discrimination of a target feature requires a focused scope. Here, we investigated whether attentional requirements modulate the impact that multiple pop-out targets have on search efficiency. Participants performed a pop-out search task ('search for the color oddball') where the target-defining color varied unpredictably from trial to trial. Target present displays could contain one or two targets. When detecting at least one target's presence, multiple targets facilitated reaction time (RT). Conversely, when discriminating a target feature the effect of multiple targets was modulated by target similarity: identical targets facilitated RT, while dissimilar targets slowed RT. These findings suggest that multiple targets are selectively processed according to task attentional requirements.
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6:00-7:30 PM (5035)

The Guidance of Attention by Redundant Target Features in Visual Working Memory. DANIEL THAYER, BRETT BAHLE, JONATHAN TOBY MORDKOFF, and ANDREW HOLLINGWORTH, *The University of Iowa* – The completion of goal-directed behavior often relies on a representation of a target template maintained in visual working memory (VWM). Prominent theories of visual attention posit that this top-down guidance of attention is implemented for multiple feature dimensions in a parallel, summative manner (e.g., Bundesen, 1990; Wolfe, 1994). In the present study, we tested this claim using a redundancy gain task. Participants were cued on a trial-by-trial basis with a particular colored shape. Following the cue, they searched a heterogeneous search display for a target that matched either the color, the shape, or both. There were two critical findings. First, we observed redundancy gains: response times (RTs) were faster to targets redundantly defined in two dimensions than targets defined in either single dimension. Second, these gains violated the race model inequality (Miller, 1982). These results provide strong evidence that the top-down guidance of attention from an active template maintained in VWM is accomplished in a parallel, coactive manner.
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6:00-7:30 PM (5036)

Visual Search Is Faster When There Is Less Target Information in Working Memory. LAUREN H. WILLIAMS and TRAFTON DREW, *University of Utah* (Sponsored by Trafton Drew) – During visual search, attention is thought to be guided by target representations held in working memory (WM). Woodman and Arita (2011) found that the Contralateral Delay Activity (CDA) indexes the maintenance of target templates in WM prior to the onset of the search array. In addition, larger CDA amplitudes were associated with faster performance (Carlisle, et al., 2011). In contrast, Schmidt, et al. (2014) found that higher CDA amplitudes were associated with slower response times (RT), which suggests that maintaining fewer features in WM leads to stronger guidance. Our study sought to disentangle these accounts using an individual differences approach. On each trial, a lateralized target (200ms) was followed by a retention interval (900ms). Participants indicated whether the target was present (50%) in the search array, which consisted of real world stimuli. ERP waveforms were time-locked to target onset, and mean CDA amplitude was measured during the retention interval. Using a median split of RT for correct trials, participants were divided into fast and slow groups. The fast participants had smaller CDA amplitudes, which suggests weaker target representations in WM are associated with faster performance.
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6:00-7:30 PM (5037)

Assessing Lifeguard Accuracy During Surveillance. LYNDSEY K. LANAGAN-LEITZEL, *Eastern Connecticut State University* – Lifeguards must rescue people who are drowning, but also engage in continuous surveillance to prevent such incidents from occurring. Critical to their success is an accurate mental representation of the features of drowning and distress. My past work has demonstrated that lifeguards are inconsistent in reporting these features and variable in their assessment of severity, and that fixations are often not directed in accordance with severity. A critical limitation of this past research is that the stimulus materials contained no drowning incidents. In this study, 24 new videos were prepared; four had a swimmer edited in that submerged and disappeared after five or 10 seconds. A sample of lifeguards monitored these videos and pressed a key to indicate when they noticed drowning or distress. There were large differences in accuracy and response time across the lifeguards, which could indicate a great deal of variability in performance in the field.
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6:00-7:30 PM (5038)

Subsequent Search Misses and Tomosynthesis: Reduced Multiple-Target Search Errors in Segmented-3D Search Displays. STEPHEN ADAMO, RACHEL BREM, and STEPHEN MITROFF, *The George Washington University* – Breast cancer detection is going through a technological shift, moving from mammography—a process that takes a two-dimensional (2D) image of breast tissue, to tomosynthesis—a technique that creates a segmented three-dimensional (3D)

space which allows radiologists to search through depth. Tomosynthesis leads to fewer false alarms and more hits, yet many questions remain about its overall impact on cancer detection. Here we explored a robust and classic radiological problem that has been known about for over 50 years—reduced target accuracy after a first target has previously been detected (Subsequent Search Miss (SSM) errors). Undergraduate observers searched in 2D and segmented-3D search displays (blocked by display-type). Searching in 2D showed the typical SSM effect (worse accuracy for a second target after a first has been found), but SSM errors were eliminated in the segmented-3D search. It is intriguing that a stubborn source of errors in radiology was not observed in tomosynthesis-like searches. This presentation will discuss implications for radiology and cognitive psychology more broadly.
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6:00-7:30 PM (5039)

Do You See What I See? Exploring Holistic Processing With Gaze-Contingent Viewing. GRACE L. NICORA, TRAFTON DREW, DUSTIN STOKES, and JEANINE STEFANUCCI, *University of Utah* (Sponsored by Trafton Drew) – The Holistic Processing Theory (HPT: Sheridan & Reingold, 2017) posits that experts, unlike non-experts, are able to take in information from their parafoveal and peripheral vision to guide target search. We tested this theory using gaze-contingent viewing (GCV) (Reingold & Sheridan, 2011) to restrict the amount of visual information two expert groups received. We tested two groups of experts: radiologists and formally trained artists. Both groups participated in two tasks, lung nodule detection in chest radiographs and a gestalt image identification task. In the presence of GCV, HPT predicts that GCV will differentially disadvantage experts, but only during tasks within their domain of expertise. While we found that GCV led to costs in behavior and changes in eye-tracking metrics, these costs did not interact with expertise on task. This suggests that a lack of peripheral information may not reduce experts to novice-like performance as predicted by HPT.
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6:00-7:30 PM (5040)

Inferring Mental States in the Lab and in Real Life: Evidence From Young and Older Adults. MARTINA DE LILLO, VICTORIA BRUNSDON, ELIZABETH BRADFORD, MATT FYSH, and HEATHER FERGUSON, *University of Kent* (Sponsored by Heather Ferguson) – Understanding others' mind is an important social ability. We continuously need to infer other people's thoughts, intentions, desires and beliefs to respond appropriately in social situations. We will present three experiments that investigate whether and how these social skills change across the lifespan, and directly compare performance on a lab-based task with real-life behaviour. In Experiment 1, participants watched short videos depicting people in everyday situations, and we measured the speed and accuracy with which they inferred mental states for the person (i.e. their intentions, desires, beliefs and personality). Experiments 2 and 3 examined how people interact in real life by recording eye gaze towards social and non-social objects, during a 1:1 interview-style conversation (Experiment 2), and while navigating around a crowded environment (Experiment 3). Results compare performance on these tasks between young (aged 20-40 years old) and older (aged 60-80 years old) adults.
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6:00-7:30 PM (5041)

Visual Search for Categorically Defined Targets Is Biased Toward Recently Viewed Exemplars. BRETT BAHLE and ANDREW HOLLINGWORTH, *University of Iowa* (Sponsored by Andrew Hollingworth) – The guidance of attention toward task-relevant objects during search often relies on a target template representation. In addition, many searches are categorical: the goal of search is to find any item belonging to a category. In the present study, we investigated the extent to which these categorical template representations are biased toward recently viewed category exemplars. Participants first completed an exposure task: they viewed objects from common categories and classified them as natural or artifact. Critically, each exemplar from a given category always appeared in one color. Next, participants performed four blocks of visual search. They saw a label specifying the target category and searched for the target within an array of objects. The target picture matched or mismatched the color of the previously viewed exemplars. Searches were more efficient for matching compared with mismatching exemplars, and this effect reliably diminished across search blocks as participants accrued more trials of search with exemplars of both colors. These results suggest that well-established category representations that guide search are constantly updated to reflect recent regularities within a category.
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6:00-7:30 PM (5042)

System Factorial Technology Provides New Insights on Hybrid Search. CHUN-YUAN HUANG (Graduate Travel Award Recipient) and CHENG-TA YANG, *National Cheng Kung University*, MARIO FIFIĆ, *Grand Valley State University* (Sponsored by Cheng-Ta Yang) – In hybrid search, participants memorize a number of possible objects and then search for any of these in visual arrays. However, previous findings of hybrid search can be explained by both limited-capacity parallel and serial models, known as the problem of model mimicry. Here, we utilized a novel and diagnostic methodology, System Factorial Technology, which allows for model identification. We manipulated the visual setsize, memory setsize, and number of targets (0/1/2) in a hybrid search task. Our results replicated the typical findings, i.e., a linear search function with the increase of visual setsize and a logarithmic search function with the increase of memory setsize. Surprisingly, we found constant limited-capacity processing across visual and memory setsize, suggesting hybrid search efficiency was neither affected by visual nor memory loads. We inferred that the limited-capacity unequal-weighed parallel model is more plausible and a novel cognitive resource reservation account will be discussed.
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6:00-7:30 PM (5043)

Teasing Apart Stages of Processing Using Stimulus- and Response-Locked Visual-Attention Event-Related Potentials During Effortful Visual Search. BRANDI LEE DRISDELLE and PIERRE JOLICOEUR, *Université de Montréal* (Sponsored by Pierre Jolicoeur) – In EEG research on visual attention, pop-out targets are generally used because they are selected first, with little variance from stimulus onset to attentional engagement. During effortful search, however, the moment of target selection is more variable from trial-to-trial. We show how combining stimulus- and response-locked lateralized posterior ERPs can shed light on processing during effortful search. Subjects located a box with a gap among boxes with two gaps. The number of distractors in the display and the difficulty of response selection was varied. A posterior contralateral negativity (PCN) indexed the deployment of visual attention in stimulus-locked averages. The onset of the PCN in response-locked averages (RpcN) was earlier when response selection was more difficult and with an increase in distractors, suggesting that more time passed between PCN onset and response execution. This approach allowed us to isolate the locus of factor effects relative to the engagement of visual attention.
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6:00-7:30 PM (5044)

Modulation of Spatial Attention by Emotions? AHU GOKCE, *Kadir Has University*, THOMAS GEYER, *Ludwig-Maximilians-Universität München* – Previous work demonstrated that emotions modulate attention orienting in Posner spatial cueing task, but it is unclear whether these effects are associated with emotional vs. semantic content of cue. It is also less clear whether emotion effects carry over to different tasks (localization vs. discrimination) and SOA levels (short vs. long). Using emotion spatial cueing task, reaction time benefits for targets presented at validly relative to invalidly cued locations for various peripheral cue types were tested in a fully factorial design. Main comparison was between spatial cueing effect arising from emotional scenes with semantic content (positive, negative, neutral) and standard peripheral cues without semantic content (geometrical square shape). Effects of emotional and semantic content (scenes vs. geometrical shape) on spatial cueing effects were disentangled. Spatial cueing effects were reliable across all SOA levels and tasks. Interestingly, for localization task spatial cueing from scenes was larger than geometrical shape and there were no differences in magnitude of spatial cueing from positive, negative and neutral scenes suggesting that up-modulation of spatial cueing is not modulated by emotional but semantic content.
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6:00-7:30 PM (5045)

Do as I Say, Not as I Say: Listening Produces the Label Feedback Effect in Visual Search. KATHERINE P. HEBERT, STEPHEN D. GOLDINGER, and STEPHEN C. WALENCHOK, *Arizona State University* (Sponsored by Stephen Goldinger) – The label-feedback hypothesis (Lupyan, 2012) proposes that language modulates low- and high-level visual processing, such as priming visual object perception. Lupyan and Swingley (2012) found that repeating target names facilitates visual search, reducing response times and increasing accuracy. Hebert, Goldinger, and Walenchok (under review) used a modified design and collected oculomotor evidence to replicate and extend this finding, and concluded that speaking modulates visual search via template integrity. During search, people spoke target names, nonwords, irrelevant (absent) object names, or irrelevant (present) object names (all within-participants). The present study utilized the same behavioral paradigm, except that participants now heard the stimuli through headphones during search, rather than speaking themselves. Results replicated those found in previous studies—hearing target names improved performance, without systematic differences among the remaining conditions. These findings add to a growing body of evidence for the label feedback effect, and provide a more flexible method that can be applied in future research.
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6:00-7:30 PM (5046)

Hemispheric Differences in Visual Evoked Potential in Aging Population With Prior Concussion. MARTINE DESJARDINS, *Université du Québec à Montréal*, CHRISTINE LEFEBVRE, *Université de Montréal*, LOUIS DE BEAUMONT, *Hopital du Sacré-coeur de Montréal*, PIERRE JOLICOEUR, *Université de Montréal* (Sponsored by Frederic Gosselin) – The litterature suggest a special role of right-hemisphere mechanisms for visual-spatial attention. Compared with fMRI or MEG research, little EEG work has examined possible hemispheric differences in visual attention mechanisms. We examined event related potentials (ERP) in the context of visual search for a lateral color singleton, and focused on the N1 and N2pc, over each hemisphere, for an aging concussed population and matched controls. Activity was stronger in the right hemisphere in matched controls for the N1 and N2pc, whereas no hemispheric differences were observed for the concussed population. The results suggest a possible reorganisation of the visual attention network following concussion in older adults. More research will be required to understand better the link between right hemispheric processing, attention, ERPs, and the underlying cognitive processes. However, the results already suggest that comparing attention-related ERPs across the two hemispheres has the potential to be a useful clinical indicator.
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6:00-7:30 PM (5047)

An Update to the Guided Search Model Using Multi-Dimensional Scaling to Capture the Features of Complex, Real-World Objects. COLLIN SCARINCE and MICHAEL CRAIG HOUT, *New Mexico State University* – Models such as Guided Search have been used to explain and predict the findings of visual search experiments that typically use rudimentary stimuli defined by basic visual features (e.g., color, orientation). Many search experiments, however, use stimuli (e.g., real world objects) that are not easily defined by simplistic dimensions. Multidimensional scaling (MDS) is a statistical tool used to model the similarity of objects based on their appearance. Real-world stimuli can be difficult to define by basic features alone, but MDS can model these dimensions without the need

to define them a priori. Our current computational model expands on Guided Search by defining the features of objects using MDS-derived dimensions of similarity. Our preliminary model was used to capture attentional guidance and object identification behaviors during search, successfully accounting for effects of set size on reaction time and error rates, and the effects of target template precision.
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6:00-7:30 PM (5048)

The Effect of Color Context on Visual Search Templates. KATIE R. JOBSON and KATHERINE S. MOORE, *Arcadia University* (Sponsored by Katherine Moore) – According to Color Constancy, an object will appear to have the same color under a range of lighting conditions in spite of reflecting different light. This is helpful, but humans are consequently poor at correctly judging emitted color across two scenes that have different lighting. In this experiment, we investigated whether perceived lighting has an effect on a visual search template held in working memory. Participants searched for a target object on a white background. Two color-shifted versions of the target were created by applying a green filter or a red filter, and participants were to reject these distractors. In subsequent blocks, the background changed to green and red using the same filters that generated the distractors; this mimicked lighting changes. Participants were to continue to look for the initial target. Consistent with the idea that color constancy has an impact on visual search templates, participants were relatively more likely to false alarm to a color-shifted distractor (e.g. greenish distractor) when on the matching (e.g. green) background than they were when such a distractor appeared on the white background or the non-matching (e.g. red) background.
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6:00-7:30 PM (5049)

Repeated Visual Search of Displays Simulating Environmental Movement. TRENT ROBINSON and EDWARD MERRILL, *University of Alabama* – As evidenced by the contextual cueing paradigm, people are very efficient at learning spatial regularities in the environment. In many cases, this spatial learning has been reported to be relatively implicit in nature. However, the application of this phenomenon to dynamic presentations reflecting movement through the environment has been limited. We conducted two visual search experiments using dynamic, multicolored, and complex videos simulating movement through a virtual environment. Videos were either experienced once (novel videos) or multiple times (repeated videos). Participants were able to locate a target object in repeated videos faster than in novel videos, $F(1, 56) = 229.653$, $p < .001$. In the second experiment, participants searched for a different target object during acquisition versus test and still exhibited faster search times for repeated videos, $F(1, 50) = 43.531$, $p < .001$. Hence, incidentally and perhaps implicitly learned object-context associations were observed with dynamic stimuli in our studies.
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COGNITIVE CONTROL

6:00-7:30 PM (5050)

The Specificity of Task Conflict in the Stroop Task. YUKI ASHITAKA, *West Japan Railway Company*, HIROYUKI SHIMADA, *Kobe University*, KAZUSHIGE WADA, *West Japan Railway Company* – The two types of conflict, task conflict and informational conflict have been extensively researched in the Stroop task. We investigated the two types of conflict in different response modalities. The participants completed the Stroop task in manual (categorical and typing) and vocal modalities. We observed informational conflict in all the response modalities. In contrast, we failed to consistently observe task conflict in both mean RTs and RT distributions, suggesting that the effect size of task conflict might vary as a function of the task goal and the context. We discuss the specificity of task conflict in the Stroop task (context specificity), along with the previous studies demonstrating that task conflict was sensitive to proportion congruency and task switching.
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6:00-7:30 PM (5051)

Better Safe Than Sorry: Response Monitoring in Dishonesty. ANNA FOERSTER (Graduate Travel Award Recipient), ROBERT WIRTH, WILFRIED KUNDE, and ROLAND PFISTER, *University of Würzburg* (Sponsored by Roland Pfister) – The cognitive architecture of dishonest responding is still elusive. Here we studied whether dishonesty entails automatic response monitoring, a question that is motivated by a combined perspective of influential theories on dishonesty as well as sensorimotor stage models of information processing. We propose that response selection during dishonest responding not only comes with an inherent activation and inhibition of the associated honest response, but also triggers prolonged monitoring processes. We tested this assumption by employing psychological refractory period methodology. The collected evidence indeed supports response monitoring, and showed this process to arise irrespective of uncertainty about eventual response success. By applying sensorimotor approaches to lying, we present clear-cut empirical evidence for theories on intensive monitoring of dishonest responses. Data suggest that this process arises as an inevitable by-product of the cognitive conflict that dishonest responses provoke. These results specify and validate previous approaches to the cognitive underpinnings of dishonesty and lies.
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6:00-7:30 PM (5052)

Causal Transfer of Specific Attentional Control States. CHRISTINA BEJJANI (Graduate Travel Award Recipient) and TOBIAS EGNER, *Duke University* (Sponsored by Tobias Egner) – Recent studies have found that people learn to associate implicit probabilistic cues with context-appropriate attentional control-states and that learned control-states transfer across paired-associates. Here, we tested whether control-state transfer occurs through associative or causal mechanisms (Experiment 1) and through mediated or direct control-learning (Experiment 2). In the Stimulus-Stimulus association

phase, a face or house (S1) repeatedly predicted a particular scene (S2) image to form paired associates in memory. In the Stimulus-Control association phase, S1 (Experiment 1) or S2 (Experiment 2) images predicted stimulus congruency in a Stroop task to create implicit control-demand cues. In the Stimulus-Control Transfer phase, S2 (Experiment 1) or S1 (Experiment 2) transfer probes likewise preceded the onset of Stroop trials, but were not predictive of congruency. We found that learned control-states are not transferred through a common-cause structure or accumulation of model-free value. This suggests that control-state transfer occurs via causal learning of model-based associations.
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6:00-7:30 PM (5053)

The Influence of Context Processing Demands on Cognitive Control. HUANGQI JIANG and BROOKE N. MACNAMARA, *Case Western Reserve University* (Sponsored by Brooke Macnamara) – The Dual Mechanisms of Cognitive Control Framework proposed by Braver et al. (2007) states that cognitive control consists of proactive control and reactive control. Individuals engaging in proactive control avoid conflict by maintaining a representation of related information before reacting, while those engaging in reactive control resolve conflict by recalling goal-related information when reacting. A central assumption of this framework is that situational factors may reduce one type of control over the other. In the current research, we used a task commonly used to study the Dual Mechanisms of Cognitive Control Framework (AX-CPT) modified to manipulate the degree of interference to investigate whether context processing demands influence proactive control. Specifically, all participants completed three conditions, one with low context processing demands, one with medium context processing demands, and one with a high context processing demands. We did not find evidence of changes in proactive control based on the level of context processing demands. Implications of these results will be discussed.
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6:00-7:30 PM (5054)

Categorization Difficulty Modulates the Mediated Route for Response Selection in Task Switching. DARRYL W. SCHNEIDER, *Purdue University* – Conflict during response selection in task switching is indicated by the response congruency effect: worse performance for incongruent targets (requiring different responses across tasks) than for congruent targets (requiring the same response). The effect can be explained by dual-task processing in a mediated route for response selection, whereby targets are categorized with respect to both tasks. In the present study, the author tested predictions for the modulation of response congruency effects by categorization difficulty derived from a relative-speed-of-processing hypothesis. Categorization difficulty was manipulated for the relevant and irrelevant task dimensions in a novel spatial task-switching paradigm that involved judging the locations of target dots in a grid, without repetition of dot configurations. Response congruency effects were observed and they varied with categorization difficulty (e.g., being larger when irrelevant categorization was easy than when it was hard). These results are consistent with the relative-speed-of-processing hypothesis and suggest that task-switching models that implement variations of the mediated route for response selection need to address the time course of categorization.
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6:00-7:30 PM (5055)

Danger Is Red and Safety Is Blue: Color-Associated Concepts Produce a Semantic Stroop Effect. ISIS B.F. GREEN, *Columbia University*, KAYLA S. SANSEVERE, *Arcadia University*, JOSHUA WOLF, *Carroll University*, STEVEN J. ROBBINS and KATHERINE S. MOORE, *Arcadia University* (Presented by Katherine S. Moore) – The semantic stroop effect (SSE) refers to the finding that people are faster to identify the ink color of a word if the meaning is associated with that color (e.g. banana written in yellow ink) than if it is not (e.g. banana written in red ink). However, it is unclear whether the SSE applies to abstract concepts that may be color-associated, but are not colored objects (e.g. "love" is associated with the color red). We first replicated the SSE using concrete words with color associations. Next, we found an SSE for abstract concepts—participants were faster to name the ink color of high arousal words like "peril" when they were written in red than when they were written in blue. Meanwhile, they were faster to name the ink color of low arousal words like "peace" when they were written in blue than when they were written in red. This effect was not predicted by individual differences in sensation-seeking. These results suggest that abstract concepts may have distinct color associations that are similar across people.
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6:00-7:30 PM (5056)

Efficient Coding of Abstract Inter-Chunk Relationships in Sequential Processing. MELISSA E. MOSS, ATSUSHI KIKUMOTO, and ULRICH MAYR, *University of Oregon* (Sponsored by Ulrich Mayr) – For a complex behavioral sequence to be executed, it must be broken down into smaller subsequences (chunks). In traditional serial-order control models, chunks are conceptualized as independent "bundles" of elements. Alternatively, based on the efficient coding principle, chunks may be coded relative to each other, based on shared, content-independent patterns. We tested these competing hypotheses using a task-span paradigm in which participants performed explicitly instructed, hierarchically organized task sequences. In Experiment 1, some sequences had matching chunk patterns, i.e., they were composed of same-element chunks that could be transformed into each other through simple inversion, while other sequences were not (e.g., ABA-BAB vs. ABA-BBA). In Experiment 2, sequences were composed of different-element chunks that either shared abstract patterns (e.g., ABA-CDC) or didn't (e.g., ABA-CCD). In both experiments, we found performance benefits for sequences constructed from "matching" chunks, particularly during chunk transitions. These results suggest that abstract, inter-chunk relationships promote efficient sequential representations.
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6:00-7:30 PM (5057)

Stop Means Go, and Go Means Stop: Inhibitory Control in the Face of Semantically Incongruent Information. BINGXIN SONG, ALEXIS GUYTON, LAURYN MUIR, and COREY N. WHITE, *Missouri Western State University* – Inhibitory control is an important component of executive function. Often it is hard to exert inhibitory control in the face of habitual behavior. This study investigates whether inhibitory control in a Go-Nogo task suffers when people are asked to perform behaviors that conflict with information from semantic memory. In experiment 1, participants were sometimes asked to inhibit their responses when they saw the word "Stop" (congruent with semantic memory), or stop their responses when they saw the word "Go" (incongruent). In experiment 2, participants were sometimes asked to inhibit their responses when they saw the red circle (congruent), or stop their responses when they saw the green circle (incongruent). We modeled the data with the diffusion model to determine how participants change decision strategies in the face of incongruent information. Results suggest that information from long-term memory interacts with inhibitory control to some extent. Implications are discussed.
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6:00-7:30 PM (5058)

Stereotype Congruency and Cognitive Control in the Shooter Task. JAYMES DURRISEAU and JARROD MOSS, *Mississippi State University* (Sponsored by Carrick Williams) – The shooter task requires participants to "shoot" any targets who are holding a gun and "don't shoot" any targets who are holding a non-threatening object. It has been used in a number of studies to examine racial bias because typically armed Black targets are shot more often and faster than armed White targets. The current study explores how individual differences in cognitive control and working memory measures are associated with this shooting bias. The proportion of stereotype-congruent trials (e.g., Black armed) to stereotype incongruent trials (e.g., Black unarmed) was manipulated across participants. The results show that the relationship of measures of cognitive control and working memory to measures of response time and accuracy on the task depend on whether the trials seen are mostly stereotype-congruent or equal proportions of stereotype-congruent and incongruent trials. The results are discussed in terms of theories of proactive cognitive control.
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6:00-7:30 PM (5059)

The Role of Affective Evaluation in Conflict Adaptation: An LRP Study. KERSTIN FRÖBER, *University of Regensburg*, BIRGIT STÜRMER, *International Psychoanalytic University Berlin*, ROMY FRÖMER, *Humboldt-Universität zu Berlin*, GESINE DREISBACH, *University of Regensburg* – Conflict between incompatible response tendencies is typically followed by control adjustments aimed at diminishing subsequent conflicts, a phenomenon often called conflict adaptation. Dreisbach and Fischer (2015, 2016) recently proposed that it is not the conflict per se but the aversive quality of a conflict that originally motivates this kind of sequential control adjustment. With the present study we tested the causal role of aversive signals in conflict adaptation in a more direct way. To this end, after each trial of a vertical Simon task participants rated whether they experienced the last trial as rather pleasant or unpleasant. Conflict adaptation was measured via lateralized readiness potentials as a measure of early motor-related activation that were computed on the basis of event-related brain potentials. Results showed the typical suppression of automatic response activation following trials rated as unpleasant, whereas suppression was relaxed following trials rated as pleasant. That is, sequential control adaptation was not based on previous conflict but on the subjective affective experience. This is taken as evidence that negative affect even in the absence of actual conflict triggers subsequent control adjustments.
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6:00-7:30 PM (5060)

The Affective Signature of Predictive and Unpredictive Control Cues. LUC VERMEYLEN, SENNE BRAEM, and WIM NOTEBAERT, *Ghent University* (Sponsored by Senne Braem) – Recent studies suggest that cognitive conflict is automatically evaluated as aversive. Here, we wanted to investigate whether this aversive evaluation could transfer to cues in our environment signaling upcoming conflict. Moreover, in doing so, we also assessed the role of the predictive value of these cues. Specifically, 77 participants performed a cued Stroop task in which cues were predictive of congruent trials, or incongruent trials, or unpredictive of the upcoming trial. As people tend to prefer predictive information, unpredictive cues could be evaluated as most negative. On the other hand, predictive cues signalling incongruent trials could evoke the negative affect associated with them. An unannounced affective priming phase showed that unpredictive and predictive incongruent cues are evaluated as equally negative relative to predictive congruent cues. These findings suggest that the aversive nature of conflict can transfer to cues announcing this conflict, and are evaluated just as negative as uninformative cues.
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6:00-7:30 PM (5061)

Inhibitory Motor Control in Adult ADHD: Mouse Movement Is a Better Indicator Than SSRT. ANTON LEONTYEV and TAKASHI YAMAUCHI, *Texas A&M University, College Station* (Sponsored by Takashi Yamauchi) – Attention-deficit and hyperactivity disorder (ADHD) is frequently characterized as a disorder in executive function. It is commonly associated with prolonged stop-signal reaction time (SSRT) in a stop-signal task. Recent research in system neuroscience, however, suggests that this might not hold for ADHD-related impulsivity in adult population. In this population, ADHD symptoms are often associated with variability in decision-making and motor control. To test whether inhibitory motor control serves as a reliable marker for adult ADHD, we implemented mouse-cursor movement measure into the traditional stop-signal paradigm and investigated the extent to which our mouse-cursor motion measures were correlated with self-report measures of ADHD. Our results show that, among non-clinical college students, mouse-cursor movement measures had stronger

associations with ADHD-related impulsivity than traditional SSRT measures, suggesting that inhibitory motor control and its deficiency are well reflected in adult ADHD.
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6:00-7:30 PM (5062)

What the TUT? Examining the Causes and Consequences of Emotionally Valenced Mind Wandering. LINDSAY CRAIG, *Nova Southeastern University*, HALEY G. GOLLER, *Western Carolina University*, AMANDA S. HOLTZMAN and EDWARD ZACKA, *Nova Southeastern University*, AUDREY V.B. HOOD, *Montana State University*, JONATHAN B. BANKS, *Nova Southeastern University* – The emotional valence of mind wandering may moderate its impact on task performance. Evidence supporting this claim has relied on examining the impact of emotional valenced mind wandering on overall performance scores. In the first study, we examined the consequences of emotionally valenced task unrelated thoughts (TUTs) on a trial-by-trial basis for high demanding and moderately demanding tasks. On high demand working memory span tasks, all TUTs predicted poorer performance on immediately preceding trials. On a moderately demanding sustained attention task, only negatively valenced TUTs predicted poorer performance on immediately preceding trials. While contextual predictors of mind wandering in real life have been explored, no research has extended this to examine predictors of emotionally valenced mind wandering. In the second study, we used an experience sampling procedure to examine predictors of emotionally valenced mind wandering. Emotional valence of the TUT moderated the predictors of mind wandering in the real world.
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6:00-7:30 PM (5063)

When a Smile Is a Conflict: Affective Mismatch Between Emotional Facial Displays and Group Membership Induces Conflict and Triggers Cognitive Control. JULIA KOZLIK and RICO FISCHER, *University of Greifswald* – Initial reactions to emotional expressions of others depend on the group membership of expresser and perceiver. But what are the underlying mechanisms? The social intention account holds that affective response tendencies are elicited by others' intentions: In-group [out-group] members are imputed to pursue benevolent [malevolent] intentions thereby facilitating concordant [discordant] responses. Alternatively, we propose that a combination of group membership and facial displays results in affectively compatible (e.g., positive expressions by positively evaluated persons) or incompatible configurations (e.g., positive displays by negatively evaluated persons). To test this processing conflict account, participants categorized facial displays of in-/out-group persons. We observed a response benefit for affectively compatible over incompatible faces. Moreover, incompatible faces in trial N-1 reduced the compatibility effect in trial N, irrespective of the type of the preceding conflict. More precisely, the fact that an affectively incompatible joyful face triggered control adjustments that facilitated processing of an affectively incompatible fearful/angry face, speaks in favor of the conflict instead of the social intention account.
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6:00-7:30 PM (5064)

Forgetful Eyes? A Comparison of Oculomotor and Manual Action-Effect Learning. EVA RIECHELMANN and LYNN HUESTEGGE, *Würzburg University* (Sponsored by Andreas Eder) – Numerous studies report evidence that people acquire and use bi-directional associations between manual actions and subsequent perceptual effects (action-effect (A-E) associations) in order to achieve their goals (ideomotor control theory). Recently, similar evidence for A-E learning in the oculomotor domain has emerged, but corresponding studies rely on different experimental designs. Thus, it is not clear to what extent A-E learning is comparable across action domains. In the present study, participants first experienced the co-occurrence between certain actions (saccade or keypress) and their visual effects. In a subsequent test phase, they responded to the former effect stimuli either with constant or reversed effect-action mappings. A-E learning, as reflected in faster reaction times for non-reversed mappings, was evident in the manual group only. The results suggest that A-E associations dissipate faster in the oculomotor (vs. manual) domain, thus allowing for a quicker adaptation to the context of the test phase.
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6:00-7:30 PM (5065)

No Gender-Related Differences in Multitasking: Evidence From Task-Switching and Dual-Task Experiments. PATRICIA HIRSCH and IRING KOCH, *RWTH Aachen University*, JULIA KARBACH, *Universität Koblenz Landau* (Sponsored by Iring Koch) – In everyday life, we are often confronted with situations that force us to multitask. It is generally believed that women are better at multitasking than men. The empirical findings concerning gender-related differences in multitasking abilities are, however, mixed in both task-switching and dual-task domains. Therefore, the present study aimed to re-examine the effect of gender on multitasking performance. By using the same stimuli, tasks, and responses, we designed highly comparable task-switching and dual-task experiments. In the task-switching experiment, we observed substantial mixing costs (i.e., worse performance in repetition trials of mixed-task blocks than in single-task blocks) and switch costs (i.e., worse performance in switch trials than in repetition trials). In the dual-task experiment, there were, in addition to dual-task costs (i.e., worse performance in Task 2 of dual-task trials with long stimulus-onset asynchrony [SOA] than in single-task blocks) and a PRP effect (i.e., worse Task 2 performance in dual-task trials with short SOA than long SOA). Neither switching-related performance costs nor dual-task-related performance costs differ in their magnitude across women and men.
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6:00-7:30 PM (5066)

Taking Shortcuts: Cognitive Conflict During Motivated Rule-Breaking. ROLAND PFISTER, ROBERT WIRTH, LISA WELLER, ANNA FOERSTER, and KATHARINA A. SCHWARZ, *University of Wuerzburg* – Deliberate rule violations have typically been addressed from a motivational perspective that asked whether or not agents decide to violate rules based on contextual factors and moral considerations. With the present study, we complement motivational approaches by providing a cognitive perspective on the processes that operate during the act of committing an unsolicited rule violation. Participants were tested in a task that allowed for violating traffic rules by exploiting forbidden shortcuts in a virtual city maze. Results yielded evidence for sustained cognitive conflict that affected performance from right before a violation throughout actually committing the violation. These findings open up a new theoretical perspective on violation behavior that focuses on processes occurring right at the moment a rule violation takes place.
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6:00-7:30 PM (5067)

What Can Eye Movements Reveal About Intentional and Incidental Forgetting? JONATHON WHITLOCK, YI-CHIEH CHIU, and LILI SAHAKYAN, *University of Illinois at Urbana-Champaign* (Presented by Lili Sahakyan) – This study demonstrates associative impairment in item-method directed forgetting (DF), and it is the first study to utilize eye-movement measures. Participants saw trials consisting of a scene, followed by a superimposed object, and a Forget or Remember cue. The recognition test presented a studied scene with three studied objects. One object (target) was studied with that scene, whereas the remaining two objects (lures) were studied with other scenes. Thus, all three objects had approximately equivalent item strength, but only the target had intact associative information to that scene. Participants were to select the target while eye-movements were collected. Associative recognition was impaired confirming successful DF. Eye-movements indicated preferential viewing (Hannula et al., 2007) to the target relative to lures for all correctly recognized objects, regardless of Remember or Forget cue. Importantly, preferential viewing to missed targets differentiated between Remember (i.e., incidental forgetting) and Forget (i.e., intentional forgetting) conditions.
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6:00-7:30 PM (5068)

The Effect of Age on Task Switching Performance Is Modulated by Working Memory Load. FELICE VAN 'T WOUT, MARIKE O'DONNELL, REBECCA SAW, and CHRISTOPHER JARROLD, *University of Bristol* – Children's ability to switch between tasks improves throughout childhood, though the mechanisms responsible for this improvement remain poorly understood. This experiment investigated the possibility that age differences in task switching performance are driven by age differences in working memory capacity. To test this possibility, participants from three age groups (aged 6, 9 and 21) switched unpredictably between two tasks with either a high (2 rules per task) or a low (4 rules per task) working memory load. The results show that children's (but not adults') performance suffered on task repeat trials, especially when the working memory load of the task was high. These results suggest that working memory plays an important role in maintaining the task rules when the task repeats, and are consistent with the view that age differences in working memory capacity contribute to the development of executive control.
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6:00-7:30 PM (5069)

The Relationship Between Cognitive Control and Delay Discounting Under Working Memory Load. AMY T. NUSBAUM, JOHN M. HINSON, PAUL WHITNEY, and ANTHONY STENSON, *Washington State University* (Sponsored by John Hinson) – Decision making dominated by immediate outcomes is characterized as impulsive. Prior work has shown that increased working memory (WM) load contributes to increased discounting of delayed rewards on intertemporal choice tasks, thereby appearing to result in more impulsive decisions. Increased discounting moderated by WM load may reflect the impact of WM load on cognitive control processes that are operative in many settings, rather than reflecting a specific effect of WM capacity on impulsivity. In the present study participants completed a delay discounting task under low and high WM load, and a version of the AX Continuous Performance Task (AX-CPT) that provides several indices of cognitive control. We found that higher values on an AX-CPT index of top-down control predicted lower discounting rate under higher WM load. These findings support the argument that WM load effects on intertemporal choice are related to the operation of general cognitive control processes.
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COGNITIVE AGING

6:00-7:30 PM (5070)

Neurophysiological Measures of Flanker Effects and Its Relationships With Cognitive Style and Workload Capacity in Older Adults. YEN-TING YU, CHENG-TA YANG, and SHULAN HSIEH, *National Cheng-Kung University-Taiwan* – Cognitive style and workload capacity of information processing may moderate the flanker effect and compensatory response in older adults. However, the underlying mechanisms were still indeterminate. This study investigated the influence and moderating effects of cognitive style and workload capacity in age-related flanker effects of an event-related potentials (ERPs) approach. A total of 39 participants (45-75 years old) participated in this study. Workload capacity (Cz) was estimated by the systems factorial technology in two different redundant tasks. Results showed that the tendency of holistic processing was positively correlated with flanker effects of P3 peak latency and ERN peak amplitude. Cz coefficients were positively correlated to P3 peak latency but were negatively correlated to ERN peak amplitude. The findings indicated that 1) the older adults who tend to use the holistic processing strategy were more easily distracted by the flankers and have lower sensitivities to errors; 2) although the older adults with larger

Cz were more sensitive to errors, they were easily influenced by the flankers. The current results demonstrate how cognitive style and workload capacity may interact with flanker effects in older adults.
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6:00-7:30 PM (5071)

Task-Switching Stroop Performance Is Sensitive to Subtle Attentional Declines in Healthy Aging, Preclinical, And Very Mild Alzheimer Disease. PETER R. MILLAR, DAVID A. BALOTA, and JESSICA L. NICOSIA, *Washington University in St. Louis*, KEITH A. HUTCHISON, *Montana State University*, JANET M. DUCHEK, *Washington University in St. Louis* (Sponsored by Janet Duchek) – Aging and early-stage Alzheimer disease (AD) are associated with declines in working memory and attentional control. We developed two 10-minute versions of a task-switching Stroop task (a vocal and a keypress version), in which participants were cued to alternate across every two trials between responding to each of the competing dimensions of the stimulus (i.e., the "color" and the "word"). Thus, these tasks challenged attentional control over the competing stimulus dimension, the ability to maintain the two task sets across trials, and the ability to switch between the task sets when cued. A very large, partially-overlapping sample of well-characterized middle-aged to older adults completed each version of the task (vocal N = 843; keypress N = 403). Across both versions, task performance, particularly incongruent color-naming accuracy, was sensitive to subtle differences in age, preclinical biomarkers of the pathophysiology of AD, and the earliest clinical diagnosis of very mild AD.
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6:00-7:30 PM (5072)

Healthy Older Adults Showed Lower CRT (Cognitive Reflection Test) Scores: Its Relation to Differences Among Three Quizzes. ETSUKO T. HARADA, *University of Tsukuba*, YUHKI HARADA, *National Institute of AIST*, SATORU SUTO, *Shizuoka University* – When we compared performances on Cognitive Reflection Test (CRT: Frederick, 2005) between healthy older adults (N=82) and younger adults (N=73) in Japan, results showed significantly lower scores with older adults (Exp.1). In order to investigate causes of these ageing decline, we executed an analysis among three quizzes in CRT, and found that older adults showed especially lower performances with Quiz #1, which is about shopping a bat and a ball, while younger adults did not show such differences among quizzes. Other studies showed no effects of quiz order (younger adults, N=128; Exp. 2), and then we changed items to be bought in Quiz #1 from a bat-and- a ball to a flower Pot-and-a broom (Exp. 3). With changed items, there were no differences among Quizzes also with older adults, implicating that specific characters of Quiz #1 coming from item familiarity or schema-based semantic relationships may cause specific ageing decline..
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6:00-7:30 PM (5073)

Individual Characterization of Aging Effects on White Matter Microstructural Integrity and Dynamic Network Connectivity of Cognitive Control: A Combined EEG and DTI Study. THOMAS THIERRY HINAULT, TRAVIS DAVID KROEKER, EDA INCEKARA, and ARNOLD BAKKER, *Johns Hopkins University*, ALAIN DAGHER, *McGill University*, SUSAN COURTNEY, *Johns Hopkins University* – This study aimed to better understand aging effects on cognitive control network connectivity, and how it is underpinned by white matter integrity. We studied the inhibition of irrelevant arithmetic knowledge (i.e., correct rejection of a false solution when it is the correct product of another operation; e.g., 8x4=12) and its interaction with the maintenance or updating of arithmetic rules (i.e., addition, multiplication) in working memory. We analyzed DTI, resting state fMRI, and EEG data in young adults (20-35 years) and older adults (60-75 years). Older adults showed lower white matter integrity and reduced activation of the frontal-parietal network. In young adults, EEG results revealed larger alpha power in frontal and posterior regions during updating, while modulations of the theta band were observed during arithmetic interference. Higher power in the gamma band was also observed posteriorly during rule maintenance in young adults. Older adults showed lower performance together with lower power in alpha and gamma bands during updating than young adults. This study contributes to a better understanding of how age-related decline in cognitive control is related to differences in functional and structural network integrity.
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6:00-7:30 PM (5074)

Signal Detection for Cyberthreats Across the Life Span. DAWN SARNO, JOANNA LEWIS, COREY BOHIL, and MARK NEIDER, *University of Central Florida* – Older adults may be vulnerable to exploitation in cyber environments due to impaired decision making and lack of familiarity. To explore this possibility, Experiment 1 examined how accurately older and younger adults classify "spam" emails. Surprisingly, older adults were both more accurate and more conservative in their choices, classifying more emails as spam. Experiment 2 investigated whether this bias was due to framing, and posed emails as "safe" or "unsafe". Older adults were again more accurate and biased toward categorizing emails as "unsafe". In both experiments, older adults took sixteen seconds longer to respond than younger adults, therefore Experiment 3 examined how time pressure affected performance. Older adults still outperformed younger adults and were biased towards identifying an email as spam. These results suggest that older adults compensate for age-related decline by being cautious in the cyber domain, and younger adults may be less rigorous in evaluating email-based cyberthreats.
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6:00-7:30 PM (5075)

Examining the Effects of Value-Directed Encoding and Valence on the Associative Deficit in Older Adult Memory Performance. GEOFFREY MADDOX, ERICKA JAMES, JOY HOCUT, and CAROLINE BOYD-ROGERS, *Rhodes College* –

Although memory is typically better for single items than for associations (e.g., words versus word pairs), this difference is often larger for older adults compared to younger adults (i.e., the associative deficit hypothesis; Naveh-Benjamin, 2000). The current study examined the extent to which the associative deficit is modulated by the emotional valence and relative importance of the stimuli. Specifically, young and older adults studied lists of word pairs that were positive, negative, or neutral in valence. Additionally, word pairs were assigned either low or high point values that would be earned if subsequently remembered on the item and association recognition tests following each list. The difference between item and associative memory was reduced for positive versus negative stimuli and for high value versus low value stimuli in both age groups. However, older adults' memory for associations benefited most for word pairs that were both positive and high value.
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6:00-7:30 PM (5076)

Spontaneous and Voluntary Cognitions Across the Lifespan. GEORGIA ARISTI FLORIDOU, *University of Sheffield*, ANDREA HALPERN, *Bucknell University*, LIA KVAVILASHVILI, *University of Hertfordshire*, VICTORIA WILLIAMSON, *University of Sheffield* (Sponsored by Andrea Halpern) – Patterns of spontaneous and voluntary cognition characteristics are altered in the elderly. However, there is no agreement on how characteristics such as frequency, vividness, and emotional valence manifest across the lifespan. In this study, we explore this question across a wide range of cognitions and ages. A sample of 679 participants between the ages of 18 and 90 completed an online battery of questionnaires about spontaneous and voluntary forms of mind wandering, autobiographical and semantic memories, and musical mental imagery. Results indicate that as age increases, the frequency of spontaneous and voluntary cognition decreases. Vividness and emotional valence are not associated with age. The findings seem robust as they agree with the majority of previous research. Implications are discussed for theories related to attentional mechanisms, individual differences, and affective wellbeing associated to the ever-present stream of spontaneous and voluntary thoughts in younger and older adults.
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6:00-7:30 PM (5077)

Creating the Creative: What Distinguishes Highly Creative Younger and Older Adults. MICHELLE L. HUGHES, PHILIP A. ALLEN, and SARA LUTE, *University of Akron*, JAMES R. HOUSTON, *Middle Tennessee State University* (Sponsored by Philip Allen) – Fifty older adults (25 female and 25 male) and 50 younger adults (29 females and 21 males) were tested using a creativity assessment (Torrance Test of Creative Thinking – verbal), broken into three subscores (fluency, flexibility, and originality) and several inhibitory control and executive function measures (Stroop task, flanker task, Barratt Impulsiveness Scale – 11). Results indicated no age differences in creativity scores despite differences in congruency effects favoring younger adults for the Stroop task. There was an effect of gender on creativity scores, such that women outperformed men on all subscores of creativity. Furthermore, when examining these gender differences in each respective group, the gender effect was only persistent in the older adult group. These results suggest that there may be an underlying cognitive advantage for females, especially older females, that facilitates creative performance that remains to be explored.
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6:00-7:30 PM (5078)

Effects of Motivation on Task Performance and Choice of Task Demand. HYOSEOK BANG, YOON KYUNG LEE, JAE HYEON LEE, and SOWON HAHN, *Seoul National University* – We investigated age differences in avoidance of cognitive demand and actual effort expenditure. Both younger and older participants were divided into low and high motivation groups. Motivation was manipulated by presenting ego involvement and pre-decision accountability. Both groups performed demand selection tasks (DST), in which participants chose whether to perform a low or high demand stop-signal task (SST). The selection was repeated 25 times and participants rated their economic preference for each SST. This rating was used as a measure of their subjective cognitive cost of the tasks. The results showed that both younger and older participants in high motivation group chose high demand task more frequently than participants in low motivation group. However, the performance of SST showed that group difference in older adults was larger than that of younger adults. Our results provide evidence that motivation can have a differential impact on effort avoidance and cognitive performance.
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6:00-7:30 PM (5079)

Testing Older Adults Online vs. in the Lab: Do We Get the Same Results? ANDRÉE-ANN CYR, KRISTOFFER ROMERO, and LAURA GALIN-CORINI, *York University, Glendon Campus* – Interest in online testing in experimental psychology has increased sharply in recent years, with many online studies finding comparable results to those obtained in laboratory settings. However, adoption of online cognitive testing in neuropsychology and cognitive aging is lagging. In this study, we validated the use of online testing as a tool for behavioural cognitive research among healthy older adults. We used a within-subjects design to examine the performance of 32 older adults on tasks measuring associative memory and attentional control in an unmonitored setting (at home) and in a monitored setting (in the lab). We found similar levels of performance regardless of testing location. Results are discussed in the context of familiarity and attitudes surrounding computer use. These findings have relevance for researchers and clinicians looking to develop online neuropsychological tools to facilitate data collection and assessment.
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6:00-7:30 PM (5080)

The Effect of Emotional Responsivity on Name Retrieval Varies Across the Lifespan. MEREDITH A. SHAFTO, *University of Cambridge*, LISE ABRAMS, *Pomona College*, LORI E. JAMES, *University of Colorado, Colorado Springs* – Recent

research (James et al., 2018) has demonstrated a link between self-reported anxiety symptoms and tip-of-the-tongue states (TOTs) which changes with age: Moderate levels of anxiety increase TOTs in older adults but decrease TOTs in middle-aged adults. To better understand the role of attentional control in these relationships, the current study used the same Cam-CAN lifespan cohort to investigate emotional responsiveness and its ability to predict automatic versus attentionally-demanding component processes involved in word retrieval. Participants (aged 18-87) rated their positive and negative emotional reactions to valenced videos and also completed a TOT-inducing task in which they attempted to name faces of public figures. Results indicated that older adults' performance benefitted from increased levels of emotional responsivity. We discuss the conditions under which name retrieval is supported versus impaired in terms of linguistic and attentional demands.
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6:00-7:30 PM (5081)

Task Difficulty Modulates Age-Related Differences in the Behavioral and Neural Bases of Language Production. HAOYUN ZHANG, ANNA EPPES, and MICHELE T. DIAZ, *Pennsylvania State University, University Park* – Older adults typically show decline in language production, with corresponding age-related increases in fMRI activation. However, it remains unclear whether such increases are compensatory or whether they reflect neural decline. The current study investigated the effect of task difficulty on age-related differences in the behavioral and neural bases of language production and inhibitory control. Twenty older and 20 younger adults were tested on a phonological Go – No-Go picture naming task. Task demands were manipulated by varying the proportion of naming trials (Go trials) and inhibition trials (No-Go trials) across runs. All participants showed task-difficulty related declines in behavioral performance and increases in fMRI activation. However, these differences were larger for older adults. Interestingly, relating the increases in fMRI activation to behavioral performance revealed that different brain regions showed discriminative compensatory function or neural decline for naming trials and trials requiring language inhibition, particularly at lower levels of task-difficulty. These findings are largely consistent with the CRUNCH model, highlighting the important influence of task difficulty on patterns of activation.
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6:00-7:30 PM (5082)

Using Speech Production to Detect Cognitive Decline. RACHEL OSTRAND, *IBM Research*, JOHN GUNSTAD, *Kent State University* – Alzheimer's Disease (AD) affects millions and has no known cure, making early detection and tracking important. In addition to memory impairments, AD causes substantial changes in speech production, especially in semantic specificity. Here we assessed whether lexical-semantic features of older adults' free speech predict their cognitive status. Older adults produced several monologues (picture description, story retelling, expository descriptions) and were administered a neuropsychological battery, including the Modified Mini Mental State Exam (3MS), a measure of cognitive status used clinically to identify dementia. Some participants returned a year later for similar speech and cognitive assessments. Lexical-semantic features of participants' speech (including lexical frequency, diversity, and content words) significantly correlated with cognitive status at the same visit, and trended toward a correlation with cognitive status one year later. Thus, speech reflects both concurrent and future cognitive status, and could be a proxy for more time- and training-intensive clinical measures for AD assessment.
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6:00-7:30 PM (5083)

Examining Age-Related Differences in the Ability to Detect Subtle Advertisements in Real-World Media. RAHELEH SARYAZDI, YVETTE HOU, and CRAIG G. CHAMBERS, *University of Toronto* (Sponsored by Craig Chambers) – Although aging entails declines in attention, memory, and processing speed, language abilities are comparatively stable. To what degree are these patterns apparent in naturalistic activities, rather than standard experimental paradigms? We explore this using a real-world task involving multiple aspects of cognition, namely distinguishing advertisements from the main content in a given medium. Younger and older adults were instructed to detect advertisements in webpages (visual) or short radio clips (auditory), all selected from real-world sources. Ads were either traditional or "native" ads, which deceptively blend into their respective media. Whereas older adults were less accurate in detecting visual ads, accuracy was similar across age for auditory ads (which depend on language abilities to a greater extent). RTs showed both age groups were slower in detecting native ads, with the greatest penalty for older adults in the visual task. The results confirm current accounts of specific domains affected in cognitive aging.
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6:00-7:30 PM (5084)

Retroactive Effects of Memory in Older and Younger Adults: The Role of Remembering Change. SYDNEY M. CODY and CHRISTOPHER N. WAHLHEIM, *University of North Carolina at Greensboro* (Sponsored by Lauren Richmond) – Older adults are more susceptible to proactive interference than younger adults, partly because they detect and recollect fewer changes (Wahlheim, 2014). Two experiments examined whether such differences are present in retroactive effects of memory. Participants studied two lists of word pairs and then completed a cued recall test of List 1 pairs. Participants reported when they recollected changes at test (Experiments 1 and 2) and when they detected changes in List 2 (Experiment 2). List 1 recall was higher for older and younger adults when they detected and recollected changes than when they detected but did not recollect changes. Age-related differences in recall for changed items was partly due to differences in detecting and recollecting changes. Unexpectedly, older adults performed better on List 1 recall, which reflected their greater susceptibility to proactive

interference during List 2. The results indicate separate roles for integrative item-level encoding and list-level interference in retroactive effects of memory.
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6:00-7:30 PM (5085)

Fool Me Once: How Schematic Support and Test Order Alter Strategic Retrieval Processes. JACK KUHNS and DAYNA R. TOURON, *University of North Carolina at Greensboro* – Despite age-related differences in associative memory, participants can utilize schematic support or prior knowledge to aid encoding and retrieval for schema-consistent pairs. Typical findings show that older adults' memory is equated to young adults' for schema-consistent pairs, but worse for schema-inconsistent pairs (e.g., Castel, 2005). Differences in young adults' memory in this vein has received less attention. Young adults' strategic retrieval processes can vary depending on schematic support (Amer, Giovanello, Campbell, & Hasher, 2018; Kuhns & Touron, in prep), but these patterns may vary with the type of test (cued-recall or associative recognition) and test order. Successful retrieval requires the use of controlled retrieval processes for schema-inconsistent pairs, whereas familiarity may be sufficient for schema-consistent pairs. Early data show that testing order interacts with schematic support, with memory for schema-inconsistent pairs impaired following a recognition test for schema-consistent pairs, but not vice versa. We will examine memory for schematic pairs in cued-recall and recognition with varied test order, and will consider the nature of strategic processes required for successful performance in each.
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6:00-7:30 PM (5086)

Differentiating Autobiographical Memory Performance in Healthy and Unhealthy Aging. SARAH L. PETERS and SIGNY SHELDON, *McGill University* (Sponsored by Caroline Palmer) – Autobiographical knowledge is organized in a hierarchy such that representations of past experiences can be dynamically retrieved at different levels of abstraction – as specific episodes and as generalized concepts. Here, we propose the novel hypothesis that the ability to access autobiographical memories from different levels of this hierarchy can distinguish healthy from unhealthy cognitive aging at early stages of impairment. To test this, healthy older adults and those exhibiting early signs of cognitive decline, assessed via the Montreal Cognitive Assessment (MoCA), retrieved multiple memories in response to cues that promoted access to the autobiographical hierarchy at a conceptual or specific/perceptual level. Participants then selected a single retrieved memory to describe in detail. Unhealthy older adults were significantly impaired both at retrieving and describing memories to specific/perceptual cues but performed equally to healthy older adults when retrieving and describing memories to conceptual cues. These results suggest that the ability to access autobiographical knowledge using a perceptually driven or 'bottom-up' approach is disproportionately impacted in unhealthy as compared to healthy aging.
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6:00-7:30 PM (5087)

What Do Old Adults Recollect in Life Review? Content Analysis of Autobiographical Narratives According to the Criteria on Episodic Description, Integrative Interpretation, and Feelings. AYA HOSOKAWA and MAKIKO TOMIDA, *National Center for Geriatrics and Gerontology* – Autobiographical memory is considered the momentous self-related memory across the lifespan. It consists of components of episodic description, integrative interpretation, and feelings: Momentous memories are likely not only to be entailed with vivid details but also represented with interpretative interpretations by making meanings, learning lessons and insights, and feelings. These components have functions related to self, social relations, directions, and so on. The purpose of the current study was to explore how momentous memories in life review were represented to elucidate the function of each component in cognitive aging. Autobiographical narratives across the lifespan recollected by old adults in group reminiscence were evaluated by content analysis according to the criteria on episodic description, integrative interpretation, and feelings. Momentous memories in the early life stage were more likely to be represented with episodic descriptions whereas integrative interpretations and feelings were more frequently represented in the middle and the later life stages.
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6:00-7:30 PM (5088)

Metacognitive Efficiency and Associative Memory in Younger and Older Adults. ALEXANDRIA C. ZAKRZEWSKI, *U.S. Air Force Research Laboratory*, EDIE SANDERS and JANE M. BERRY, *University of Richmond* – Research has shown metacognitive accuracy (i.e., how well monitoring judgments match performance) to be stable across age groups, despite older adults' decline in memory. Research on the associative deficit hypothesis (ADH; Naveh-Benjamin, 2000) indicates an age-related impairment for memory of paired stimuli. The current study tested the relationship between memory and trial-by-trial confidence ratings on item (individual words) and associative (word pairs) memory tests. As expected, memory performance was worse for older than younger adults and was consistent with previous demonstrations of the ADH. We calculated metacognitive efficiency, or meta-d'/d', which captures how well confidence ratings discriminate between correct and incorrect judgments given one's performance level (Maniscalco & Lau, 2012). Despite age differences on recognition accuracy, age groups had equivalent meta-d'/d'scores, replicating previous work. Interestingly, metacognitive efficiency was better for associative memory than item memory. Results are discussed in terms of theoretical relationships between metacognitive ability and associative recognition.
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6:00-7:30 PM (5089)

Are Age-Related Differences in Episodic Feeling-of-Knowing Accuracy due to a Lack of Recollection? MICHEL L. ISINGRINI, MATHILDE SACHER, LAURENCE TACONNAT, and BADIN BOUAZZAOUI, *University of Tours* – Using a cued recall task, we examined whether age-related-

differences in episodic feeling-of-knowing accuracy linked to an unrecalled target may be related to recollection and/or familiarity. We used the online remember-know-no memory procedure combined with the episodic FOK procedure, for which three measures of FOK accuracy can be identified, based on recollection, familiarity, and no memory. The results indicated that patterns of R and K responses were similar to what has been observed in recognition task in the presence of a target already recognized. FOK accuracy was higher for R and K responses than for N responses, and, consistent with the noncriterial recollection hypothesis of episodic FOK, FOK accuracy was related significantly more to recollection than to familiarity. Age-related effect on FOK accuracy was mainly limited to FOK recollection-based. This is accounted by an age-related lack of effectiveness of the partial information recollected by older adults compared to young adults.
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6:00-7:30 PM (5090)

Examining Metacognitive Differences in Older and Younger Adults During a Working Memory Task. SABRINA BHANGAL and SARAH J. BARBER, *San Francisco State University* (Sponsored by Sarah Barber) – We examined younger and older adults' metacognitive accuracy of their working memory performance on a trial-by-trial basis. To do so, participants completed a working memory task. During the letter-cueing blocks, participants saw letter pairs (A / B). After a brief delay they received one of the letters as a cue (A) and were asked to respond either with the congruent (A) or incongruent (B) letter. During the spatial-cueing blocks, participants again saw letter pairs (A / B). They then received a spatial cue (* /) and were asked to respond either with the spatially-congruent (A) or spatially-incongruent (B) letter. After each response participants also rated their subjective urge to commit an error. Results showed that older adults made more errors and had slower responses, particularly during incongruent trials. This is consistent with age-declines in inhibitory control. Interestingly, metacognitive ratings were related to response times, particularly for older adults.
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6:00-7:30 PM (5091)

Electrophysiological Correlates of Successful Memory Encoding Sustain the Hypothesis of a Deficit in Self-Initiated Encoding Strategies in Aging. BADIÂA BOUAZZAOUI, LUCIE ANGEL, and SÉVERINE FAY, *University of Tours*, MATHILDE SACHER, *University of Toulouse*, CHARLOTTE FROGER, *University of Tours*, RADOUANE EL YAGOUBI, *University of Toulouse*, LAURENCE TACONNAT, *University of Tours* – Episodic memory decline with aging may be due to age-related deficit in encoding processing. Indeed, numerous studies have reported that older adults have difficulty to initiate effective encoding strategies that support later recollection. The present study explored the neural correlates of successful encoding in young and older adults using event-related potentials (ERPs) by contrasting the neural activity elicited by study items subsequently recalled with those that are forgotten (Subsequent Memory effect, SMe). Young and older adults were instructed to encode word lists for a subsequent free recall test. At a behavioral level results confirmed that younger adults outperformed older adults in memory performance. Electrophysiological data revealed that ERPs elicited by recalled items were greater than those for forgotten items. In the 700-1000 ms time window, this SMe was significant in the younger group at bilateral parietal and frontal locations whereas older adults showed no evidence of significant SMe. This pattern suggests that when the memory task requires to self-initiate encoding strategies older adults engage less specific encoding processes than young adults resulting in impaired episodic memory performance.
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6:00-7:30 PM (5092)

Age Differences in Memory Precision Across Different Study-Test Delays. STEPHEN RHODES, EMILY ABBENE, and MOSHE NAVEH-BENJAMIN, *University of Missouri* – Age differences in short-term and long-term memory performance are typically assessed with paradigms that differ in a number of qualities, in addition to delay. This makes comparison, and the search for potential commonalities in age-related memory decline across short and longer delays, difficult. The present study used a continuous recall task in which study/test events were intermixed, allowing memory to be probed following different lags. At test, participants had to reproduce the precise studied location of an object. Recall error was used as an analog measure of performance, offering greater insight than typical binary choice responses and allowing us to separate responses into distinct sources of error. Error increased markedly with delay and particularly so for older adults. This appeared to be driven primarily by complete information loss and guessing, whereas object-location misassociations made a slight contribution. We relate these memory measures to neuropsychological measures of medial-temporal and frontal functioning.
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6:00-7:30 PM (5093)

Age-Related Changes Across Time in Verbatim and Gist Memory for Face-Scene Pairs. NATHANIEL R. GREENE (Graduate Travel Award Recipient) and MOSHE NAVEH-BENJAMIN, *University of Missouri* (Sponsored by Moshe Naveh-Benjamin) – Older adults typically perform worse than younger adults on associative memory tests. From a Fuzzy Trace Theory perspective, this age-related associative memory deficit may reflect an inability to access the verbatim representation formed at encoding, as older adults often process the gist-based representations when real-world, pre-existing schematic support is available. However, some associative representations, such as face-scene pairs, may not necessarily activate any specific pre-existing schemas, so the gist of these associations must be formed alongside the verbatim at encoding. We assessed whether older adults' associative memory deficit for face-scene pairs is restricted to the verbatim representation or if it extends also to the gist representation by measuring verbatim- and gist-memory trace strength over variable delays in both younger and older adults. Although older adults demonstrated deficient

verbatim memory for face-scene pairs, their gist memory was equivalent to that of younger adults and remained stable across time.
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6:00-7:30 PM (5094)

Age-Related Deficits in Episodic Memory: Insights From a Dual-Process Analysis and Individual Differences in Neuropsychological Function. ANJALI THAPAR and ALLEN OSMAN, *Bryn Mawr College* – Episodic memory performance declines with advanced age to a greater degree on tasks requiring access to contextual details. In dual-process accounts (e.g., Jacoby, 1999; Yonelinas, 2002), episodic memory is supported by familiarity- and recollection-based processes, with memory for context dependent on recollection. The disproportionate loss of memory for context is attributed to a greater loss of recollection than familiarity with age. To test this explanation, the current study examined the effects of age, as well as individual differences in neuropsychological functioning, on estimates of recollection and familiarity. Participants (150 young and 150 older adults) completed neuropsychological tests sensitive to frontal lobe (FL) and medial temporal lobe (MTL) functioning and performed an associative memory task. Estimates of recollection and familiarity were obtained from task performance using a process-dissociation procedure. Results indicate that recollection was influenced by FL score, MTL score, and age, whereas familiarity was influenced by age alone. The results disentangle the effects of aging on episodic memory from age-independent effects of FL and MTL functioning and inform theories of age-related memory deficits.
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6:00-7:30 PM (5095)

Executive Functions Involved in Affective Theory-of-Mind in the Elderly. YUKI OTSUKA, *Kyoto University*, MIHO SHIZAWA, *Kyoto Prefectural University of Medicine*, AYUMI SATO, *Shimane University*, SHOJI ITAKURA, *Kyoto University* – Vetter et al. (2013) found that only inhibition significantly explained variance in the performance of affective theory of mind among three subcomponents of executive functions (inhibition, updating, and shifting) in young people. Executive functions are known to decline by aging, but it is not entirely clear whether aging change the relationship between affective theory of mind and executive functions or not. We examined the association between affective theory of mind and three subcomponents of executive functions in the elderly. We performed multiple regression analysis of the performance in affective theory of mind task, using the indexes of three executive function (inhibition, updating, and shifting) tasks as predictors. We found that only inhibition contributed significantly to the variability in the performance of affective theory of mind in the elderly. Our results indicate that inhibition would be important for affective theory of mind among three subcomponents of executive functions even after executive functions decline by aging.
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6:00-7:30 PM (5097)

Dual Tasking of a Rhythmic Motor and Cognitive Task Deteriorates Performance of Both Tasks in Older Adults. KRYSTAL KIRBY and AREND VAN GEMMERT, *Louisiana State University*, SREEKRISHNA RAMAKRISHNAPILLAI, ROBERT BROUILLETTE, JEFFREY KELLER, and OWEN CARMICHAEL, *Pennington Biomedical Research Center* (Sponsored by Arend Van Gemmert) – Execution of cognitive tasks during walking, driving, and other motor activities is common in older adults but task performance effects on execution of these dual-tasks (DT) in this population are not fully understood. 42 cognitively healthy older adults aged 61 to 91 (33 female) completed a cued rhythmic finger tapping and AX – Continuous Performance Task (AX-CPT) separately (i.e., single-task or ST), and simultaneously (DT). Finger tapping cadence was greater ($p < 0.001$), and consistency of tapping cadence was lower ($p<0.001$) in DT compared to ST. AXCPT accuracy was significantly less ($p < 0.001$), and reaction time significantly greater ($p<0.05$) in DT compared to ST. In older adults, performance of both cognitive and continuous motor task performance deteriorates substantially when performed as a dual-task. Reduced motor task performance in a dual-task setting could contribute to falls during distracted walking or accidents during distracted driving.
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6:00-7:30 PM (5098)

Declarative, Nondeclarative, Working, and Short-Term Memory From 5 to 89 Years of Age. HASKER DAVIS, *University of Colorado, Colorado Springs*, ANA LEVY, *CogQuiz, LLC*, ROBERT DURHAM and DAMON TOMLIN, *University of Colorado, Colorado Springs* – Four purportedly different forms of memory (Declarative, Nondeclarative, Working, and Short-term Memory) in either a verbal or visuo-spatial mode were administered to individuals (N = 629) from 5 to 89 years in 10 age groups (5-9, 10-14, 15-19, 20s, 30s, 40s, 50s, 60s, 70s, 80s). The dependent variables for each memory test were converted to z-scores with positive scores indicating better performance. The tasks for declarative memory were verbal recall and a spatial location task, for nondeclarative memory a word stem priming task and the Tower of Hanoi task, for working memory verbal and location n-back tasks, and for short-term memory immediate letter sequence recall and visual span forward. A repeated measures ANOVA with test mode (2) and memory type (4) as within factors and age group (10) as the between factor was performed. A significant effect of age group was detected, ($F 9,619 = 50.9$; $p < .001$). A significant memory type x age group was also detected,($F 27,1857 = 5.18$; $p < .001$). The three-way interaction was significant but not meaningful. Declines in performance on the nondeclarative memory tasks were detectable by the 50s but were not affected as much by aging as the other types of memory (i.e., showed less decline).
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6:00-7:30 PM (5099)

Use of Redundant Multimodal Stimuli to Facilitate Associative Memory in Older Adults. REED DECKER and MOSHE NAVEH-BENJAMIN, *University of Missouri* (Presented

by Moshe Naveh-Benjamin) – The cognitive permeation hypothesis states that the correlation between sensory ability and age-related cognitive decline is due to increased cognitive resources needed in the aged to correctly perceive stimuli. Prior research has also shown that degraded stimuli can be perceived more easily when presented in multiple sensory modalities. If this is the case, we expect that use of multimodal presentation will lead to better associative memory, though not item memory, for older adults. In the present study, we tested item and associative memory of younger and older adults for study lists of unrelated pairs in either a visual, auditory, or audiovisual format. Half of all word pairs were degraded via reduction of color contrast and/or increase in auditory noise, depending on sensory modality. Results indicate the presence of a multimodal gain in older adults' associative memory for degraded stimuli, which is not shown in item memory.
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REASONING AND JUDGMENT

6:00-7:30 PM (5100)

Understanding Biases in Decision Making: A Latent Variable Approach of Memory and Judgments of Likelihood. ROSALIND NGUYEN and MICHAEL DOUGHERTY, *University of Maryland, College Park* (Sponsored by Michael Dougherty) – Many of the decisions we make depend on how likely we think that decision would lead to a certain desired state of the world. Further, the perceived likelihood of a certain state of the world is influenced by the consideration of alternative states of the world. Cognitive models of judgment and decision making suggest that an individual's memory ability plays a crucial role in the variance of likelihood estimates. This may be explained by the number of alternatives one is able to generate and consider. In this project, I present data from 2 studies that suggest that the likelihood estimate of a to-be-judged item may be influenced by the distribution of the alternative items and that different aspects of memory differentially relate to different judgment types. Results imply that the perceived likelihood of an event may be influenced by the number of alternative events one considers. Further, these alternatives may be constrained by memory retrieval processes.
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6:00-7:30 PM (5101)

Exploring Time Distortion in Virtual Reality. WILLIAM G. VOLANTE, JESSICA CRUIT, JAMES TICE, WILLIAM SHUGARS, and PETER A. HANCOCK, *University of Central Florida* – Two studies were run on the HTC Vive to provide insight into the relationship between time perception and flow in a virtual environment. In Experiment 1 participants played a music-oriented virtual game for 2 minutes, while in Experiment 2 participants played a space-shooter virtual game for 5 minutes. Duration Judgment Ratio (DJR) and Flow State Scale (FSS-2) measures were taken and assessed with one another. In both Experiment 1 and 2 a relationship between DJR and Flow was not found. DJR scores were significantly higher in Experiment 2 compared to Experiment 1, by almost twofold. Similarly, overall Flow scores were significantly higher in Experiment 2 compared to Experiment 1. Insights gained from the comparison of the two experiments provide additional understandings of time perception. Applications focus on the further understanding of time perception as it relates to Flow, virtual environments, and the length of time one is experiencing such states.
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6:00-7:30 PM (5102)

Psychological Opportunity Cost. ITAY SISSO, *Hebrew University of Jerusalem*, FANNY BRUN, *University of Zurich*, RETO ODERMATT, *Booth School of Business - Chicago*, BENJAMIN SCHEIBEHENNE, *University of Geneva* (Sponsored by Benjamin Scheibehenne) – A fundamental assumption in economics is that opportunity costs are only relevant in the decision-making process. In this study, we consider the possibility that the opportunity costs created by the forgone alternative may reduce the experienced utility from consumption of the selected option, even when the forgone alternative is inferior to the selected one (i.e. without experiencing regret). We denote the extent to which opportunity costs matter for post-choice utility as psychological opportunity costs (POC) and hypothesize that POCs are positively related to the utility of the non-chosen alternative. Furthermore, while opportunity costs are defined as the value of only the best forgone alternative when making a decision, we hypothesize that POCs could also be influenced by the number of forgone alternatives. We test these predictions in 3 experiments and find that post-choice satisfaction is indeed significantly reduced with increasing opportunity costs, operationalized as an inferior (albeit desirable) forgone option(s). In sum, we find evidence for the existence of POCs that cannot entirely be explained by alternative explanations such as regret or decision difficulty, and identify some moderators of the effect.
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6:00-7:30 PM (5103)

Fluency Effects on Risk Perception Are Driven by the Processing Experience, Not the Stimulus. MADELINE JALBERT, *University of Southern California*, ERYN NEWMAN, *Australian National University*, NORBERT SCHWARZ, *University of Southern California* (Sponsored by Norbert Schwarz) – Familiar stimuli are perceived as safer than novel ones. One variable that increases perceived familiarity is ease of processing. Hence, food additives with easy to pronounce names seem safer than ones with difficult to pronounce names (Song & Schwarz, Psych Scie, 2009). Bahník and Vranka (Psych Scie, 2017) replicated this finding with the original stimuli but did not obtain it with other stimuli, suggesting that it "might be limited only to the original items." We test the role of a key methodological difference: Song and Schwarz alternated between easy and hard to pronounce words, resulting in large changes in processing fluency from item to item, whereas Bahník and Vranka randomly sampled from words with a wide range of pronounceability, resulting in smaller fluency changes from item to item. When Bahník and Vranka's stimuli are presented in a sequence that matches the fluency variation of the original study, a significant fluency effect emerges with

their words. Whether a word elicits a fluency effect depends on its fluency in context, not on characteristics of the word in isolation, consistent with the general observation that perceivers are more sensitive to changes in processing experience than to its absolute level.
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6:00-7:30 PM (5104)

Exploring Why Choosing Reduces Judgment Accuracy. ABA SZOLLOSI, CHRIS DONKIN, and BEN R. NEWELL, *University of New South Wales* (Sponsored by Balazs Aczel) – In uncertain environments, people need to judge the probabilities of possible events in order to make advantageous choices. Yet it seems that the act of choosing reduces the accuracy of probability judgments about those events: people provide less accurate judgments when they simultaneously choose and provide judgements, compared to when they only provide probability judgments. Here, we tested whether this effect is the result of the additional attentional resources that the choice task requires. Therefore, we introduced a condition in which we substituted the choice task with an unrelated memory task. We compared people's probability judgments in the resulting three conditions: simultaneous choice and judgment; unrelated memory task and judgment; and judgment only. Experiment 1 showed that judgment accuracy in the unrelated memory task condition was more similar to that of the judgment only condition; however, in Experiment 2 it was more similar to that of the simultaneous choice and judgment condition. Potential explanations for the discrepant results are discussed.
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6:00-7:30 PM (5105)

Psychological Engagement in Choice and Judgment Under Risk and Uncertainty. MICHELE BUONTEMPO and PETKO KUSEV, *The University of Huddersfield*, VICTORIA BARANOVA, *Lomonosov Moscow State University*, RENATA HEILMAN, *Babeș-Bolyai University* – Theories of choice and judgment assume that agents behave rationally, choose the higher expected value option, and evaluate the choice consistently (Expected Utility Theory, Von Neumann, & Morgenstern, 1947). However, researchers in decision-making showed that human behaviour is different in choice and judgement tasks (Slovic & Lichtenstein, 1968; 1971; 1973). In this research, we propose that psychological engagement and control deprivation predict behavioural inconsistencies and utilitarian performance with judgment and choice. Moreover, we explore the influences of engagement and control deprivation on agent's behaviours, while manipulating content of utility (Kusev et al., 2011, Hertwig & Gigerenzer 1999, Tversky & Khaneman, 1996) and decision reward (Kusev et al, 2013, Shafir et al., 2002).
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6:00-7:30 PM (5106)

The Effect of Source on Judgment Change for Health Decisions. TALIA ROBBINS and PERNILLE HEMMER, *Rutgers University* (Sponsored by Pernille Hemmer) – How do people make health judgments based on evidence from different sources (e.g. doctor vs. online health resource) and are health decisions different from decisions in other domains (i.e. car problems)? Normative models assume that people make decisions with advice by averaging advice with previous personal judgments, while descriptive models suggest that people show egocentric biases, overweighting their own judgments relative to advice. These models however, ignore people's expectations for the quality of the source. We asked people to make a judgment about the likelihood of a problem given symptoms, and then measured the change in their judgment after new evidence was presented. Results show greater judgment change from experts than from online resources or past symptom experience. Finally, we implemented a Bayesian model assuming judgment as a linear weighted combination of initial judgments and source information, weighted by expectations for the quality (confidence) of each piece of information.
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6:00-7:30 PM (5107)

Autonomous Self-Driving Cars: How Enhanced Utilitarian Accessibility Alters Consumer Purchase Intentions. ROSE MARTIN and PETKO KUSEV, *The University of Huddersfield*, PAUL VAN SCHAIK, *Teesside University* – Autonomous vehicles (AVs) are anticipated to prevent approximately 90% of road accidents (Fagnant & Kockelman, 2015), however, there will still be occasions where AVs face unavoidable collisions. Yet, AVs can be pre-programmed to make split-second life-saving decisions. Nonetheless, the question remains as to whether they should be programmed to maximise the number of lives saved (utilitarian) or protect the passenger at all costs. Importantly, experimental research by Bonnefon et al. (2016) revealed a 'social dilemma' – where respondents exhibit a preference for other people to own utilitarian cars but want to purchase protective cars for themselves. Here we argue that this result was simply an artefact of limited accessibility to utilitarian information (Kusev et al., 2016; Martin et al., 2017). Accordingly, our research reveals that accessibility (agency involvement) to utilitarian information predicts respondents moral and purchasing judgments about utilitarian and passenger protective AVs for others and themselves (agency type).
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6:00-7:30 PM (5108)

The Future of Luck. MEGHAN M. SALOMON-AMEND, *Northwestern University* (Sponsored by Lance Rips) – Events like winning the lottery are random: one's likelihood of winning now is no different from one's likelihood of winning in a week. Here, participants were asked to consider these luck-based events, and whether their likelihood of success would change over time. Participants indicated that the likelihood of success at these luck-based events improves over time. This may be due to participants' implicit belief that luck-based events involve skill. In a second experiment, participants were asked to predict success for themselves and others at both skill- and luck-based events. Indeed, participants recognized that skill-based events should show steep (quadratic) improvements over time. However, the improvement over time for luck-based events

persisted, suggesting that participants don't fully distinguish between luck- and skill-based events when predicting future occurrences.
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6:00-7:30 PM (5109)

Establishing Judgment Policies in the Absence of Feedback. TJASA OMERZU, *University of Konstanz*, MAARTEN SPEEKENBRINK, *University College London*, JANINA ANNA HOFFMANN, *University of Konstanz* (Sponsored by Beetina von Helversen) – In daily judgment situations, for instance, when employees prioritize daily duties according to urgency and importance, individuals often evaluate the object under consideration based upon subjective standards without receiving objective feedback. Our study aimed to disentangle which statistical properties of the environment attract people's attention in the absence of feedback and to infer the degree to which participants jointly consider several pieces of information. The results suggest that on average participants developed highly consistent judgments during the experiment but judged the same stimuli less consistently in conditions in which the cues provided less variable information. The analysis also revealed that participants weighted all cues equally in their judgment and, as suggested in a follow-up study, those judgments were picked up successfully by another person - though not to the same level of consistency. Taken together, these results suggest that participants formed consistent judgments even in the absence of feedback by integrating multiple pieces of information.
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6:00-7:30 PM (5110)

Dissent Among Scientists Harms the Public's Ability to Differentiate Strong and Weak Evidence. ETHAN A. MEYERS, MICHAL BIALEK, MARTIN H. TURPIN, DEREK J. KOEHLER, and JONATHAN A. FUGELSANG, *University of Waterloo* (Sponsored by Jonathan Fugelsang) – We tested whether reported policy support for and belief in an environmental issue would differ depending on whether the conclusion of the research was said to be from a single study (weaker evidence) versus a line of research (stronger evidence). We also examined whether discrimination between weaker and stronger evidence was affected by the level of scientist consensus regarding the quality of the research in question. We found that when scientific consensus was unanimous (either 100% or not listed) people placed greater weight on conclusions from a line of research as opposed to a single study. In the presence of even modest disagreement (imperfect consensus), however, participants failed to discriminate weaker from stronger evidence. We suggest that disagreement among scientists negatively impacts the public's ability to evaluate the quality of scientific evidence.
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6:00-7:30 PM (5111)

The Good, the Bad, and the Manipulative: An Initial Investigation Into the Effectiveness of Doublespeak. ALEXANDER C. WALKER, ETHAN A. MEYERS, MARTIN H. TURPIN, JENNIFER A. STOLZ, JONATHAN A. FUGELSANG, and DEREK J. KOEHLER, *University of Waterloo* (Sponsored by Derek Koehler) – Doublespeak is a form of deceptive language that makes the unpleasant seem pleasant, the unethical seem righteous, and the horrific seem acceptable. While the use of doublespeak in real-world scenarios, such as politics, advertising, education, science, and business has been well documented, few empirical investigations have been conducted. Across multiple experiments, we presented participants with plain language and doublespeak descriptions of actions and had them rate their level of agreement with each action. We find that substituting in a single doublespeak term (e.g., enhanced interrogation) in replacement of a plain language term (e.g., torture) is effective in increasing peoples' agreement with disagreeable actions. Furthermore, doublespeak remains effective even when participants notice that deceptive language is being used and when they acknowledge the similar meaning of the plain language and doublespeak statements in a direct comparison. Overall, the current study represents an initial foray into the study of doublespeak, a real and consequential phenomenon.
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6:00-7:30 PM (5112)

Differential Influence of Integral Affect and Incidental Affect on Attractiveness Judgment of a Gambling Task. MIJIN KWON, YONG-EUN RHEE, and SOWON HAHN, *Seoul National University* (Sponsored by Sowon Hahn) – We used a simple gambling task (7/36 to win 9 $ and 29/36 to lose 5 ¢ or to win nothing) and investigated the differential influence of integral affect (affect relevant to the current task) and incidental affect (affect irrelevant to the task) on attractiveness judgment of the task. Previous research showed that the condition involving a loss was evaluated to be more attractive than the condition without a loss, which was significant only in the high-numeracy group. We hypothesized that integral affect can mediate this phenomenon that is caused by the comparison between win and loss and, it is stronger in the condition with a loss and in the high-numeracy group. We further hypothesized that integral affect modulates the influence of incidental affect on attractiveness judgment. Firstly, the mood of the participants with different numeracy level was manipulated to induce incidental affect. Participants then rated attractiveness of the gambling task of two conditions with or without a loss. Lastly, they reported how the attributes of the task made them feel, which was used as a measure of integral affect. Our results indicate that the influence of incidental affect on attractiveness judgment is reduced by stronger integral affect.
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6:00-7:30 PM (5113)

In-SANE for the Brain: Dualism and the Allure of Neuroscience. GWENDOLYN SANDOBOE and IRIS BERENT, *Northeastern University* (Sponsored by Iris Berent)

– People consider brain-based accounts of behavior more convincing than cognitive explanations. Here, we ask whether this phenomenon, the Seductive Allure of Neuroscience Explanations (SANE), is due to Dualism. We hypothesize that people prefer brain-based explanations because they offer a material explanation of behavior. Since cognitive traits are considered less material than sensorimotor traits, they should elicit a weaker SANE effect. Results showed that participants favored neuroimaging tests for sensorimotor disorders (e.g., auditory hypersensitivity), in line with the SANE effect. But when the description of the disorder underscored cognitive representations (e.g., theory of mind), no preference for neuroimaging obtained. In a follow up experiment, participants were asked to diagnose the disorders (rather than evaluate the test). Here, participants were more likely to diagnose cognitive disorders based on behavioral (compared to neuroimaging) tests. These results suggest that the allure of neuroscience depends on people's tacit beliefs concerning the material causes of behavior.

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6:00-7:30 PM (5114)

Effects of Presentation Format and Incidental Affect on Bayesian Inference. BONNIE ANDREA ARMSTRONG, ERIKA SPARROW, and JULIA SPANIOL, *Ryerson University* (Sponsored by Julia Spaniol) – Bayesian inference is difficult when probabilities are described verbally. Learning probabilities from experience facilitates Bayesian reasoning, but the mechanism remains unknown. Description and experience conditions typically differ not only in presentation format, but also in the information provided (probabilities vs. frequencies). The current study examined which of these factors is responsible for the experience advantage, by contrasting description and experience formats to a hybrid format in which frequency information is provided via description. Furthermore, the generality of format effects was tested through a manipulation of incidental affect. 165 younger adults completed a Bayesian inference task following random assignment to a format (description, experience, hybrid) x affect (stress, no stress) condition. Format significantly affected accuracy, with experience and hybrid formats producing higher performance than the description format, across stress and no-stress states. Critically, the experience and hybrid formats were matched, suggesting that information content rather than experience drives the "experience advantage."

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6:00-7:30 PM (5115)

Can Reasoning About Correlations With Salient Alternative Explanations Reduce Causality Bias? AUDREY MICHAL and PRITI SHAH, *University of Michigan* – People often erroneously interpret correlations (e.g., A is associated with B) as one-way causal relationships (A causes B). One way to reduce this causality bias is to teach people to generate alternative explanations for correlations, such as common third variable (C causes both A and B) or reverse causal models (B causes A). However, people struggle to generate these sorts of alternative explanations on their own. We asked if we could manipulate whether correlational scenarios lend themselves more easily to alternative explanations than others. Participants were asked to generate alternative explanations for sixteen fictional scientific reports describing correlational results that varied in difficulty and the most likely type of alternative explanation (third variable or reverse model). The frequency with which alternative explanations were provided varied systematically across scenarios. Thus, manipulating the salience of alternative explanations shows promise as a scaffolding tool for reducing causality bias.

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6:00-7:30 PM (5116)

The Coding of Internal Reference Information in Duration Discrimination. RUBEN ELLINGHAUS, KARIN BAUSENHART, and ROLF ULRICH, *Tübingen University* (Sponsored by Rolf Ulrich) – The Internal Reference Model explains assimilation effects in perceptual judgments by the formation of an internal reference which continuously integrates previous and current stimulus instances. This model predicts higher discrimination sensitivity when a constant standard precedes rather than follows a variable comparison (i.e., the Type B effect) in a Two-Alternative Forced-Choice (2AFC) task. The present study investigated the coding of the internal reference by varying a task-irrelevant stimulus attribute in a 2AFC duration discrimination experiment. Specifically, within each block the frequency of the auditory intervals either stayed constant at 400 or 1200 Hz, or alternated from trial to trial. The observed Type B effect did not meaningfully differ between these conditions. This suggests that the integration process either isolates the task-relevant information from other stimulus attributes or also integrates the task-irrelevant stimulus attributes. In any case, the variation of task-irrelevant information did not hamper the formation of the internal reference.

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6:00-7:30 PM (5117)

Thurstone's Method of Paired Comparisons for Social Values Revisited 91 Years Later: Evidence From Individual Data. YOONHEE JANG, *University of Montana*, HEUNGCHUL LEE, *Net Intelligence & Research* (Presented by Heungchul Lee) (Sponsored by Yoonhee Jang) – In 1927, Thurstone introduced his law of comparative judgment for measuring subjective magnitudes and applied the idea of psychophysical measurement in the field of social values. Ninety-one years later, we explored whether the method could yield an interval-scale ordering of items at the level of individual data (as well as group data, as originally demonstrated). Specifically, we replicated his scaling study of the judged seriousness of crimes/offenses. With the method of paired comparisons, 19 crimes/offenses were presented in 171 pairs (e.g., cheating – murder), and for each pair, participants were asked to decide which of the two is more serious (e.g., murder). The paired-comparison data were analyzed separately for each individual and summed over individuals. Results show consistency between group

and individual data analyses, which extends the validity and usefulness of his method at the individual level. We discuss applications of the method to the analysis of a summative scale.
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6:00-7:30 PM (5118)

Everyone's a Comedian: The Relationship Between Humor Styles, Humor Production, and Creativity. CHRISTOPHER C. SIMMONS and TRINA C. KERSHAW, *University of Massachusetts, Dartmouth* – While humor and creativity have been known to be linked constructs for some time, few studies have thoroughly examined the relationships between these constructs. Previous studies have explored only one type of humor or creativity, such as the association between production of cartoon captions and fluency or a positive association between several humor styles and figural fluency and flexibility. In the present study, participants completed a variety of humor and creativity measures, including humor production measures (cartoon captions, joke completion, and funny definitions), a humor styles questionnaire, verbal insight problems, the remote associates test (RAT), and the alternative uses test (AUT). Preliminary results indicated a positive relationship between an affiliative humor style and the RAT, and that a self-defeating humor style was a positive predictor of fluency and novelty of responses in the AUT. There was no relationship between insight problem solving and any of the humor styles.
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6:00-7:30 PM (5119)

Working Memory Capacity Predicts Multiply-Constrained Problem Solving: An Examination of Potential Mediators for This Relation. DEREK ELLIS and GENE BREWER, *Arizona State University* (Sponsored by Gene Brewer) – In the daily life of an individual, being able to understand and resolve complex problems is of vital importance. Certain problems are defined by the constraints inherent for the problem solver. Multiply constrained problems of this nature are traditionally examined with the compound remote associates task (CRAT). Performance on the CRAT is related to an individual's working memory capacity (WMC) suggesting reliable individual differences in multiply constrained problem-solving abilities. However, the nature of this relation is not fully understood. WMC ability is strongly related to several different cognitive abilities, such as attention control, controlled retrieval from secondary memory, and crystallized and fluid intelligence. This experiment has two primary goals 1) understand the underlying nature of the relations between WMC, attention control, controlled retrieval from secondary memory, intelligence, and multiply-constrained problem solving 2) determine the factors responsible for the WMC and problem-solving relation.
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6:00-7:30 PM (5120)

Basic Cognitive Processes of Intelligence: Bridging the Gap Between Working Memory, Executive Functions, and Processing Speed. GIDON T. FRISCHKORN, ANNA-LENA SCHUBERT, and DIRK HAGEMANN, *Heidelberg University* (Sponsored by Claudia von Bastian) – Present research on intelligence discusses several processes that may account for individual differences in fluid intelligence (Gf), e.g working memory capacity (WMC), executive functions (EF) or speed of information processing (PS). Recent results showed that neural PS is strongly related to Gf (r = -.89; Schubert, Hagemann & Frischkorn, 2017). One interpretation of these results is that a higher speed of neural information processing may increase WMC and Gf by enhancing the efficiency of selective attention and memory updating. This poster will present results from a new study that further explored this idea. We examined the inter-relations of WMC, EFs and PS and their correlations to Gf on a behavioral and neural level. Results showed that PS and EF could not be separated and showed medium to large correlations with Gf and WMC (r = .50 - .60), while WMC was strongly related to Gf (r > .90). These results contradict the popular idea that attentional control mechanisms within working memory are decisive for the relationship between WMC and general intelligence. Instead, EFs and PS both seem to rely on similar cognitive processes that are related to WMC as well as general intelligence.
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6:00-7:30 PM (5121)

What Kind of Practice Makes Perfect, and When? Exploring Conditions for Benefits of Interleaved Practice. MARTA K. MIELICKI and JENNIFER WILEY, *University of Illinois at Chicago* (Sponsored by Jennifer Wiley) – Interleaved practice has been found to confer benefits in mathematical learning and problem-solving performance compared to blocked practice, however, existing research has mainly focused on performance when the problem type is given (Rohrer & Taylor, 2007; Taylor & Rohrer, 2010) or on problem categorization without solution (Sana, Yan, & Kim, 2017). The current research explored whether interleaved practice benefits generalize to more complex problems that require categorization of the problem type in addition to solution, and whether interleaved practice benefits depend on practice accuracy. Participants learned how to solve four types of probability word problems through worked examples, completed practice problems either blocked by problem type or interleaved, and were tested after a week delay. Results suggest that the typical pattern of results where blocked practice leads to higher practice accuracy and lower test accuracy than interleaved practice is not observed with complex problems, but that interleaved practice does lead to better retention of learning between practice and test. Also, benefits of interleaved practice over blocked practice at test depend on practice accuracy.
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6:00-7:30 PM (5122)

A Generative Paradigm for Investigating Accurate Performance of Untrained Tasks. ORESTIS PAPAIOANNOU and STEVEN LUCK, *University of California, Davis* (Sponsored by Steven Luck) – One of the most amazing aspects of human cognition is the flexibility that it demonstrates, and the ability of humans to tackle entirely novel tasks with little problem. Let's say, for example, that you ask participants to tap their

nose a number of times equal to the month of their birth. It would be an easy task for them, even with no practice. Despite the apparent ease of the task, this is far from trivial from the perspective of the nervous system: It requires rapid rerouting of information through the brain to associate the participant's birth month to a quantity, and then to transform that into a motor plan. Moreover, this rerouting can occur with no direct training on the task. Although humans obviously have this ability to perform instructed tasks with no practice, it has been the subject of very little research. To facilitate future research, we developed a paradigm in which tasks are selected at random from a pool of more than 3 million possible tasks. We demonstrate how this can be used to study task learning, and show empirical evidence of rapid task learning, as well as signs of within-task and across-task metalearning.
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6:00-7:30 PM (5123)

Effects of Articulatory Suppression on Insight and Non-Insight Problem Solving. SACHIKO KIYOKAWA, MIZUKI IMASHITA, ASAKI KIRIBAYASHI, YUKA MARUKAWA, SAKI MATSUO, and YURIKA NIRA, *Nagoya University* – There are two theories on insight problem solving: special process and business as usual. The special process theory posits that unreportable, implicit processes are involved in insight problem solving but not in non-insight processing. Thus, we predicted that insight problem solving is facilitated by restricting verbal processes, but non-insight problem solving is not. We investigated the effects of articulatory suppression on insight and non-insight problem solving. Eighty undergraduates were randomly assigned to either an articulatory suppression group or a control group. Eight problems, 2 each of insight/non-insight × verbal/spatial problems, were used. The articulatory suppression participants solved each problem while repeatedly counting aloud from 1 to 7 within 4 minutes. Control participants solved each problem silently within 4 minutes. The results showed that articulatory suppression did not significantly facilitate or disrupt problem solving. We discuss the possible moderating effects of participants' strategy use.
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6:00-7:30 PM (5124)

Sleep Facilitates Analogical Transfer in Problem Solving. SEAN E. FICKLE, CHLOE E. TROUPE, and CARMEN E. WESTERBERG, *Texas State University* (Sponsored by Carmen Westerberg) – During sleep-dependent memory consolidation, recently acquired memories are integrated with existing knowledge, facilitating connections between new and old information. This process may also facilitate analogical transfer—transferring knowledge from an old situation to a new, structurally similar situation, leading to improved problem solving. In this experiment, participants were shown eight initial source problems, each followed by the solution. They then attempted to solve eight structurally similar target problems with no solutions provided. After a two-hour break that included a nap (n = 16) or wakefulness (n = 16), participants attempted to solve the target problems they were unable to solve before the break. Nap participants solved more target problems after the break than wake participants despite no difference in memory for source problems between groups. Additionally, time spent asleep predicted the number of target problems solved after the break. These results suggest that sleep-dependent memory consolidation also facilitates analogical transfer.
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6:00-7:30 PM (5125)

Examining Working Memory and Example Type With Interleaved and Blocked Math Problems in the Fourth-Grade Classroom. RACHAEL D. TODARO and BRADLEY J. MORRIS, *Kent State University* (Sponsored by Bradley Morris) – Interleaved practice (shuffled practice of concepts) demonstrates better performance when compared to blocked practice (practice of one concept before moving on to the next) in mathematics. This study investigates (1) whether performance (i.e., correct procedure utilization) is enhanced by interleaved practice that includes concrete or abstract examples and (2) whether interleaved practice improves performance for low working memory students when learning about area? Fifty-four fourth-graders completed a working memory task, a pretest, and two practice sessions manipulated within subject. Practice order (interleaved/blocked) and example type order (abstract/concrete) were counterbalanced. After a delay, children completed a post- and transfer test. Logistic regression indicates abstract examples significantly decreased the probability of correct procedure utilization, $p < .01$. With each point scored on the working memory task, students were significantly more likely to use the correct procedure, $p < .001$. Interleaving did not modify the effect of working memory on correct procedure utilization.
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6:00-7:30 PM (5126)

The Relationship of Working Memory Span, Cognitive Reflection Test, and Compound Remote Associates Performance. IVAN K. ASH, KIMBERLY D. LEE, and EKATERINA Y. SHURKOVA, *Old Dominion University* – Research suggests that insight problem solving engages both Type 1 and Type 2 processes, with former being intuitive and independent of working memory (WM) capacity, and latter being analytical and dependent on WM span. The current study investigated the relationship of individual differences in WM span and propensity for analytical and intuitive problem solving, as measured by the Cognitive Reflection Test (CRT), with performance on Compound Remote Associates problems (CRA). Think-aloud protocols collected during CRA were coded for occurrences of impasse in order investigate Type 1 and Type 2 processes in strategic versus insightful solutions. WM was correlated with number of analytical CRT solutions. Number of CRA problems solved after impasse was not significantly related to WM or CRT measures. Number of CRA problems solved without impasse was predicted by CRT analytical and intuitive solutions, but not WM span. Average successful CRA

solving time without impasse was predicted by WM, but not CRT measures. WM and CRT measures did not predict average successful CRA solving time with impasse.
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6:00-7:30 PM (5127)

Is There a Specificity of Insight Solution? SERGEI Y. KOROVKIN, ANNA D. SAVINOVA, ALEXANDRA R. LUNEVA, and EKATERINA N. MOROZOVA, *Yaroslavl State University* – We suppose that insight solution has specific mechanisms which differ from the solution of non-insight problems. In our study participants solved insight and non-insight problems simultaneously performing probe-tasks. We used reaction time of the probe-tasks to trace dynamics of working memory load during problem solving. We assumed that high reaction time in probe-tasks means that the main problem requires more resources. As a result, working memory load in insight and non-insight problems is different both in the reaction time and the dynamic patterns. Dividing working memory load into three stages we found a significant increase of working memory load immediately prior to awareness of a solution. Working memory load in the first stage is similar for the insight and non-insight problems and related to problem comprehension. The further increase of working memory load in insight and non-insight problems may be due to increasing processing. Thus we may assume that the closer one gets to the insight solution, the more important role working memory plays in insight problem solving. Nevertheless, working memory load does not increase to the same degree in the non-insight problems. Supported by RSF 16-18-10030.
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6:00-7:30 PM (5128)

WMC and Changes in Strategy Use Across gF Tasks. MEGAN J. RADEN and ANDREW F. JAROSZ, *Mississippi State University* – Two strategies predict performance on the Raven's Advanced Progressive Matrices (RAPM): constructive matching, where an individual formulates the answer to the problem before looking at any responses, and response elimination, where an individual compares the responses to the problem, eliminating the responses until the solution is found. Constructive matching is more often used by high-working memory capacity (WMC) individuals and is associated with greater performance on the RAPM, while response elimination is generally employed by low-WMC individuals. The current study used eye tracking to assess changes in strategy across two tasks: the RAPM, and a similar figural analogies task, with task order counterbalanced across participants. Results indicate that high-WMC individuals are more consistent in their strategy use across tasks when compared to low-WMC individuals, but are also more inclined to use constructive matching when the RAPM is completed first and response elimination when the RAPM is completed after figural analogies.
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EVENT COGNITION

6:00-7:30 PM (5129)

Event Segmentation and Expertise. DANIEL P. FELLER, *Northern Illinois University*, STEPHAN SCHWAN, *Leibniz-Institut für Wissensmedien*, KATJA WIEMER and JOSEPH MAGLIANO, *Northern Illinois University* (Sponsored by Joseph Magliano) – Events are composed of component parts (i.e., sub-events) and humans naturally recognize shifts between events and sub-events. The process of chunking continuous spatiotemporal information into discrete parts during encoding is known as event segmentation. Research suggests segmentation is driven by perceptual change, in a bottom-up fashion, rather than by background knowledge, in a top-down fashion. The goal of the present study was to explore the extent to which a person's domain knowledge affects the segmentation and interpretation of events. In Experiment 1, participants watched basketball clips that were more or less structured in nature and provided ratings on the extent to which gameplay was structured. In Experiment 2, participants watched clips from Experiment 1 and engaged in a segmentation task followed by an event description task. Domain knowledge did not affect segmentation but did affect video ratings and interpretation. Results suggest that segmentation is largely driven by perceptual change with knowledge affecting later processing.
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6:00-7:30 PM (5130)

Framing and Editing Guides Event Segmentation and Memory. CHRISTOPHER A. KURBY, *Grand Valley State University*, JOSEPH P. MAGLIANO, *Georgia State University*, THOMAS E. ACKERMAN, *University of North Carolina SA* – Viewers of filmed narrative tend to segment characters' actions into events. Filmmakers use various cinematic techniques in an effort to guide attention to the events. Here, we investigated how framing and editing can guide viewers' attention toward character actions during event segmentation. Participants watched and segmented a movie showing two actors engaged in two related activities, simultaneously: pitching a tent and building a campfire. The activities were filmed from three angles. Different versions of the movie were made that contained a specific framing of the activity only, or also included editing to highlight the actors' goals (using establishing shots). Event segmentation behavior was more closely associated with changes in character actions in the framing plus editing condition than the framing only conditions. The use of framing plus editing also improved memory for the activity. These results suggest that editing can provide an important guiding framework for attention during event comprehension.
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6:00-7:30 PM (5131)

The Symmetry of Deception: Predictability Reduces Attention Toward Symmetrical Actions. ANTHONY S. BARNHART and CHEYENNE DUCKERT, *Carthage College* – Many magical deceptions encourage audiences to interpret incomplete information using assumptions constructed from experience with environmental regularities. Symmetry is one

such regularity that magicians exploit. Anecdotally, deceptive actions are more likely to evade detection if they are part of a symmetrical action sequence. This symmetry of action has been stressed in a piece of sleight of hand known as the top change, wherein a playing card in one hand is covertly switched for the top card of a deck held in the other hand. If the action underlying the switch is performed with mirror symmetry (i.e., the hand with a single card approaches the deck and then the hand with the deck retreats in the same direction of motion), the sleight may be harder to detect. We tested this hypothesis across two experiments. Participants watched videos of top changes that were symmetrical or asymmetrical, pressing a button upon detecting a switch. Participants were significantly slower to detect sleights in symmetrical conditions than in asymmetrical conditions, but this tendency was not consistent across all forms of symmetry. Our results could be explained by a form of perceptual filling in or shifting of perceived event boundaries.
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6:00-7:30 PM (5132)

The Influence of Cognitive Control and Bilingual Experience on Event Processing. KYRA KRASS and GITTE JOERGENSEN, *University of Connecticut*, CLOE ZEIDAN, *California State Polytechnic University, Pomona*, MEGAN ZIRNSTEIN, *University of California, Riverside*, GERRY ALTMANN, *University of Connecticut*, ELEONORA ROSSI, *University of Florida* (Sponsored by Gerry Altmann) – We assessed how individual differences in executive functioning predicted performance in event comprehension in monolingual and early/late bilingual speakers who are processing information in their dominant language (L1) or their second language (L2). Replicating previous literature (Altmann & Kamide, 1999), we found that, when seeing a quadrant of different objects and hearing "The boy will eat…", all participants anticipated the only edible object in the array. This demonstrates that, regardless of L2 exposure, participants are able to anticipate the object that affords the action. Furthermore, cognitive control ability, measured via the AX-CPT, also influenced online comprehension. Both monolinguals and bilinguals showed a correlation between control ability and looks to the target object. Participants who demonstrated greater goal maintenance abilities on the AX-CPT were more able to maintain the goal of what affords an action in the visual world paradigm, regardless of whether they were comprehending in their L1 or L2.
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6:00-7:30 PM (5133)

Age-Related Differences in Using Memory to Predict the Course of New Events. DAVID STAWARCZYK and RYAN KAHLE, *Washington University in St. Louis*, CHRISTOPHER N. WAHLHEIM, *University of North Carolina at Greensboro*, JEFFREY M. ZACKS, *Washington University in St Louis* – Activities such as parking a car or grocery shopping often repeat with variations. To guide action, people retrieve relevant previous events and register discrepancies with current ones. Wahlheim & Zacks (in press, JEP:G) proposed that perceivers' brains register discrepancies and encode the retrieval and the discrepancy as part of the new event representation. If any of these steps are affected by aging, this could account for some age differences in event memory. To test this, we presented young and healthy older adults with pairs of movies showing similar daily activities but involving changed features—for example, hanging a purple vs white towel. Before each changed feature, we asked participants to predict what would happen based on their memory for the previous instance. For trials where young adults were able to make memory-based predictions their subsequent memory for the changed events was better. Older adults made fewer memory-based predictions—and, critically, failed to show a benefit of doing so on their subsequent memory for the changed features. This suggests that healthy aging may affect the ability to form memory representations that integrate the cognitive traces of processing unexpected discrepancies.
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6:00-7:30 PM (5134)

Differential Effects of Knowledge on Encoding and Memory for Everyday Activities in Younger and Older Adults. MAVERICK E. SMITH, KIMBERLY M. NEWBERRY, and HEATHER R. BAILEY, *Kansas State University* (Sponsored by Kimberly Kirkpatrick) – Efficient understanding of real-world events is enabled by integrating current sensory input with prior experiences in an event model, which is used to generate predictions and guide subsequent processing. When predictions of the event model fail, an event boundary is perceived, demanding more intensive processing than at locations containing stable actions. Research has shown that the ability to overtly segment continuous activity into events and remember their contents declines with age; however, knowledge improves with age. We investigated how older adults use knowledge to more efficiently encode and later remember by having participants view a series of self-paced slideshows depicting activities that were more or less familiar to young and older adults. Older adults both dwelled longer on boundary than non-boundary slides and had better recognition memory for the familiar, but not for the less familiar, activities. We also found that more sensitivity to the event structure at encoding was associated with better memory for the activities. Results indicate that older adults use their intact knowledge to better encode and remember everyday activities.
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6:00-7:30 PM (5135)

Investigating Event Segmentation Decisions Using Mouse Trajectories. LAURA J. KELLY, *University of California, Merced*, EVAN HEIT, *National Science Foundation* (Sponsored by Evan Heit) – Event segmentation is the process of breaking up continuous activity into its constituent parts. It has been theorized to be a basic, automatic perceptual process. A proxy for the perceptual process is the behavioral task of event segmentation, in which participants indicate event boundaries while perceiving ongoing activity. However, segmenting through overt decisions is not equivalent to automatically segmenting during perception. We have developed a continuous measure, a slider response, to get action dynamics reflecting the segmentation decisions made while watching videos of everyday activities. In Exp. 1, segmentation responses were recorded with

a button press. Half the participants also reported their ongoing level of expectation of the current activity ending using a slider response. Less than half of segmentations occurred while a high expectation of the end of the current activity was simultaneously reported. In Exp. 2, the segmentation response was made by moving a slider across a track. Rather than discrete points, the decisions are extended in time and space. These experiments provide new insight into expectation of change and discrete segmentation, issues of theoretical interest in event cognition.
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6:00-7:30 PM (5136)

The Future Is Now: Structure and Function of Mental Simulations of the Imminent Future. VANNIA A. PUIG RIVERA and KARL K. SZPUNAR*, *The University of Illinois at Chicago* (Sponsored by Karl Szpunar) – Simulations of the future are commonly conceptualized as mental representations of events that are temporally removed from the present moment (e.g., tomorrow, next week). Across two retrospective surveys, we present novel evidence demonstrating that in addition to simulations of temporally removed events, people also often experience mental simulations of temporally imminent events that might occur next, in the context of the present moment. Whereas simulations of temporally removed events tend to be strongly biased toward positive outcomes, simulations of temporally imminent events are strongly biased toward negative outcomes. Our data further indicate that this valence-based dissociation appears to be related to the context in which simulations arise and their function. Temporally removed simulations were predominantly reported in contexts of disengagement from the surrounding environment (e.g., mind wandering in educational settings), whereas temporally imminent simulations were predominantly reported in contexts of engagement with the surrounding environment (e.g., threat detection).
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6:00-7:30 PM (5137)

The Role of Prior Knowledge on Memory for Temporal Information. KENDRA ANDREW, ANNA B. DRUMMEY, ANNE E. MOZEL, KATHRYN CUSHING, and IRENE P. KAN, *Villanova University* (Sponsored by Irene Kan) – Decades of memory research have demonstrated that prior semantic knowledge can both enhance and constrain episodic memory, and much of the existing work has focused on its influence on item memory. However, relatively little is known about its effect on other aspects of episodic memory, such as the temporal structure of an episode. We examined this under-explored aspect in a story comprehension task and evaluated whether familiarity in story plot may influence memory for temporal information. After listening to either a familiar story (e.g., Little Red Riding Hood) or an unfamiliar story (e.g., The Stonecutter), subjects were asked to recall at what point during the story a specific event occurred. We found that subjects' temporal memory was better for familiar stories than unfamiliar stories. Furthermore, this enhancement was only found for shorter (approximately 2 minutes) but not longer (approximately 3.5 minutes) stories.
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6:00-7:30 PM (5138)

Visual Narrative Continuity: Processing Event Boundaries in Visual Narratives. MARKUS HUFF, *German Institute for Adult Education*, FRANK PAPENMEIER, *Eberhard Karls Universität Tübingen*, MARTIN MERKT, *German Institute for Adult Education* – During narrative understanding, comprehenders have to infer a good portion of the narration. In comic research, such inference generation processes are typically measured using viewing times. Yet, increased viewing times are also observed at the beginning of a new narration. We report a study at the intersection of narrative comprehension and event cognition. As stimulus material, we used short visual narrations. Each narration depicted a bridging event that was either presented as picture or was replaced by a visual mask. After the bridging event, the visual narration either continued (single event condition) or a new event began (two events condition). We measured event segmentation behavior and viewing times. The most important finding was that event segmentation and viewing times measure different processes of event cognition. Event segmentation data reflected the semantic structure of the clips and was relatively robust against omissions (i.e. masking visual information). The event model representing the narrative in working memory might provide stability. In contrast, viewing time data also captured such inference generation processes during an ongoing event.
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6:00-7:30 PM (5139)

What Working Memory Modalities Are Engaged During Event Model Construction? BENJAMIN SWETS and CHRISTOPHER A. KURBY, *Grand Valley State University* – Readers of narrative passages show evidence from eye movements of mentally dividing and representing the narrative into discrete events. This previous research also suggests that working memory could be an important substrate in which these event representations are processed. Specifically, this research showed that readers with low working memory were more likely to slow down their reading of narrative passages that were judged to be "event boundaries" than were readers with high working memory. However, the nature of this relationship with working memory remains understudied. For example, is it visual or verbal working memory that facilitates event processing? Can the effects of event boundaries generalize to individuals with high working memory if they are placed under a working memory load? To further investigate the role that working memory plays in representing event structure during natural reading, we compared eye movement patterns of readers under conditions of different working memory load.
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6:00-7:30 PM (5140)

The Retention of Six Elements of Autobiographical Memory Over Time. ANDREA E. O'REAR and GABRIEL A. RADVANSKY, *University of Notre Dame* (Sponsored by Gabriel Radvansky) – Research has shown that there are at least five dimensions that compose the events we experience and influence our memory for those events (e.g., Zwaan & Radvansky, 1998). This study examined the retention functions for these dimensions in autobiographical memories, using a modification of the procedure used by Wagenaar (1986). Twenty-four participants reported one unique autobiographical event each day for 12 weeks. Each diary entry addressed six elements developed from the five event dimensions: WHO was involved, WHAT occurred, when it occurred (broken into DATE and TIME), WHERE it occurred, and WHY it occurred. After 12 weeks, participants took a memory test in which they were randomly shown three of their responses for each given entry and asked to recall the other three. Different rates and patterns of retention were observed across the six elements, indicating that not all information is treated the same way. Implications will be discussed.
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6:00-7:30 PM (5141)

Influences of Actor Appearance and Movement Features on Action Recognition. ALAN W. KERSTEN, JULIE L. EARLES, and JONATHAN PERRY, *Florida Atlantic University* – Kersten, Earles, and Berger (2015) revealed that actions involving relative movements of body parts (i.e., intrinsic motions) are more strongly tied to particular individuals than are actions involving movements through space (i.e., extrinsic motions). One possible explanation is that intrinsic motions are represented conjointly with actor appearance, and thus the same intrinsic motions will be perceived differently when performed by different looking people. Alternatively, the motions themselves may differ when performed by different people because of differences in body structure. To test for influences of these two factors on action recognition, participants viewed videos of two different actors performing various intrinsic and extrinsic motions while wearing either the same or different costumes. Recognition of intrinsic motions was reduced both when the costume was changed (thus affecting appearance) and when the person wearing the costume was switched (thus affecting movement), suggesting that both types of information participate in intrinsic motion representations.
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6:00-7:30 PM (5142)

Prediction Error in Event Memory. MARY M. HERMANN and JEFFREY M. ZACKS, *Washington University in St. Louis* (Sponsored by Jeffrey Zacks) – We often see others repeat actions with changes, e.g., heating pizza by microwave or oven. Event Memory Retrieval and Comparison Theory (Wahlheim & Zacks, in press, JEP:G) proposes that changes induce prediction errors, leading to operations that encode the changes. We tested this by manipulating prediction errors while participants viewed movies of a daily routine on two days that included changed actions. On Day 2, actions were interrupted and participants predicted which of two endings would occur based on memory for Day 1. Crucially, endings were manipulated based on participants' responses to contradict their choice—creating a prediction error—or not. On a final cued recall test for the activities of both days, repeated items were remembered better than changed items as expected. Contrary to hypothesis, contradicting participants' predictions did not lead to better memory. This weighs against the theory, but alternatively could reflect limitations in the explicit prediction task.
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6:00-7:30 PM (5143)

How Event Structure and Relatedness Impact Memory for Extra-Event Words. ASHLEY S. BANGERT and OMAR CARRASCO, *University of Texas at El Paso*, CHRISTOPHER A. KURBY, *Grand Valley State University* – Prior research suggests that information embedded within an event structure is remembered better when presented at event boundaries. We examined whether this memory benefit generalized to words presented concurrently with, but not embedded within, the event structure when words were a) related to the depicted activity, b) unrelated to the activity, or c) unrelated to the activity but related to each other within list (mixed condition). Participants watched movies of everyday activities while listening to words presented at event boundaries or non-boundaries, either engaging in concurrent articulatory suppression (experiment 2) or not (experiment 1). Memory was better for related and mixed condition words than unrelated words, but there was no difference for words presented at boundaries versus non-boundaries. These results suggest that concurrent, extra-event, information does not receive a specific encoding boost from event model updating at event boundaries.
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6:00-7:30 PM (5144)

Offense, Defense, and Tanks... Oh my! The Influence of Expertise on the Perception and Memory of Basketball and Overwatch Videos. KIMBERLY NEWBERRY and HEATHER BAILEY, *Kansas State University* (Sponsored by Heather Bailey) – Decades of work have shown that experts have superior memory in their field of expertise, and people have proposed that various encoding mechanisms, such as chunking and differentiation, explain this effect. Another potential encoding mechanism that influences memory is event segmentation, which is the process by which individuals parse information into meaningful units. In the current study, we evaluated the effects of expertise on segmentation and memory. Participants with high (n = 11) and low knowledge (n = 6) for basketball watched and segmented basketball and Overwatch videos at coarse and fine grains, then completed memory tests. Both segmentation ability and recognition performance differed between the experts and novices for the basketball videos but not for Overwatch videos. Segmentation marginally predicted memory. The results suggest that expertise may influence event encoding; however, the results should be interpreted cautiously due to small sample sizes.
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LANGUAGE

6:00-7:30 PM (5145)

This Presentation Is Not a Sedative! The Right Hemisphere Activates Salient and Non-Salient Meanings of Low Familiarity Metaphors. ANDRIANA CHRISTOFALOS and GARY RANEY, *University of Illinois at Chicago* (Sponsored by Stellan Ohlsson) – We examined how the left- and right-cerebral hemispheres access meanings of metaphors in two experiments. We predicted that that hemispheric priming would differ as a function of metaphor familiarity. In Experiment 1, participants read high- (e.g., The baby is an angel) and low-familiarity metaphors (e.g., The class is a sedative) for 1000 ms and then made a lexical decision to a target presented in the left- or right-visual field. Target words were related to the figurative (e.g., BORING) or literal (e.g., DRUG) meaning of each metaphor. Priming of the figurative and literal targets was found in the right hemisphere (left visual field) following low familiarity metaphors. In a self-paced version of the task (Experiment 2), priming of the figurative and literal targets was found in the right hemisphere following both high- and low-familiarity metaphors. Priming of the literal meaning was also found in the left hemisphere following low familiarity metaphors. These findings are consistent with the Graded Salience Hypothesis, such that the right hemisphere activates both salient (literal) and non-salient (figurative) meanings of low familiarity metaphors, whereas the left hemisphere only activates the salient (literal) meaning.
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6:00-7:30 PM (5146)

Need More Reasons to Study Abroad? Cognitive, Linguistic, and Socio-Emotional Benefits. KHRISTA EMMLEEA NEVILLE and SARA INCERA, *Eastern Kentucky University* (Sponsored by Conor Mclennan) – Education abroad programs offer students an experience that they cannot get in a classroom setting. A variety of studies have looked at specific ways in which these programs enhance student's cognitive, linguistic, and socio-emotional skills. The goals of the current study are (1) to better understand what skills are most influenced by immersive experiences abroad, (2) and to quantify how much each skill is affected by these experiences. Participants (n = 19) are measured before leaving for their abroad experience and when they return. During each session participants are asked to complete cognitive and linguistic tasks on a computer, and questionnaires about their socio-emotional skills. The general prediction is that performance in these tasks is better after studying abroad than at baseline. Using these data we can better understand the effect of immersive experiences abroad, allowing us to maximize students' benefits to their fullest potential.
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6:00-7:30 PM (5147)

Language Skills in Early Childhood: What's Play Got to do With It? TANYA MARIA PAES and MICHELLE ELLEFSON, *University of Cambridge* (Sponsored by Michelle Ellefson) – The role of pretend play on children's cognitive development has gained interest recently. This study examines the efficacy of a pretend play intervention on the language skills of four- to five-year-olds with English as an Additional Language. Pretend play includes a pretender projecting a mental representation onto reality. The sample consisted of 150 children who were randomized into two experimental conditions: (a) Pretend play; and (b) Art activities. A third untreated control group was also included in the study. The intervention involved sixteen 30-minute sessions, in groups of six children. Each session included: (1) storybook reading; (2) role-playing; and (3) review. During storybook reading explicit phonological awareness (PA) and vocabulary instruction were provided for 18 words in each book. Role-playing involved giving children props to partake in pretend play. Review comprised revising the PA and vocabulary of the target words. The improvements that occurred in the children's language skills are considered alongside other cognitive factors, including memory, to better understand the role of pretend play in children's language learning.
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6:00-7:30 PM (5148)

Tracking Changes in Resting-State EEG During Novel Language Learning. KINSEY BICE, *Pennsylvania State University, University of Washington*, ESRA KURUM and JUDITH F. KROLL, *University of California, Riverside*, ELEONORA ROSSI, *California State Polytechnic University, Pomona* (Sponsored by David Rosenbaum) – Resting state EEG (rEEG) is assumed to represent a stable, off-task EEG network signal that is recognized as a predictor for a number of cognitive functions (Doppelmayr et al., 2002). Recent research has demonstrated that rEEG predicts the rate of novel language learning (Prat et al., 2016). Given the relationship between rEEG and new language learning, we investigated whether and how rEEG is modulated as a consequence of short but intensive new language learning. 33 participants were taught Finnish for two sessions of an hour each; rEEG was collected pre- and post-training. Importantly, rEEG revealed changes from before to after language training in electrodes identified as important for predicting the rate of new language learning, suggesting that more stable network properties are influenced by these learning experiences. Preliminary analyses further demonstrated that age and gender influence the degree of change in rEEG. This is among the first studies to evaluate the stability of rEEG and how it may change as a function of intensive experiences with language and/or learning.
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6:00-7:30 PM (5149)

A Pupillometric Examination of Cognitive Control in Taxonomic and Thematic Semantic Memory. JASON GELLER, *University of Alabama at Birmingham*, JON-FREDERICK LANDRIGAN, *Drexel University*, DANIEL MIRMAN, *University of Alabama at Birmingham* – Semantic knowledge includes taxonomic and thematic relationships, which may comprise complementary semantic sub-systems, or a single semantic system with differing control processes. The latter view is most clearly supported by a recent report (Thompson et al., 2017) suggesting that low-strength thematic

relationships (i.e., relations based on participation in the same event or scenarios) require more cognitive control than low-strength taxonomic relationships (i.e., relations based on similar internal features). In a preregistered study, we tested this prediction using a semantic relatedness judgement task that manipulated semantic type (thematic vs. taxonomic) and relatedness strength (high vs. low) of word pairs. Cognitive control was examined with reaction times, accuracy, and pupillometry. Across all three measures, low-strength semantic relations required more cognitive control than high-strength relations, but this additional recruitment of controlled processing did not differ as a function of thematic and taxonomic knowledge. These findings are inconsistent with the view that semantic knowledge operates over a single system with differing control processes.
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6:00-7:30 PM (5150)

Examining Conflict Adaptation Across Stroop and Semantic Interference Tasks: An Eye-Tracking Study. ANGELA DE BRUIN and EFTHYMIA C. KAPNOULA, *Basque Center on Cognition, Brain, and Language*, JON ANDONI DUÑABEITIA, *Universidad Nebrija* – Words may activate semantically related lexical items, which sometimes leads to interference. The mechanisms used to resolve this interference may be similar to those used in e.g., a Stroop task, but much of the evidence is correlational. More direct evidence could be obtained by examining conflict adaptation (the finding that conflict costs diminish after a conflict trial). If adaptation occurs across Stroop and semantic conflict, this would be evidence for similar underlying control mechanisms. Forty participants completed an eye-tracking study in which they heard a word and had to identify the corresponding image ('semantic task') or colour ('Stroop task'). On conflict trials, there was a semantic distractor (semantic) or the colour name in a different colour (Stroop). Behavioural data showed a conflict cost but no adaptation. Eye-tracking data showed within-task effects, with a smaller semantic but larger Stroop cost after a same-task conflict trial. No effects of the previous trial were found on semantic-Stroop or Stroop-semantic sequences, suggesting that conflict adaptation did not occur across tasks. Thus, there was no evidence for the involvement of similar control mechanisms in Stroop and semantic conflict resolution.
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6:00-7:30 PM (5151)

An Intracranial EEG Study of Semantic Cognition. MELISSA THYE, JASON GELLER, DIANA PIZARRO, JERZY P. SZAFLARSKI, and DANIEL MIRMAN, *University of Alabama at Birmingham* (Sponsored by Daniel Mirman) – Previous research examining the neural basis of semantic processing has been restricted to methods with limited spatial or temporal resolution. An alternative, stereoelectroencephalography (sEEG), records from intracranial depth electrodes and captures spatio-temporal network transitions. SEEG data from 124 to 253 predominately left hemisphere electrode contacts were collected from several patients with refractory epilepsy during completion of a semantic relatedness judgment task. Critical word pairs varied in semantic type (taxonomic vs. thematic) and relatedness strength (high vs. low). After excluding incorrect trials, average baseline-corrected high gamma power (80-190 Hz) indicated higher power for low compared to high relatedness trials in an anterior portion of the hippocampus and in the left anterior orbital frontal gyrus and inferior frontal gyrus for one of the patients. These findings suggest greater involvement of inferior frontal and hippocampal regions for identification and retrieval of distant (weak) semantic relations.
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6:00-7:30 PM (5152)

Meaning Detection Processes Influence Receptivity to Bullshit. SHELBY J. MCGREW, LUCAS A. KEEFER, MITCH BROWN, and LAURA A. PAZOS, *University of Southern Mississippi* – Research indicates individuals are motivated to maintain a sense of meaning, and enact cognitive processes to do so (e.g., perceiving structure in the environment). This motivation to find meaning may ultimately impact humans' interpretation of bullshit, statements intended to convey profundity without verifiable semantic content. Conversely, subtle cues threatening the meaningfulness of bullshit may elicit greater skepticism. Two studies tested situational factors predicted to heighten or diminish susceptibility to bullshit. Meaning-threatened participants found greater profundity in bullshit statements compared to those not experiencing that threat (Study 1). Moreover, cognitive disfluency caused by hard to read font, a subtle threat to meaningfulness in other research, reduced susceptibility to bullshit (Study 2). Taken together, results indicate basic processes shaping the detection of meaning have implications for the appraisal of ambiguously insightful information.
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6:00-7:30 PM (5153)

Grammatical but Unexpected Verbs for Motion Events Leads to 'Semantic P600' Effect in English and Spanish Speakers. SAMANTHA N. EMERSON, ŞEYDA ÖZÇALIŞKAN, and CHRISTOPHER M. CONWAY, *Georgia State University* (Sponsored by Christopher Conway) – Languages differ in how they express motion: English expresses manner in verbs and path in prepositions; Spanish expresses path in verbs and rarely expresses manner. These differences suggest that speakers of different languages should vary in their sensitivity to manner and path. However behavioral research shows mixed results. We examined event-related potentials of native English and Spanish speakers reading English- or Spanish-like sentences about motion where the verb was either congruent or incongruent with an animation. The stimuli were designed to elicit the N400 component—a marker of semantic expectancy—with the hypothesis that there would be cross-linguistic variation in motion expression with the amplitude difference between congruent and incongruent verbs increasing with speakers' level of sensitivity to each motion type. Preliminary results suggest an N400 effect but only for manner verbs in English. Incongruent path verbs in English and incongruent and congruent manner verbs in Spanish produced an unexpected P600—a marker of syntactic violation—despite sentences being grammatical

suggesting a qualitative difference in the processing of manner and path in English and less expectancy for manner in general in Spanish.
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6:00-7:30 PM (5154)

Evidence for Neurological Correlates of Grounded Semantic Richness. BRIAN DUFFELS, PAUL D. SIAKALUK, and HEATH MATHESON, *University of Northern British Columbia*, PENNY M. PEXMAN, *University of Calgary*, R. LUKE HARRIS, *University of Northern British Columbia* – Near-infrared spectroscopy (NIRS) is a non-invasive technique that monitors cerebral cortex perfusion and metabolism via hemoglobin oxygenation. NIRS of the prefrontal cortices was used to examine two dimensions of grounded semantic richness in lexical processing. We used semantic categorization tasks (SCT) of single word presentations with a go/no-go procedure. Semantic richness of word stimuli was manipulated through the grounded cognition dimensions of body-object interaction and emotional experience. Behavioural results show that task-relevant semantic richness facilitated SCT response latencies for both dimensions. NIRS data indicate that the largest hemodynamic changes occurred in the right hemisphere on no-go trials where a response had to be fully inhibited. The smallest hemodynamic changes occurred for stimuli high in task-relevant semantic richness. These data suggest that NIRS, when employed in lexical processing experiments, provides evidence of inhibitory processes as a function of automatically elicited grounded representations of conceptual knowledge.
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6:00-7:30 PM (5155)

Do Individuals With Autism Spectrum Disorder Integrate the Speaker and Meaning During Language Comprehension: Evidence From Eye-Tracking and ERPs. MAHSA BARZY, JO BLACK, DAVID WILLIAMS, and HEATHER J. FERGUSON, *University of Kent, Canterbury* (Sponsored by Heather Ferguson) – We examined the time course with which adults with/without autism spectrum disorder (N=48) can anticipate and integrate speaker and meaning during language processing. Experiment 1 employed the visual world paradigm. Participants heard sentences that were consistent or inconsistent between voice and message, and concurrently viewed scenes that included consistent and inconsistent objects. All participants were slower to select the mentioned object in the inconsistent condition, and all anticipated the consistent object at least 600ms before disambiguation. Experiment 2 explored integration by recording ERPs. Participants listened to sentences as in Experiment 1, time-locked to the onset of a consistent, inconsistent, or semantically anomalous word. Both groups evoked an enhanced N400 for inconsistent speaker-meaning sentences, comparable to anomalous sentences. Thus, contrary to pragmatic dysfunction theories, people with ASD were sensitive to speaker inconsistency effects online.
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6:00-7:30 PM (5156)

Representation and Retrieval in Semantic Memory. JOHNATHAN E. AVERY (Graduate Travel Award Recipient) and MICHAEL N. JONES, *Indiana University* (Sponsored by Michael Jones) – The semantic fluency task ("name all the animals you can in a minute") is widely used to study organization and retrieval in semantic memory. Hills, Jones, and Todd (2012) observed that responses yield temporal signatures resembling animal food search patterns. They proposed a cue-switching model that mimicked the foraging pattern of local exploitation versus global exploration. Abbot, Austerweil, and Griffiths (2015) argued against cue switching, demonstrating that a random walk operating on a semantic network could produce the same temporal signatures. We propose here a direct and novel comparison of the different models by holding constant the training corpus and learning mechanism. We qualitatively demonstrate that both models are able to produce the temporal signatures indicative of foraging. We then use BIC to quantitatively compare the cue-switching model and several variants of the random walk model on numerous representational structures. The comparisons demonstrate a clear superiority of the cue-switching model.
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6:00-7:30 PM (5157)

Semantic Diversity Benefits Lexical Processing. CURTISS ANTHONY CHAPMAN and RANDI MARTIN, *Rice University* (Sponsored by Randi Martin) – Recent findings suggest that words with higher semantic diversity (SemD)—i.e., association with more varied contexts—have noisier lexical-semantic representations, which slows processing when selecting specific representations (e.g., semantic relatedness decisions) but speeds processing when specific selection is not required (e.g., lexical decision; Hoffman & Woollams, 2015). Because frequency and SemD are positively correlated, SemD is claimed to have a greater effect for HF words, eliminating frequency effects in stroke patients with semantic selection deficits (Hoffman et al., 2011). We extended the examination of SemD and frequency to a broader range of subjects and items using data from multiple megastudies, including, e.g., lexical decisions, picture naming, and concreteness decisions. Across tasks and across healthy subjects and stroke patients with and without semantic deficits, high SemD benefited performance, though that benefit decreased as the specificity of representation accessed increased and as frequency increased. Implications for models of lexical processing are discussed.
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6:00-7:30 PM (5158)

Distant Semantic Network Connectivity and Semantic Priming: Evidence From a 5,000-word Semantic Network. ABHILASHA A. KUMAR and DAVID A. BALOTA, *Washington University in St Louis*, MARK STEYVERS, *University of California, Irvine* – We examined 3 different semantic networks (directed, undirected, and an association correlation network) constructed from a large 5000-word set of English free association norms to predict priming effects. In Experiment 1, participants made semantic relatedness

judgments for word pairs (e.g., LEAP – HIGH) with varying path lengths. Response latencies to make relatedness judgments followed a quadratic relationship with path length for all networks, replicating and extending a pattern recently reported by Kenett, Levi, Anaki, and Faust (2017, Journal of Experimental Psychology: Learning, Memory & Cognition) for an 800-word network based on Hebrew association norms. In Experiment 2, participants identified words in a progressive demasking task, where network path length was manipulated for consecutive words. Response latencies to identify the target again showed a quadratic trend with path length for the association correlation network, but a linear trend for the directed and undirected networks. Importantly, in both studies there were reliable differences between relatively distant words, e.g., path lengths 4 and beyond, suggesting that association networks can capture distant functional semantic relationships.
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6:00-7:30 PM (5159)

The Complexity of Plural Nouns. SHELIA KENNISON, *Oklahoma State University*, RACHEL MESSER, *Bethel College* – The conceptual representation of plural nouns has been debated. One view is that the representations of plural nouns are inherently more complex than those of singular nouns due to the greater number of individuals included in the representation. A second view is that the representations of plural and singular nouns are comparable in complexity, as the representations are abstract in nature and information about individual entities are not specified. To explore whether the semantic complexity of plural nouns produces measurable differences in processing time during reading comprehension, we conducted a series of self-paced reading experiments in which readers processed plural or singular noun descriptions (e.g., lakes or lake) in sentences in which the noun was syntactically ambiguous. Reading time was compared with the reading time on syntactically unambiguous control sentences. The results revealed that readers did not take longer to process plural nouns than singular nouns. Furthermore, the processing difficulty stemming from reanalyzing the syntactically ambiguous phrase did not significantly differ for phrases containing plural versus singular nouns.
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6:00-7:30 PM (5160)

Discovering Syntactic Constructions Using Machine Learning Methods. JACQUELYN M. ELLISON and PHILLIP WOLFF, *Emory University* – The meaning of a sentence relies heavily not only on its words, but also its syntactic form. We propose that the units of syntactic form, syntactic constructions, carry meaning that is distributed across its linguistic contexts and does not rely on direct reference to the world. We investigated this proposal using methods from Natural Language Processing and Machine Learning. Approximately 20,000 clauses were automatically extracted from 42 million sentences from New York Times. Meanings for these clauses were derived using the semantic embedding procedure Word2vec, which captures contextual properties of each clause, and a vector splitting method that expresses the embedded meanings in words. Using no information outside of the text itself, the method confirmed a number of well-known constructions (e.g., the di-transitive, meaning "to give") and discovered several other form-meaning pairs not previously recognized in the literature, but confirmed in a series of reaction time studies. Implications for Language Acquisition will be discussed.
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6:00-7:30 PM (5161)

Episodic and Semantic Priming From Novel Words Learned From Context. BENJAMIN RICKLES, MICHAL BALASS, and DONALD J. BOLGER, *University of Maryland, College Park* – Complimentary learning systems posit that episodic and semantic memory systems combine to account for behavioral learning of novel vocabulary items. Each encounter with a word in context constitutes an episodic trace from which semantic knowledge is extracted during consolidation (Kwantes, 2005). To understand how this framework applies to vocabulary acquisition in adults, we trained participants on the meaning of 80 rare words with four learning trials per word; the training contained four conditions: two contextual (a definition or a sentence) and two repetition (repeated or varied). Upon completion of training, participants performed lexical decisions to targets primed by the recently trained rare words. Targets were either recently seen in the context of the prime (Episodic), semantically related to the prime but unseen (Related), unrelated and unseen (Unrelated), or Nonwords. Preliminary analyses show differential effects of Context on RT for Episodic targets seen in Sentences vs Definitions. We interpret these results within the complementary learning systems framework.
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6:00-7:30 PM (5162)

Rely on What's Reliable: Effects of Cognitive-Control Engagement on Children's Sentence Comprehension. ZOE OVANS, YI TING HUANG, and JARED NOVICK, *University of Maryland* – Children process sentences incrementally, which can yield misinterpretation and difficulty revising when initial commitments turn out to be wrong. We hypothesized that cognitive-control engagement modulates revision by increasing children's reliance on reliable cues to interpretation (e.g., verbs). This would decrease revision when verbs initially mislead toward an analysis that in time becomes incorrect (Exp.1, "Put the frog on the napkin onto the box"; misinterpret napkin as goal, revise to box less), but increase revision when verbs correctly cue it (Exp.2, "The dax is chased by the rat"; misinterpret dax as agent, revise to patient given "-ed by"). We recorded five-year-olds' eye-gaze during sentence processing after Stroop-Incongruent (SI) or -Congruent (SC) trials, varying cognitive-control engagement. Following SI (versus SC) trials, children made fewer box-as-goal looks (decreased revision), and more dax-as-patient looks (increased revision). Children's cognitive-control engagement thus biases interpretation toward likely structures, impeding revision when verbs misdirect processing but improving revision when verbs accurately prompt it. This may aid learning by guiding children to follow reliable cues to interpretation.
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6:00-7:30 PM (5163)

What Goes Up May Come Down, but Only If You Need It To! The Production of Transitive and Reciprocal Inferences. ROSS ALLEN MCCOOL and GARY BRADSHAW, *Mississippi State University* (Sponsored by Gary Bradshaw) – In language, information omitted for brevity consequently requires inferences for comprehension. Two experiments were performed to explore whether transitive or reciprocal inferences are made during encoding or later. Participants read stimulus sentences permitting an inference, then immediately answered an inference-based question. The first experiment tasked participants to validate the inference without the stimulus sentence present while the second maintained the stimulus sentence. Inference timing can be determined by contrasting verification against inferential sentences. Transitive inferences were made during encoding only when the stimulus sentence disappeared before the question; reading times for the stimulus sentence were correspondingly longer. Reciprocal inferences were never made during encoding. Prior knowledge about the relationships permitted direct recall of the answer without an obvious inference. Collectively the results indicate that participants may use controlled processing to encode transitive inferences given appropriate demand characteristics, but do not normally make such inferences until needed.
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FALSE MEMORY II

6:00-7:30 PM (5164)

Do False Memories Prime the Detection of Unexpected Objects in an Inattentional? DUSTIN P. CALVILLO and ALEXANDER J. BAKER, *California State University, San Marcos* – Critical lures from Deese-Roediger-McDermott (DRM) word lists have been shown to prime correct responses in reasoning and problem solving tasks. The present study examined whether DRM word lists can prime the detection of unexpected objects in a modified inattentional blindness task. Participants saw DRM word lists followed by a pair of intersecting lines. Their tasks were to determine which line was longer and then to recall the words from the list. On the fourth trial, the critical lure from the DRM word lists was either the same as an unexpected object that appeared along with the intersecting lines or they were different. Participants were not significantly more likely to detect the unexpected object when it matched the critical lure from the word list. A follow up study will examine if changing methodological details, particularly having participants recall the words before the inattentional blindness task, can increase priming effects.
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6:00-7:30 PM (5165)

When Misinformation Has a Continued Influence: The Roles of Detecting and Recollecting Factual Corrections. TIM R. ALEXANDER and CHRIS WAHLHEIM, *University of North Carolina at Greensboro* (Sponsored by Chris Wahlheim) – Abstract People often continue to misremember fake news as being true even after receiving corrective information. We examined the roles of detecting and recollecting the discrepancies between such information on later memory for true facts. Participants studied true and false statements taken from actual news sources that appeared on the internet recently before the experiment took place. Participants then studied either repeated true statements or corrected false statements and indicated when they detected misinformation corrections. Finally, participants completed a cued recall test of the correct information and also indicated when they recollected contradictions. Misinformation correction was effective when contradictions were detected and recollected. In contrast, fake news was more often misremembered when contradictions were detected but not recollected. These results are consistent with the memory-for-change framework (2013), which emphasizes the importance of representation integration for effective episodic memory updating. Implications for real-world misinformation corrections are discussed.
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6:00-7:30 PM (5166)

The Impact of Verbal and Gestural Misinformation Over the Short and Long Term. KRISTEN P. D'ANGELO and LISA BLALOCK, *University of West Florida* (Sponsored by Lisa Blalock) – The misinformation effect occurs when inaccurate post-event information affects a person's memory of the original event. Studies of the misinformation effect typically focus on verbal misinformation, but gestures might be even more misleading. The purpose of the current research is to compare the potential of gestural and verbal misinformation to affect memory, and to include a comparison of the effects over a short and long time period. In Experiment 1, participants watched a video of a non-violent robbery, then answered a set of video recorded open-ended questions that contained misleading gestures. The most misleading gestures were then used in Experiment 2. In Experiment 2, participants viewed the same crime, then answered video recorded questions in one of three conditions: gestural misinformation, verbal misinformation, or no misinformation (control). Additionally, we varied the delay before recall with either a short (5 minutes) or a long (2 days) delay. Our preliminary results reveal that the verbal misinformation was more misleading than the gestural misinformation, but the longer delay period did lead to more errors across all conditions.
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6:00-7:30 PM (5167)

Faces and Places: Strong Contextual Associations Reduce False Memories. DANIELLA K. CASH and SEAN M. LANE, *Louisiana State University* (Sponsored by Sean Lane) – Identifying the source of a previous encounter with someone is a difficult memory task, and real-life errors of this type (e.g., unconscious transference) can be consequential. We examined the role of contextual association in false recognition. We varied the level of association between face-context pairings by showing faces and contexts paired together three times, or showing a face/context paired with three different contexts/faces. At test, participants had to discriminate between pairs that had been seen at encoding and pairs that had been recombined. Results revealed that participants were less likely to falsely

recognize an incorrect pairing when the context had a strong association to the face than when the association was weak. Participants were also more confident in their correct rejections when contextual associations were strong. Our results suggest that strong contextual associations can reduce source memory errors by allowing individuals to reject false conjunction lures.
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6:00-7:30 PM (5168)

The Effect of Familiar Contexts on Memory for Novel Faces. KAITLIN M. ENSOR and NANCY FRANKLIN, *Stony Brook University* – False recognition of novel stimuli increases when they are paired with familiar contexts, likely because the sense of familiarity created by the context is misattributed to the novel stimulus. This effect is observed both when context familiarity is created through prior experimental exposure and when familiarity is pre-existing, as with well-known landmarks (Deffler, Brown, & Marsh, 2015). Some theories of face recognition would predict subjective recollection judgments to also increase for familiar contexts. The current study used remember-know judgments to examine how context familiarity affects judgments of recollection and of familiarity for novel faces. Familiar contexts (landmarks) enhanced face familiarity judgments but had no effect on recollection judgments. That is, while people could not retrieve details associated with prior exposure of the faces, they nevertheless interpreted simple familiarity as evidence of prior exposure. This has important theoretical as well as applied implications, including for eyewitness identification of suspects in familiar contexts.
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6:00-7:30 PM (5169)

The Benefits and Costs of Sleep on Memory for True and False Information. DAVID PHILIP MORGAN, LAURA MICKES*, TRAVIS SEALE-CARLISLE, and JAKKE TAMMINEN, *Royal Holloway, University of London* (Sponsored by Laura Mickes) – Sleep supports the consolidation of new information. This benefit may not come cost free. That is, if misinformation is introduced prior to sleep, then that information may also be consolidated. Participants, assigned to a sleep (n = 100) or wake (n = 100) condition, took part in a recognition memory experiment where they studied a series of events, were exposed to misinformation, experienced a 12-hour period of sleep or wake, and then were tested on recognition and source memory tests. We predicted that participants in the sleep condition would have better memory for studied items (a benefit), wrongly endorse misinformation as being seen in the initial study phase (a cost) because they would more likely confuse the source of the original and misinformation events. The results have real world implications for the criminal justice system, educational system, and information disseminated by traditional and social media.
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6:00-7:30 PM (5170)

Mapping the Time Course of Semantic Activation in Mediated False Recognition. ALYSSA DI MAURO, *University of Southern Mississippi*, SHUOFENG XU, KAI CHANG and COLE WALSH, *Colby College*, ASHLEY WOOD and MARK HUFF, *University of Southern Mississippi*, JEN COANE, *Colby College* – We evaluated the time course of persisting automatic spreading activation from a mediated list of indirect associates (e.g., meow, day, basement) that all converged upon a non-presented critical item (CI; e.g., black). Mediated lists were related to CIs through non-presented mediators (e.g., cat, night, bottom). Two speeded tasks were then used to evaluate the time course of semantic activation of the CI: A continuous semantic-classification task (SCT; concrete/abstract decisions) or a recognition test (old/new memory decisions). The SCT or recognition test was completed immediately following the presentation of mediated lists, and CIs were presented in either the 1st, 3rd, or 8th, positions. CI priming declined across positions in the SCT, however, false recognition was equivalent across all test positions. Thus, spreading-activation processes decline despite persistent false recognition which may reflect a retrieval-mode process in which retrieval instructions reactivate a list's associate structure, producing long-term effects.
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6:00-7:30 PM (5171)

Estimating Parameters for False Action Memories in Other-Oriented Observation Inflation: Insights From a Bayesian Multinomial Processing Tree Approach. SHIHO KASHIHARA, SHUSHI NAMBA, RUSSELL SARWAR KABIR, MAKOTO MIYATANI, and TAKASHI NAKAO, *Hiroshima University* (Sponsored by Michiko Asano) – Observation inflation (OI) occurs when an onlooker who performed an observed action and the performer to themselves. Despite the fact that the source monitoring paradigm of human memory has employed stochastic models of categorical data, or multinomial processing tree (MPT) models, to map memory deficits and biases, these have yet to be applied to OI. In addition, possible biases in the predictability of observed actions others have yet to be investigated. This study manipulated other-oriented observed action predictability (easy and hard-to-predict, no predictability, and control condition) and analyzed OI with MPT modeling. The results showed that false attributions of self-performance were greater than the control condition for actions that the participants did not perform at all in the experimental process. This study demonstrates that parameters estimated by Bayesian MPT models show promise revealing new insights in OI-related false action memories.
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6:00-7:30 PM (5172)

The Effects of Diurnal Variability and Modality on False Memories Formation. JUSTYNA M. OLSZEWSKA, AMY HODEL, and DEANNA LUTTENBERGER, *University of Wisconsin, Oshkosh* – There is considerable evidence that time of day at which cognitive tasks are performed affect the quality of performance differently (Folkard, 1979). The main objective of the current study was to compare the effects of auditory and visual list presentation for semantically and acoustically related words on false recognition in the short -and long-term memory at different times of day, morning and evening. Overall, we predicted more false memories in the

evening than in the morning for semantically related stimuli (Experiment 1) and more errors in the morning for acoustically similar material (Experiment 2). Our study confirmed our hypotheses supporting also Folkard's (1979) findings on semantic and acoustic encoding at different times of the day. We demonstrated that time of day affect semantic and acoustic memory performance differently depending on the modality in which stimuli were presented as well as on the delay. These findings add new data to the existing literature in the field of chronopsychology that may have strong practical applications in various work settings where people work with semantic or acoustic material presented auditorily and visually.
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6:00-7:30 PM (5173)

The Effect of Reality Monitoring and Wording on False Memory in the DRM Paradigm. YAYOI KAWASAKI, *Senshu University / JSPS*, MATIA OKUBO, *Senshu University* – We examined effects of reality monitoring on false memory using the DRM paradigm with two types of wording of old items: Presented vs. watched. Participants observed ten lists of semantically related words. Differently from the conventional DRM paradigm, some critical lures were included in the word lists and were presented to the participants. After observing each list, participants took a recognition test, where half the participants rated their confidence on the response while the remaining half performed reality monitoring as the secondary task. False recognition of critical lures did not differ between the secondary task conditions (i.e. confidence rating vs. reality monitoring) and between wording conditions. For the reality monitoring condition, critical lures were evaluated as "generated it in mind during learning" when the critical lures were falsely recognized or correctly rejected, particularly in the "presented" condition. Such evaluations were not found for presented and nonpresented list words. These results suggest that representations of critical lures were different from those of list items with regards to meta-cognitive processes like reality monitoring, and wording might also influence on the process.
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6:00-7:30 PM (5174)

People Are Better Able to Separate False From True Memories in a Foreign Language. LEIGH H. BURNETT and DAVID A. GALLO, *University of Chicago*, YUE PAN, *Northwestern University*, BOAZ KEYSAR, *University of Chicago* (Sponsored by Boaz Keysar) – Recent work shows that people are less susceptible to cognitive biases when thinking in a foreign language, but are they also less susceptible to memory distortion? We investigated how the nativeness of language affects recall accuracy using the DRM false memory paradigm, in which people study lists of associated words (bed, rest, awake…) and often falsely recall missing lures (sleep). Native Mandarin speakers fluent in English studied semantically associated word lists in Mandarin or English. They then attempted to recall the words, and importantly, also were asked to report words they thought of but did not remember appearing, allowing us to separately measure lure activation as well as people's ability to correctly monitor the source of this activated item. We found stronger lure activation in the foreign language (English), likely because the word lists were originally created in English. Despite this, participants were less likely to be fooled by these lures in the foreign language, as monitoring accuracy was greater in English than Mandarin. People are better at distinguishing true memories from those that never happened in a foreign tongue, suggesting we employ more careful or effective monitoring in a foreign language.
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6:00-7:30 PM (5175)

Persistence of False Memories and Associated Confidence Is Modulated by Sleep. WILLIAM B. CORLEY, SURYA RAJAN SELVAM, NATALIA G. STEPHENS, MANZURA IBRAGIMOVA, and NICHOLAS C. HINDY, *University of Louisville* – While false recognition of lures is commonly observed immediately after encoding in the DRM paradigm, the effect of sleep on false recognition in delayed tests is less clear. This study explored the relationship between sleep and false memories in a variation of the DRM paradigm with confidence judgments and ROC analysis. Participants listened to lists of semantically related words for later recognition. For each participant, recognition tests were performed immediately after encoding for half of the word lists, and 24 hours later for the remaining lists. Intervening sleep was monitored by a wrist-worn actigraphy device. High confidence recognition was reduced for both targets and lures from day 1 to day 2. For low and medium confidence recognition, there were consistently high false alarm rates across tests for lures despite reduced accuracy for targets on day 2. Amount of intervening sleep modulated the greater durability of false relative to true memories.
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6:00-7:30 PM (5176)

Mindfulness Induction Attenuates Inflated False Recognition in a High Differentiation Requirement Context. LI-HAO YEH, SHAO FU SHIH, KAI-ZHEN LIOU, JINZHOU HE, YUAN RONG LIM, and WENXUAN RUAN, *Chung Yuan Christian University* – Mindfulness is known to increase false memory. However, high trait mindfulness is associated with an external encoding style, which in turn is associated with low false memory. The inconsistent findings may reflect that mindfulness is related with high cognitive flexibility as well as attention regulation. While the high cognitive flexibility may activate related gist traces, high attention regulation may facilitate focus on verbatim traces to reduce false memory. Two experiments were conducted. In both, a mindfulness induction was inserted between DRM false recognition tasks in which items and lures were in either hollow or solid fonts. The only difference between the two experiments is the degree of differentiation requirement. In experiment 1, a typical old-new recognition was adopted, whereas a font-specific recognition was adopted in experiment 2. The results showed that while the false recognition of hollow and solid lures were increased after mindfulness induction in experiment 1, only hollow, but not solid lures were increased in experiment 2 indicating that when

specific features are required for recognition, mindfulness may elicit more vivid verbatim traces for familiar fonts to attenuate inflated false recognition.
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6:00-7:30 PM (5177)

The Effect of Time on False Memories for One's Own Lies. ERIC RINDAL, HANNAH POLLOCK, MARY BETH LEES, SAMUEL MARTIN, and KELSEY WRIGHT, *Georgia College and State University*, MARIA ZARAGOZA, *Kent State University* – This experiment sought to assess the memorial consequences of lying over time. Participants viewed an eyewitness event and were later asked questions about the event that they were instructed to answer truthfully or by lying. Participants were also provided with positive feedback indicating they had provided a believable response on half of their responses. Their memory for the originally witnessed event was later tested after one week or four weeks using free recall and yes/no recognition. Whereas participants were successfully able to reject information they previously lied about after one week, they falsely assented to having witnessed their lies, including some of those they had previously rejected, after four weeks.
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6:00-7:30 PM (5178)

Differential Patterns of Phonological and Semantic False Memories Across Different Memory Systems. SHUOFENG XU, YI FENG, BRIDGET HORWOOD, and KAI CHANG, *Colby College*, DAWN M. MCBRIDE, *Illinois State University*, JEN H. COANE, *Colby College* (Sponsored by Dawn McBride) – Both long-term (LTM) and short-term (STM) memory are susceptible to false memories in list learning paradigms (Roediger & McDermott, 1995; Coane et al., 2007). However, it's not clear how the differences between these two memory systems affect false memories. We investigated whether the dependence on phonological coding in STM and semantic coding in LTM system would differentially affect the rate of semantic and phonological false memories. Combining the paradigms developed by Coane et al. (2007) and Flegal et al. (2010), we directly compared long-term and short-term phonological and semantic false memories. Our results demonstrated that phonological false memories were higher than semantic false memories in an STM task whereas the reverse effect was found in an LTM task. These data suggest that, although both memory systems are susceptible to reconstructive errors, the factors that drive such errors differ and reflect the preferential coding systems of the two stores.
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6:00-7:30 PM (5179)

Working Memory, Mindfulness, and False Memories. KERRI GOODWIN, EMILY COHEE, ALIYA GLADDEN, MALLORY KAHN, and CINDY MAKORI, *Towson University* – Prior research demonstrated that brief exposure to mindfulness meditation increased susceptibility to false memories in the DRM paradigm (Wilson et al., 2015). Others, however, have found contrary results depending upon how long the mindfulness meditation session lasts and when the session occurs relative to encoding DRM lists (Baranski & Was, 2017; Calvillo et al., 2018). What constitutes mindfulness meditation varies greatly as does the construct of mindfulness itself. We sought to examine mindfulness from an individual difference perspective ("dispositional" mindfulness) and used various measures of mindfulness as predictors of true and false recall. Because many descriptors of mindfulness focus on attentional monitoring and control, we also examined the role of working memory as an individual differences measure related to mindfulness and memory. We tested individuals using OSPAN and RSPAN to assess working memory capacity, four measures of mindfulness, and the DRM paradigm to measure true and false recall. Results are discussed within the context of different aspects of dispositional mindfulness (e.g., awareness and observation) and their relation to attentional control and true and false memories.
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6:00-7:30 PM (5180)

Memory for Medical Procedures in Diabetic Children and Adolescents. MINYU CHANG, *Cornell University*, TAMMY MARCHE, *University of Saskatchewan*, CHARLES BRAINERD, *Cornell University* (Sponsored by Valerie Reyna) – Seventy-eight 8- to 16-year-olds with Type 1 diabetes were recruited from summer camps for diabetic youth. Participants rated their pain and anxiety for a blood sugar test and an insulin injection and completed a recognition test for the details of this medical experience. Fuzzy-trace theory's conjoint recognition model was used to test theoretical predictions about how pain and anxiety affect underlying retrieval processes. The results showed that participants who experienced more intense pain during the medical experience had weaker verbatim memory for the surface form of this experience, which impaired true memory. Also, participants who experienced higher pain affect and anxiety during the experience exhibited stronger gist memory for the semantic content of this experience, which increased their susceptibility to false memory. In addition, verbatim and gist retrieval were affected by other diabetes-related factors, such as age of diabetes onset.
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6:00-7:30 PM (5181)

The Role of Sleep in the Consolidation of Incidentally Encoded Information. ELLE MARIE DELGROSSO and KIMBERLY M. FENN, *Michigan State University* (Sponsored by Kimberly Fenn) – We investigated the role of sleep in the consolidation of information that is not actively remembered using the DRM illusory memory paradigm. In two experiments, participants rated words in either a deep or shallow encoding task. Half of the participants rated words in the morning and half did so in the evening; all were given a surprise recognition test after 12 hours, either after waking or a period of sleep. In Experiment 1, list words appeared in order of descending associativity with the critical lure, and in Experiment 2, list words were presented randomly. We found higher correct recognition of list words and higher false recognition of critical lures after sleep than wake in Experiment 1, but in Experiment 2, preliminary results show no differences based on sleep condition. Together, these results

suggest that sleep may consolidate gist-based representations but does not consolidate veridical memory after incidental encoding.
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6:00-7:30 PM (5182)

Item-Based Directed Forgetting for Categorized Lists: Forgetting of Words Not Presented. AMANDA MONTAGLIANI and WILLIAM E. HOCKLEY, *Wilfrid Laurier University* (Presented by William E. Hockley) – The effects of item-based directed forgetting on recognition memory for categorized word lists was examined. All studied exemplars of half the categories were followed by a Remember cue and half by a Forget cue. In Experiment 1, a forced-choice recognition test showed that the effects of directed forgetting were greater when the distractor was from the same category as the target compared to a novel category. In Experiment 2, a yes-no recognition test showed that a directed forgetting effect was seen not only in higher hit rates for Remember-cued targets but also in higher false alarm rates. The false alarm rate was significantly greater for new exemplars from Remember-cued compared to Forget-cued categories, and significantly greater for new exemplars from Forget-cued categories than for exemplars from unstudied categories. The results demonstrate that item-based directed forgetting extends to entire semantic categories, including words that were not presented at study.
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6:00-7:30 PM (5183)

Measuring and Manipulating False Recollections in Recognition Memory. ALEXIS E. PAYNE, DEBORAH K. EAKIN, and MICHAEL S. PRATTE, *Mississippi State University* (Sponsored by Deborah K. Eakin) – Prominent theories of recognition such as the Dual Process Signal Detection (DSPD) model posit that studied items can be recognized by recollection. These models do not, however, allow recollection for nonstudied items, despite previous studies that find evidence for false recollection (e.g., Roediger & McDermott, 1995). We increased the potential for false recollection by including nonstudied word pairs that were implicitly associated with a studied pair. Amending the DPSD model to allow for false recollection, independent of nonstudied-item familiarity, provided a way to measure the impact of implicit associations on false recollection. As expected, false recollection rates were low for control items, whereas implicitly associated nonstudied pairs produced false recollection rates as high as 20%. This new model provides a way to quantify the rate of false recollection, which our experiment suggests can be prominent in conditions with strong implicit associations between studied and nonstudied items.
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IMPLICIT MEMORY

6:00-7:30 PM (5184)

Contextual Cueing with Very Brief Exposures of Search Displays. SARAH POULET, ANDRE DIDIERJEAN, and ANNABELLE GOUJON, *University of Bourgogne-Franche-Comté* (Presented by Andre Didierjean) – Contextual cueing (CC) refers to learning of regularities while searching for a target within predictive visual contexts, thereby making search more efficient. In the typical CC tasks, the search displays are available until a response is made, hence providing sufficient time for exploring the display. In two experiments, we investigated whether CC could occur when the search displays were presented very briefly, i.e. 50ms. After the presentation of each search display, participants had to report the target orientation (a T presented among Ls, Experiment 1), or its identity (a letter R or N presented within a configuration of other letters, Experiment 2). Overall, the results revealed CC in both experiments. The processes likely to be involved in this CC phenomenon, including iconic memory will be discussed.
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6:00-7:30 PM (5185)

Unification of Implicit and Explicit Memory Representations in Recognition and Priming Tasks After Sleep. JOHANNA SANCHEZ-MORA and RICARDO M. TAMAYO, *Universidad Nacional de Colombia* (Presented by Ricardo M. Tamayo) – The goal of this research was to assess whether or not sleep has different effects on the consolidation of explicit (recognition) and implicit (priming) knowledge. Eighty-nine healthy participants were randomly assigned to one of two experimental conditions: sleep or wake. All participants were first implicitly exposed to a sequence embedded in a SRT task, and were subsequently tested for their explicit and implicit knowledge both immediately after the learning session, and after 12 hours. In the sleep condition, participants had a night of normal sleep between the pretest and the posttest, whereas in the wake condition they did not. The measures included an explicit recognition task and a priming RT task for new and old fragments of the learned sequence. The sleep group performed better in both the implicit and the explicit tasks for old items. The wake group did not show significant changes between the pretest and the posttest in any measure. Additionally, quadratic correlations between implicit and explicit knowledge were found only for the sleep group. These results suggest that the systems cooperate during sleep to produce a unified representation of the knowledge acquired implicitly during the prior night.
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6:00-7:30 PM (5186)

The Influence of Retrieval-Induced Forgetting in Analogical Reasoning: Preliminary Findings From EEG. TANIA M. VALLE, *University of Granada*, CARLOS J. GÓMEZ-ARIZA, *University of Jaen*, TERESA BAJO, *University of Granada* (Sponsored by M. Teresa Bajo) – The effects of accessing relevant information during analogical reasoning have not been addressed in depth. In previous studies, we used an adaptation of the Retrieval-Practiced paradigm to explore the role of implicit memory accessibility during analogical problem solving. We found that reduced access to previously inhibited information disrupted analogical reasoning unconsciously. Although recent research has clarified the inhibitory neural substrates of retrieval-induced forgetting in episodic memory, the question still remains of whether equivalent mechanisms

lead to forgetting when analogical reasoning requires access and retrieval of relevant information. In this study, we replicated and extend the findings from the previous study by employing electrophysiological recording of brain activity throughout the experiment. We found that the retrieval of a subset of potential solutions led to forgetting of related non-retrieved solutions, which affected performance in a subsequent analogical reasoning test. ERP data suggest the involvement of inhibitory processes during selective retrieval. These findings are consistent with inhibitory accounts and advance our understanding of the neural correlates of analogical thinking.
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6:00-7:30 PM (5187)

Statistical Learning in a Noisy Environment Is Associated With Vocabulary. VIOLET KOZLOFF and AN NGUYEN, *University of Delaware*, JOANNE ARCIULI, *University of Sydney*, ZHENGHAN QI, *University of Delaware* – Robust statistical learning (SL) has been reliably demonstrated in numerous studies. However, SL often encounters frequent interruptions by random noise. The current study examines SL when structured sequences are interspersed with random interruptions. Forty-eight adult participants viewed interleaved Structured and Random sequences either from Same or Different domains (linguistic Letters and non-linguistic Images), while performing a target-detection task. After the exposure phase, participants completed a two-alternative forced-choice test and a Picture Vocabulary test (NIH toolbox). Both Same and Different groups showed significantly above-chance test performance (p's < 0.05). Response time (RT) slopes were steeper for Structured than Random sequences ($F(1,44) = 8.88$; $p = 0.005$). Higher vocabulary in the Different group was significantly associated with the RT slope measure of the Letters task ($r = -0.54$, $p = 0.007$). These results suggest adults are capable of SL even when the useful information is scattered in a noisy environment.
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6:00-7:30 PM (5188)

Examining the Reliability of Statistical Learning Tasks Across Domains and Modalities. AN NGUYEN, *University of Delaware*, YOEL SANCHEZ ARAUJO, *Princeton University*, WENDY GEORGAN, *Harvard University*, JOANNE ARCIULI, *The University of Sydney*, ZHENGHAN QI, *University of Delaware* – This study examines individual difference in statistical learning (SL) using four versions of the embedded triplet task across two domains (linguistic and non-linguistic) and two modalities (visual and auditory). Each task consisted of four triplets of each type: Letters, Syllables, Images, and Tones. 145 participants (76 males, mean age: 29.6) conducted a target-detection task during the exposure phase and a two-alternative forced-choice task during the test phase. 79 participants completed the same task 2 months later with different sets of triplets. Results showed significant learning (mean accuracy > 50%, p's < 0.001) in all tasks, with significant correlation between sharper decrease of reaction time and higher accuracy. Composite scores, computed by principal component analysis to extract the domain- and modality-general learning construct, showed a high test-retest reliability (rho = 0.58, $p < 0.001$), suggesting that that SL ability is more reliably measured with a composite score than a single task.
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6:00-7:30 PM (5189)

Sharing Associations Influence Color-Word Contingency Learning. BRADY R.T. ROBERTS, NOAH D. FORRIN, and COLIN M. MACLEOD, *University of Waterloo* (Sponsored by Colin MacLeod) – In the color-word contingency learning paradigm, each word appears more often in one color (high-contingency) than in the other colors (low-contingency). Shortly after beginning the task, color identification responses become faster on high-contingency trials than on low-contingency trials: the contingency learning effect. Across a series of experiments, the ratio of color contingency for any given word was held constant while the number of words associated with each color was varied. The usual contingency learning effect was replicated, however this effect was significantly attenuated when color-word contingencies were 'shared' among multiple words. Under an instance account, this reduction in the contingency learning effect could result from increased ambiguity in memory regarding color-word contingencies in past trials. Additional implications for the effects of multiple low contingency stimuli are also considered.
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6:00-7:30 PM (5190)

Visual Statistical Learning Based on Time Information. SACHIO OTSUKA, *Doshisha University* – This study examined whether visual statistical learning (VSL) occurred based on time information of objects. In the familiarization phase, participants observed a stream of visual objects that consisted of structured triplets. Specifically, forty-eight objects were presented in random order, but the durations of each of the three successive objects (i.e., triplet) were fixed in the same order (e.g., 500ms-900ms-650ms, 850ms-700ms-1000ms). In the subsequent forced-choice familiarity test, two sequences, a target sequence, which was a triplet that had a sequence of duration presented previously (e.g., 500ms-900ms-650ms), and a foil sequence, which was created with time information from a different triplet (e.g., 500ms-700ms-600ms), were presented. Participants were required to judge which of the two sequences were more familiar based on the prior familiarization phase. The results showed greater chance familiarity for the previously presented sequence. This result suggests that people can extract and learn the statistical regularities of visual items based on time information without conscious awareness.
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6:00-7:30 PM (5191)

Investigating the Predictions of a Memory-Based Account of Statistical Learning. SANDRINE GIRARD and ERIK THIESSEN, *Carnegie Mellon University* (Sponsored by Roberta Klatzky) – Statistical learning (SL) refers to the ability to extract statistical regularities from the environment. Many researchers believe that SL arises as a consequence of the way that information is stored and accessed in memory (Thiessen,

Kronstein, & Hufnagle, 2013). Accordingly, manipulations that influence memory should have similar effects in SL experiments. The current study investigated the impact of competition (namely, competition arising from similarity in the input) on the ability to segment words from fluent speech. Participants' performance was clearly influenced by this manipulation; for example, the ability to segment a word (e.g., "dupona") differed as a function of whether there was one frequent competitor (e.g., "dugalo") or several less frequent competitors (e.g., "dugalo," "dufalu," "dumiso"). Experimental results were compared to two memory-based computational models of SL (PARSER and TRACX). Implications of the experimental results and model comparisons will be discussed.
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6:00-7:30 PM (5192)

Interleaved Practice Enhances Implicit Learning of Motor Sequences. JULIA SCHORN, VAIBHAV THAKUR, and BARBARA KNOWLTON, *University of California, Los Angeles* (Sponsored by Barbara Knowlton) – Compared to blocking, interleaved practice of different tasks leads to superior long-term retention. This finding is well-documented in learning verbal materials, concepts, and skills. By one view, interleaving increases explicit retrieval practice of information, leading to better memory. However, it is not clear if implicitly learned information also benefits from interleaving. The present study used a serial reaction time task where participants practiced three different 8-item sequences that were either interleaved or blocked on Day 1 (training) and Day 2 (testing). Subjects were randomized into the Interleaved or Blocked training groups and were tested in either a Blocked or Random condition, counterbalanced across training conditions. There was a significant interaction between training group and Day, with the Interleaved group showing less forgetting from the end of Day 1 to the beginning of Day 2. In a test of explicit knowledge of the sequences, however, the interleaved group were able to produce on average fewer than 3 elements of the practiced sequences. These results suggest that the benefits of interleaving for retention extend to implicitly learned sequences.
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6:00-7:30 PM (5193)

Can Implicit Learning Techniques Help Children Understand Symbolic Magnitude? ERIN N. GRAHAM and CHRISTOPHER A. WAS, *Kent State University* (Sponsored by Chris Was) – Although the explicit presentation of conceptual information doubtlessly plays an important role in mathematics education, explicit instructional techniques place a heavy burden on children's working memory. This means that students with limited working memory resources are often placed at a disadvantage when it comes to learning foundational math skills in a traditional educational context. However, research in the field of artificial grammar acquisition suggests that implicit learning techniques can be successfully applied to domains that are working memory dependent, error persistent, and governed by complex rules that are difficult to articulate. The present study applied implicit learning techniques that have proven successful in artificial grammar acquisition- vanishing cues and errorless learning- to number line estimation training for second grade students. Our findings indicate that students performed better under conditions that facilitated implicit learning rather than explicit learning, which provides preliminary evidence in favor of mathematics interventions centered on implicit learning.
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6:00-7:30 PM (5194)

Adaptive Memory: An Exploration of the Survival Advantage in Sub-Saharan Africa. DANA M. BASNIGHT-BROWN, *United States International University*, STEPHANIE KAZANAS, *Tennessee Technological University*, JEANETTE ALTARRIBA, *University at Albany* – Research aimed at better understanding human memory has emphasized the role of survival relevant information and its influence on memory recall. Specifically, participants show better overall recall after reading scenarios that prime survival conditions as compared to control scenarios (Nairne et al., 2007), a phenomenon examined under various experimental paradigms in both recall and recognition conditions and reported mostly in Western cultures (see Kazanas & Altarriba, 2015). In order to determine whether traditional survival memory scenarios extend to a Nonwestern population, survival memory was examined in a Sub-Saharan African population. Results from 175 participants located in East Africa revealed no differences in recall for control, grasslands, and urban survival conditions. Language analyses (English as L1 vs. L2) and living condition (rural vs. urban) did not influence memory, yet socioeconomic status (SES) revealed that high SES participants produced significantly better memory for survival conditions as compared to low SES participants. Results will be discussed with reference to cross-cultural variables that may be moderating these effects.
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6:00-7:30 PM (5195)

The Influence of Race and Gender on the Recall of Occupations and the Recognition of Faces. TRAVIS REX RICKS and JESSIE FUHRMAN, *Bemidji State University* – This research investigated how race and gender affected the recall of presented occupations and the recognition of faces. Participants were presented pictures of faces selected from the Chicago Face Database. The faces were paired with stereotypical male or female occupations. Participants were then presented either matching or mismatching pairings of gender specific occupations with male or female pictures. In addition, half of the male and female pictures were classified as black while half were classified as white. Following the presentation of the face/occupation pairings, participants recalled the occupations to the best of their ability and recognized previously presented faces. The results of this research indicates that the gender and race of individuals affects whether their paired occupation is recalled. It was also observed that consistent and inconsistent pairings of gendered occupations with pictures of black and white males, and black and white females affected the recognition of faces.
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METAMEMORY II

6:00-7:30 PM (5196)

Integrating Multiple Cues in Metamemory: Using the Illusory Effect of Font Size and Level of Processing to Inform FOK Judgments. TASNUVA ENAM and IAN M. MCDONOUGH, *University of Alabama* (Sponsored by Ed Merrill) – Metamemory judgments are often prone to be influenced by misleading cues such as fluency. The present study investigated how multiple fluency cues influence FOK judgments with font size (large vs. small font size) as a perceptual cue and level of processing (deep vs. shallow processing) as a conceptual cue. In Experiment 1, participants studied large/small words and were either directed to process the words with conceptual links or to focus on the structure or appearance of the word pairs. Fluency manipulation phase was followed by a cued recall phase (cue—?), an FOK judgment phase (1-100 rating scale) and a recognition phase (5AFC). Experiment 2 was similar except the deep condition was replaced with a no-processing (no instruction) condition. Results revealed that large font size influenced FOK judgments only when word pairs were processed in the shallow condition in both experiments whereas for Experiment 1, deep processing overall led to higher FOK judgments compared to shallow processing. The interaction of multiple cues provide insight as to how people integrate different sources of information to inform metamemory decisions that is applicable both in academic learning and everyday decision making.
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6:00-7:30 PM (5197)

A Comparison of Self and Other Metacognitive Judgments. ROBERT TIRSO, *Texas A&M University*, LISA GERACI, *University of Massachusetts, Lowell* – People are often overconfident in their own cognitive abilities. We investigated whether overconfidence extends to judgments from or about other people. We compared self and other global metacognitive judgments on a variety of cognitive tests and settings. Across four studies, results showed that people were more confident in others' cognitive abilities than in their own. This pattern of results occurred in the classroom for grade predictions (Study 1), in the laboratory for standard cognitive test predictions (Study 2), when people knew others well or had just met (Study 3), and regardless of whether prediction accuracy could be verified (Study 4). These findings demonstrate that people are overconfident in their own cognitive abilities, but even more overconfident in others' cognitive abilities.
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6:00-7:30 PM (5198)

Training Confidence Calibration: Exploring Bias Blind Spot and Metacognitive Self-Regulation. VINCENT T. YBARRA and JINAN N. ALLAN, *University of Oklahoma*, ROCIO GARCIA-RETAMERO, *University of Granada*, ADAM FELTZ and EDWARD T. COKELY, *University of Oklahoma* (Sponsored by Edward Cokely) – General Decision Making Skill tends to predict an individual's confidence calibration in ratings of performance and perceptions of cognitive biases (Cokely et al., 2018; Cokely et al., 2012; poster by Ybarra et al., 2017). This was shown previously by using a bias blind spot (BBS) measure of cognitive biases and decision making tasks (e.g. the Berlin Numeracy Test and descriptive decision tasks from Toplak, 2011). To extend this work, the measures were again tested but with between subjects conditioned on completion of a pseudo-intelligent, online risk literacy tutor shown to improve decision making ability by one standard deviation (Woller-Carter, 2015; Ybarra et al., 2017). Results explore further what predicts an individual's confidence perception of one's decision skill and how confidence calibration is altered with mitigation. Discussion will focus on how training metacognitive strategies may influence self-regulation.
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6:00-7:30 PM (5199)

Forget Framing involves the Assumption of Mastery but Does Not Activate the Notion of Forgetting. BENJAMIN D. ENGLAND, *Missouri Western State University*, MICHAEL J. SERRA, *Texas Tech University* – Soliciting predictions about hypothetical memory performance—without having participants engage in the task—allows researchers to examine people's metacognitive beliefs about memory functioning. Using this methodology, researchers can vary what information is provided in the scenario and how the memory prediction is framed to examine how these alter people's memory predictions. In the present experiments, we sought to replicate the findings of Koriat et al. (2004), including an additional frame: whether or not the hypothetical learners had mastered the information. In our experiments, neither the forget frame nor mastery information seemed to consistently trigger participants' beliefs about forgetting. Participants' remember-framed predictions were higher when mastery was stated than when it was not but forget-framed predictions were not affected by mastery information. The present results indicate that the forget frame naturally involves the assumption of an initially high level of mastery but does not activate a "notion of forgetting."
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6:00-7:30 PM (5200)

Shifting Focus: A New Theory Explaining Harmful Overconfidence in Students. GABRIEL D. SAENZ and LISA GERACI, *Texas A&M University* (Sponsored by Lisa Geraci) – Students are often overconfident about how they will perform on an exam, a condition that reflects poor metacognition (awareness of one's thoughts and knowledge). Poor metacognition may cause students to stop studying prematurely and perform poorly on exams. Unfortunately, we do not completely understand why students have poor metacognition, so interventions thereupon have had mixed results. My preliminary research indicates that people are motivated to think positively about their future performance, and that making students aware of this bias can help improve their metacognition and performance. Therefore I propose a novel theory: students become more confident in their future performance over time, as they shift the focus of their predictions to motivated, optimistic information. Across three studies, I tested and replicated data showing that people shift away from accurate metacognition over time and investigated the possibility that these shifts are caused by

motivated optimism. Finally, Studies 4 and 5 tested the efficacy of interventions based on these findings in the classroom. These interventions used frequent feedback over time to prevent shifts towards unrealistic optimism.
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6:00-7:30 PM (5201)

Self-Regulated Learning Habits: Do They Vary With Context and Motivation? LISI WANG and VERONICA X. YAN, *University of Texas at Austin* – Prior research shows that overall, students tend to be inefficient, choosing less effective strategies over more effective ones. But, how do students' learning strategies vary with context and motivational beliefs? We conduct a rich exploration into students' study habits by instructing them to think of a particular "flag" course (writing, quantitative reasoning, or cultural diversity) at the University of Texas and to describe how they would study for an upcoming exam (both the distribution of 12 hours and use of that time). There was an overwhelming tendency to cram and to self-test oneself only toward the end of the study period. But patterns varied across individuals: Cramming was more likely in more senior students, those with weaker mastery approach goals, and those who have not taken a learning-related course. Students with mastery goals and productive interpretations of difficulty were more likely to diversify their study strategies, especially toward the end of the study period.
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6:00-7:30 PM (5202)

When Are Judgments of Learning Reactive? PARKER SORENSON and COLLEEN M. KELLEY, *Florida State University*, AINSLEY MITCHUM, *California Department of Motor Vehicles* – Metamemory judgments of learning (JOLs) are meant to measure naturally occurring monitoring of learning by asking participants to predict the probability that they will be able to recall each item on a future test, but they have been shown to be reactive. Mitchum, Kelley, and Fox (2016) found that participants asked to make JOLs change their learning goal away from mastery as reflected in a reduced correlation between study time and pair difficulty and a greater discrepancy between recall of difficult versus easy pairs. We tested whether reactivity is more likely when difficult pairs are relatively rare in a study list, as good performance can be achieved with an emphasis on easy pairs. The proportion of difficult pairs affected the reactivity of JOLs on study time allocation in line with the changed goal hypothesis.
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6:00-7:30 PM (5203)

Task Context Moderates the Influence of Perceptual Fluency on Judgments of Learning (JOL): A Role for Cue Saliency. EVAN MITTON, CHRIS FIACCONI, and SKYLAR LAURSEN, *University of Guelph* (Sponsored by Naseem Al-Aidroos) – Judgments of learning (JOLs) are predictions regarding the likelihood of remembering recently acquired information on a later memory test. Past literature has shown that such predictions are inferential in nature and can be informed by a variety of different cues. Here, we investigate the role of one such cue, namely perceptual fluency (experienced ease of perceptual processing) in guiding memory predictions. Given that previous research has yielded equivocal findings on this issue, the current study employed a novel experimental approach in which perceptual fluency was manipulated outside of participants' conscious awareness, allowing us to isolate its potential role in memory predictions. Across three experiments, we demonstrate that perceptual fluency can inform such predictions, but that its influence depends on the extent to which it is rendered salient by the method through which predictions are solicited. These results are discussed in relation to experience- vs. theory-based contributions to meta-memory judgments.
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6:00-7:30 PM (5204)

The Act of Giving a Wrong Answer Makes One More Sure That It Was Right. JOSHUA FIECHTER and NATE KORNELL, *Williams College* – Eyewitness memory research suggests that people are more confident in their retelling of events after repeated questioning (e.g., Shaw, 1996). We asked whether responses to general knowledge questions are subject to a similar effect. Participants were asked trivia questions (e.g., Who was the first U.S. President born outside of the original 13 colonies?) either once or three times. After the final presentation of each question, but before learning the correct answer, they made a confidence judgment. Confidence was higher for questions answered three times than once, even for incorrect responses, and even though no learning was observed during the questioning. This confidence inflation might have resulted from the fact that response times were substantially faster after answering a question three times versus once. These findings suggest that the more often one remembers something incorrectly, the more convinced they become that it is true.
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6:00-7:30 PM (5205)

Self-Regulated Category Learning: Learners Are Sensitive to Category Structure. XINYI LU, *Dartmouth College*, TREVOR B. PENNEY, *Chinese University of Hong Kong*, SEAN H.K. KANG, *Dartmouth College* (Presented by Sean H.K. Kang) – During learning, interleaving exemplars from different categories (e.g., ABCBCACAB) rather than blocking by category (e.g., AAABBBCCC) often enhances inductive learning, especially when the categories are highly similar. However, when allowed to select their own study schedules, learners tend to block rather than interleave (Tauber et al., 2012; Yan et al. 2016). We investigated whether learners' choices in a self-regulated category learning task depended on category structure. In Exp. 1, learners interleaved more often when the categories were highly similar (difficult to discriminate from each other), compared to when similarity was low. In Exp. 2, learners were presented with two sets of categories to learn; categories within each set were similar to each other, but categories were dissimilar across sets. When learners chose to interleave, they tended to switch to a similar rather than dissimilar category. Importantly, learners' study choices predicted their subsequent categorization performance. The findings suggest learners are

strategic in their search for commonalities within vs. differences among categories (Carvalho & Goldstone, 2014) and can regulate their study behaviors based on category similarity.
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6:00-7:30 PM (5206)

Relative Roles of Test Experience and Response Scale Format in Metacomprehension Judgment Accuracy. ELIZABETH A. GREEN, and MICHAEL J. SERRA, *Texas Tech University* (Presented by Michael J. Serra) – Prior test experience is a predictive cue for metacomprehension judgments. Whether judgment accuracy after test experience can be further improved by varying response scale format is unknown. Our participants studied eight texts, made metacomprehension judgments, and completed two tests (each covering four of the eight texts). One group made generic metacomprehension judgments on a single number line before each test ("How well did you comprehend this text?"). A second group made generic judgments before Test 1 and time-differentiated judgments, phrased as "prior to Test 1" and "at the present time," before Test 2. A third group made no judgments before Test 1 and time-differentiated judgments before Test 2. Post-test judgment accuracy improved in all conditions, but participants' judgment adjustments in the latter two groups were even more accurate. Scale format changes can enhance metacomprehension accuracy, particularly when they prompt participants to re-evaluate earlier judgments with consideration for acquired test-related information.
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6:00-7:30 PM (5207)

Exploring the Mechanisms Underlying Judgment of Learning Reactivity on Actual Learning Using Eye-Tracking Measures. IVAN CARBAJAL and ANTHONY J. RYALS, *University of North Texas*, AMBER E. WITHERBY and SARAH "UMA" TAUBER, *Texas Christian University* (Sponsored by Kenneth Leising) – Recently, researchers have demonstrated that judgments of learning (JOLs) enhance learning of related word pairs (e.g., Soderstrom et al., 2015). One theoretical explanation for this finding, is that JOLs strengthen the relationship between the cue and target, which increases the likelihood that the target will be recalled on a test. Even so, JOLs may also produce a small attentional benefit that enhances learning of related word pairs. This possibility was investigated in the present research. Participants studied a series of word pairs. Half of the participants made an oral JOL for each and half did not. After study, participants took a cued-recall test. During the task, eye-movements including fixations, and pupillary dilation were recorded. This allowed us to quantify attentional allocation during JOL generation. Participants who made JOLs outperformed participants who did not. The use of psychophysiological measures in the study of metacognition offers advanced understanding, and implications will be discussed.
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6:00-7:30 PM (5208)

Prompting Judgments of Learning With Criterial Information Improves Metacomprehension Accuracy. ROBERT ARIEL and JEFFREY D. KARPICKE, *Purdue University* – Research examining paired associate learning indicates that people's judgments of learning (JOLs) are more accurate when JOLs are framed to encourage retrieval of the target information (target absent JOLs) than when JOLs are framed to encourage restudy (target present JOLs). As a consequence, researchers recommend that students should set the material they need to remember aside before making JOLs for it. The current experiments evaluated the validity of this recommendation for monitoring one's learning of educationally relevant texts. Across 4 experiments, learners read several sections of a science text and made JOLs for each section with either the target information they were expected to remember present or absent. Surprisingly, JOLs were always more accurate when target information was present than when the target information was absent. These findings contradict results from the paired associate learning literature and suggest that current educational recommendations about how to elicit JOLs may be misguided.
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6:00-7:30 PM (5209)

Exploring the Effect of Self-Referential Encoding on Memory and Metamemory for Rich Stimuli. LINDSEY WRIGHT and TROY A. SMITH, *University of North Georgia* (Presented by Troy A. Smith) – Self-referential processing during encoding has been shown to lead to improved memory relative to semantic processing; however, the impact on metamemory is not well understood, nor are the effects of individual difference variables. We address these questions in an experiment in which participants (n=184) were either trained on how to use self-referential processing as a study tactic or performed analogical reasoning tasks as a control. Participants also completed a brief Need for Cognition (NFC) scale. Participants then studied 60 trivia facts and took a cued recall test. Metamemory was measured using judgments of learning (JOLs) during study and confidence judgments during test. There were no significant differences in accuracy, confidence, or JOLs between the groups, suggesting that the self-reference effect may not generalize to rich stimuli. NFC scores were positively correlated with accuracy and confidence ratings in the experimental group, suggesting that NFC moderates self-reference effects on memory and metamemory.
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6:00-7:30 PM (5210)

Fact vs. Fiction: The Influence of Learning Styles and the Testing Effect on Predictions of Memory Performance. SABRINA BADALI, JOANNA REEDER, HUNTER ANDERSON, GIUSEPPE PAUCARPURA, and SHANNON MCGILLIVRAY, *Weber State University* – Many incorrectly believe that learning styles influence one's ability to learn. Conversely, the testing effect typically does lead to improved memory performance. The current study examined the effect of learning styles and the testing effect on predictions of and

actual memory performance. Participants made global JOLs as well as an ease of learning judgement before receiving "verbal" and "visual" lessons both with and without practice questions. After each lesson, participants completed a test on the material. Memory performance was the same regardless of whether the lesson was within the participants' preferred learning style. However, participants' JOLs were significantly higher for lessons that matched their learning style. Lessons with practice questions were associated with higher JOLs and scores on the final memory tests. These results suggest that students are aware of the beneficial effects of retrieval practice, but continue to overestimate the beneficial effect of learning within one's preferred "style."
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6:00-7:30 PM (5211)

Expectations About Type of Recognition Test Affects Alignment of Retrospective Confidence Judgments With Accuracy. MICHAEL S. COHEN and PAUL J. REBER, *Northwestern University* – Expectations about future test format (e.g., free recall vs. recognition) have been shown to elicit study strategies leading to better performance and more accurate metamemory judgments on tests in the expected format. Here, participants studied novel abstract kaleidoscope images, and test expectancy was created by random assignment to either yes-no (YN) or forced-choice (FC) recognition tests interspersed after some study blocks. FC tests were made challenging by using similar foils, roughly equating accuracy across tests. A surprise final test was administered in either the matching (expected) or non-matching format, with only previously-untested stimuli analyzed. For the YN test, memory accuracy was higher in the matched condition. Alignment of confidence with accuracy, as measured by meta-d' or gamma correlations, was higher for YN tests and was marginally higher across test types when final tests matched the expected format, but meta-d' < d' only on an unexpected FC test. These results are consistent with YN tests relying more on explicit memory that can be consciously accessed, leading to accurate metamemory, while metamemory accuracy on challenging FC tests depends on an encoding strategy appropriate to the test.
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6:00-7:30 PM (5212)

Learning From Your Own vs. Others' Metacognitive Errors in a Social Information-Sharing Setting: Evidence for Hypercorrection? JENNIFER A. MANGELS, *Baruch College, The City University of New York*, CASEY M. WILLIAMSON, *The Graduate Center, City University of New York* – The higher the confidence we have in our own errors, the better we learn from feedback to correct them, an effect known as hypercorrection (Butterfield & Metcalfe, 2001). But do we similarly hypercorrect errors resulting from confidently accepting inaccurate information from otherwise trusted, highly-confident outside sources? The answer appears to be no. In a novel general-knowledge retrieval task, participants provided an initial answer and confidence, but before settling on a final response, were offered alternative answers from three different sources who usually had accurate metacognition regarding answer accuracy (70%), but sometimes made high-confidence errors (30%). Confidence in one's initial, self-generated error positively predicted error correction on a later retest, replicating the original hypercorrection effect, however selecting a source's high-confidence answer that corrective feedback revealed to be inaccurate resulted in relatively poor retest correction outcomes. Contributions of novelty, prediction error, and semantic fluency (see www.mangelslab.org/bknorms) to these effects are considered, as are general implications for confidence-cued trust heuristics in our social-media flooded, Wikipedia-dependent world.
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6:00-7:30 PM (5213)

Enhanced Integrative Encoding Through Active Control of Learning. DOUGLAS MARKANT, *University of North Carolina at Charlotte* – Active control of learning improves episodic memory relative to passive observation, in part due to increased metacognitive monitoring when learners decide which material to study. It is less understood how active control impacts the formation of relational knowledge in which studied episodes are linked together to support inference and generalization. This study employed a novel transitive inference task to examine the effects of active control on both memory for directly experienced associations and the formation of relational knowledge ("integrative" encoding). Participants learned ordinal hierarchies by studying individual premises (e.g., A < B, B < C) either through passive observation of predetermined sequences or active selection of pairs. They were tested for memory of studied premises and the ability to make transitive inferences across pairs. Active selection led to increased integrative encoding such that participants constructed an schematic representation of the hierarchy to make study decisions, a strategy that was associated with robust improvements in both recall and inference after a week delay. These findings show how the opportunity to exert control over learning can lead to more effective encoding strategies.
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RECOGNITION MEMORY II

6:00-7:30 PM (5214)

Memory Binding Errors for Multimodal Naturalistic Stimuli. MARIANNE E. LLOYD and NICOLE OPPENHEIMER, *Seton Hall University*, AMY LEARMONTH, *William Paterson University* – Robust associative memory errors have been reported for visual stimuli including words and pictures. The present experiment tested whether picture sound pairings would show similar effects. Using animal-sound pairings, a study of 63 undergraduate students showed that robust false alarms occurred for elements that were re-paired at test relative to the rate of endorsement of novel pictures or sounds. Further, the rate of errors was similar to that of older children tested in a separate experiment. Implications for memory binding theories including the role of semantic memory in episodic decisions will be discussed.
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6:00-7:30 PM (5215)

Face-Name Associative Recognition: The Effects of Major Depression. SHEILA R. MELDRUM, *University of Texas at Dallas*, CRYSTAL COOPER and AYSHA NAJJAB, *University of Texas Southwestern Medical Center*, TIMOTHY ODEGARD, *Middle Tennessee State University*, MARISA TOUPS, *University of Texas at Austin*, JAMES C. BARTLETT, *University of Texas at Dallas* (Sponsored by James Bartlett) – Major Depressive Disorder (MDD) is characterized by mood and cognitive complaints, as well as deficits in episodic memory. We aimed to better characterize these episodic memory deficits by contrasting MDD patients' (ages 19-60) associative memory performance to that of normal populations (healthy older adults, ages 60-80, and younger adults, ages 19-30). Participants studied face-name pairs then took a recognition test containing studied pairs, recombined pairs, and entirely new pairs. Free-responses to recombined pairs were also recorded and identified as reflecting one of three levels of specificity of content. MDD participants performed similarly to older adults and significantly worse than younger adults. However, free-response data revealed differences in the specificity of content accompanying "recombined" judgments. Our findings indicate both MDD and older adult groups show an associative memory deficit, but the deficit may result from different underlying pathological processes in these two groups, perhaps reflecting differing degrees of hippocampal dysfunction.
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6:00-7:30 PM (5216)

Context-Dependent Recognition with Pre-experimentally Familiar and Unfamiliar Picture Contexts. TYLER M. ENSOR, *Memorial University of Newfoundland*, WILLIAM E. HOCKLEY, *Wilfrid Laurier University*, AIMEE M. SURPRENANT, *Memorial University of Newfoundland* (Sponsored by Aimee Surprenant) – Memory is generally better when testing takes place in the study context than when testing takes place in a new context (Godden & Baddeley, 1975). In recognition, a common paradigm used to investigate context effects involves presenting targets against different background pictures at study (Hockley, 2008; Murnane, Phelps, & Malmberg, 1999). At test, half of the targets are tested with the picture from study, and half are presented with a new picture. Distractors are similarly divided between old and new pictures. Although subjects are instructed to only study the words, recognition decisions are affected by the pictures, with more "old" responses made to probes presented with pictures from study. Here, we assessed whether pre-experimental familiarity enhances this effect. We tested students on two university campuses with pictures from their campus (familiar) or the other campus (unfamiliar). Results showed greater context-dependence for familiar pictures than unfamiliar pictures.
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6:00-7:30 PM (5217)

The Influence of Associating Faces With Repeated vs. Different Scenes on Context Reinstatement Effects. CHRISTOPHER LEE and MYRA A. FERNANDES, *University of Waterloo* (Sponsored by Myra Fernandes) – The context reinstatement (CR) effect suggests that memory improves when the context in which a person is initially met is reinstated at test. Anecdotally, however, familiar faces are easily recognizable regardless of context, possibly because we have seen them in a multitude of different places. To examine the role of face familiarity and context type on CR effects, we presented faces 1, 3, or 10 times, in a Pre-Exposure phase, paired with either the same scene repeatedly or with different ones. In the ensuing Encoding phase, faces were presented alongside one of the contexts with which they were previously paired. On a later Recognition test, faces were paired with either the same context scene as during Encoding, or with a new one. Results indicate that memory for the faces pre-exposed with the same scene repeatedly was enhanced when that context was later reinstated, and this effect occurred regardless of number of pre-exposures. For faces pre-exposed with a variety of contexts, the CR effect diminished as pre-exposures increased. Findings suggest that reinstating context is beneficial for faces previously associated with a single context. For those we have seen in various contexts, CR does not offer as much support to memory.
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6:00-7:30 PM (5218)

Familiarity Increases Recollection Confidence but not Recollection Accuracy. ANDREW M. HUEBERT, ANNE M. CLEARY, and KATHERINE M. WHITE, *Colorado State University* (Sponsored by Anne Cleary) – Much research has investigated the idea that recognition memory involves two processes: familiarity (a sense that something was encountered) and recollection (retrieval of context). However, little is known about how familiarity might influence recollection. One reason may be the prevalent assumption that these processes are independent. Our study examined whether increasing familiarity increases recollection confidence when recollection is absent. We used the recognition without cued recall paradigm to systematically vary familiarity intensity during recollection's absence by increasing the feature-overlap of cues to unretrieved memory representations. Increasing feature overlap increased perceived cue familiarity during retrieval failure replicating prior work. Increasing feature overlap also increased source memory confidence (a measure of recollection), despite having no effect on source memory accuracy. These results suggest that recollection confidence is influenced by familiarity level, which has implications for recognition memory theory.
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6:00-7:30 PM (5219)

Revisiting How Levels of Processing Influence Recollection and Familiarity: Comparing Judgment and Rating Measures. HELEN L. WILLIAMS and JAMIE ADAMS, *Keele University*, GLEN E. BODNER, *University of Calgary* – Although a deeper Level of Processing (LOP) usually boosts recollection, effects on familiarity are mixed; and comparisons across studies are difficult due to differences in methods and instructions. We compared the influence of LOP on recognition states across three methods: 1) mutually exclusive Recollect/Familiar/Guess (RFG) judgments; 2) non-mutually exclusive Recollect/Familiar/Both/Guess (RFBG) judgments, where participants

could report having both recollection and familiarity for an item; 3) independent Recollect and Familiar (RF) ratings, where occurrence and strength of each state was rated for each item. Both RFG and RFBG judgments demonstrated dissociative effects of LOP, with deeper encoding resulting in increased recollection and decreased familiarity. In contrast, RF ratings showed parallel increases in both recollection and familiarity after deep encoding. Based on our findings, we offer guidelines for collecting reports of recollection and familiarity, and suggest that how experiential states are conceptualized in theories of recognition memory should be aligned with how they are assessed.
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6:00-7:30 PM (5220)

Avoiding the Work of Introspection During Recognition: Evidence for a "Laziness Bias". CASSIE GREENWALD and JUSTIN KANTNER, *California State University, Northridge*, IAN G. DOBBINS, *Washington University in St. Louis* – Experiments intending to measure the content of memory invariably measure other cognitive factors, such as participant response strategies, in addition to memory per se. Here we test the possibility that the collection of secondary memory assessments may induce what we refer to as a "laziness bias," a tendency on the part of participants to avoid a given response when it entails additional "work" (cognitive effort) compared to an alternative. We tested whether even simple numerical ratings of confidence would evince a laziness bias. After making a recognition judgment, participants rated the confidence of the judgement following only "old" responses, only "new" responses, or both types of response (between-subjects). Participants adjusted response bias in order make fewer confidence ratings where possible. Introspective demands that are unbalanced across judgment types elicit biases that favor ease over the natural classification of memories and can lessen the availability of the reports of interest.
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6:00-7:30 PM (5221)

Searching Through Memory Along a Compressed Timeline: A Continuous Recognition Task With Multiple Repetitions. JOHN E. SCOFIELD, MASON H. PRICE, ANGELICA FLORES, EDGAR C. MERKLE, and JEFFREY D. JOHNSON, *University of Missouri* (Sponsored by Jeffrey Johnson) – Memory studies employing recognition or recency judgments have demonstrated diminished performance with increasing lag between a retrieval cue and target memory. These effects can be interpreted as reflecting sequential scanning back in time, whereby response times (RTs) indicate the termination of the search process. Moreover, recent behavioral and neural findings have suggested that the represented timeline is compressed, resulting in nonlinear RT increases as a function of lag. Here, we sought to evaluate the sequential-scanning account as it relates, in particular, to multiple repetitions of common test items (words and pictures). Subjects completed a continuous recognition task by making old/new judgments to items repeated up to three times across lags up to 34 items. Multilevel modeling of the RTs indicated logarithmic increases with lag for the first repetition, but this effect was attenuated on later repetitions. These findings thus provide partial support for backwards scanning along a compressed representation of time. However, this process may be overridden by more general mechanisms related to fluency with additional repetition.
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6:00-7:30 PM (5222)

Equating Interference on an Initial Test Eliminates the Negation Effect. RACHEL E. DIANISKA, CHRISTIAN A. MEISSNER, and JASON C.K. CHAN, *Iowa State University* (Sponsored by Christian Meissner) – The negation effect refers to the relative memory impairment associated with correctly saying "no" (a negation) to a statement on an initial test, compared to correctly saying "yes" (an affirmation). In Experiment 1, we conceptually replicated the negation effect using a single-item presentation list-learning paradigm. In Experiment 2, we adapted the initial test to examine the contributions of initial test uncertainty and differential interference to final test errors. Participants studied a set of simple objects with varied features. Next, participants completed either the standard initial test or an adapted interference-equated initial test. For all items, participants had the option to respond "don't know". After a 20-minute retention interval, participants completed a final recognition test on which they indicated whether an object was present or not present in the encoding phase. A significant negation effect (i.e., more errors following a negation, compared to an affirmation) was observed when we allowed participants to indicate their uncertainty on the initial test, but the effect disappeared when we introduced an interfering item to both affirmed and negated statements.
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6:00-7:30 PM (5223)

Mnemonic Consequences of Encoding Items During Memorization Mode vs. Retrieval Mode. JASON MCCAIN and BENTON PIERCE, *Texas A&M University, Commerce*, DAVID GALLO, *University of Chicago* – During retrieval people often imagine or recapitulate encoding events to try to cue their memories for nonstudied items. To avoid the generation of misinformation, we hypothesized that this retrieval information might not be encoded as deeply as information generated during memorization attempts. To test this hypothesis, participants encoded words once during a memorization phase (targets) or once during a retrieval phase/initial memory test (lures). Critically, some of the targets did not occur on this initial memory test, thereby matching these targets and the lures on the number of initial encoding presentations. A final memory test was given for all items. Across several experiments, memory on this final test was driven more by the initial stimuli exposure time than the encoding context (i.e. memorization mode vs. retrieval mode). These findings do not support the hypothesis that retrieval mode leads to less robust encoding, suggesting that some other process minimizes retrieval-generated misinformation.
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6:00-7:30 PM (5224)

An Examination of Feature Loss Over Time in Auditory Memory. AMBER CARLETON and MELISSA GREGG, *University of Wisconsin, Parkside* – Research on visual memory has indicated that the features of visual memory representations are lost at different rates, rather than decaying as bound representational units. The purpose of this study was to examine how the features of auditory representations are lost over time. Participants received a study phase with 128 environmental sounds, followed by a recognition memory test. During the memory test, participants were presented with sounds that were old (presented during study), new (not presented during study), exemplar foils (same-category variants of objects presented during study), or state foils (studied objects slightly altered in an acoustic feature). Participants were instructed to classify each sound as "old" or "new" by pressing a corresponding key. The results suggest that the features of auditory memory representations are lost at different rates, rather than decaying as bound units. These results contribute to our understanding of how the world is represented in auditory long-term memory.
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6:00-7:30 PM (5225)

Different Mechanisms of Forgetting for Words and Pictures. EMMA MEGLA, LAURA JANAKIEFSKI, and ASHLEIGH M. MAXCEY, *The Ohio State University* – Recently we found that each encounter with a picture of an object appears to trigger a difference-of-gaussian memory activation pulse in which the encountered item is activated and flanking categorical items are suppressed and forgotten. Alternatively, people have proposed that forgetting is due to inhibition needed to retrieve a representation from memory. However, these different theoretical proposals have been tested with different stimuli. Here we used both pictures and words and found that memory for words was consistent with the inhibition account whereas memory for pictures was consistent with the difference-of-gaussian activation account. Specifically, forgetting was retrieval specific for words in that forgetting occurred only when words were recognized and not when words were merely restudied. However, forgetting was not retrieval specific for pictures in that forgetting occurred both when pictures were recognized as well as restudied. These findings demonstrate that the mechanisms underlying forgetting differ dependent upon the nature of the memoranda.
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6:00-7:30 PM (5226)

Recognition-Induced Forgetting of Temporally Related Visual Episodic Memories. YOOLIM HONG, ASHLEIGH M. MAXCEY, and ANDREW B. LEBER, *The Ohio State University* (Sponsored by Andrew Leber) – Previous research suggests that retrieval practice of learned stimuli can cause the forgetting of semantically related memories. We asked whether access-based forgetting occurs for a broader range of memories, specifically semantically distinct but temporally grouped episodic memories. We employed a modified recognition-induced forgetting paradigm in which objects were presented in sequential triplets. In the initial study phase, every three consecutive objects were grouped as triplets to impose temporal groupings. Next, in the recognition-practice phase, subjects made old-new recognition judgments in response to the middle objects from half of the triplets. In the final test phase, memory for all the study phase objects was tested. We found that non-practiced objects from practiced triplets were forgotten relative to a baseline comprised of objects in the same serial positions of non-practiced triplets. These results suggest that access-based forgetting phenomena represent a more ubiquitous forgetting effect than previously assumed.
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6:00-7:30 PM (5228)

What Coding for Images in Visual Long Term Memory? ANNABELLE GOUJON and NICOLAS TRIBOUT, *Université de Bourgogne Franche-Comté* – What is the content and format of visual memories in LTM? To address this issue, we investigated how memory for meaningless and meaningful images evolves over time. In a learning phase, participants were exposed to hundreds of images that were presented once or twice during 120ms or 1920ms. Immediately after, three weeks, six weeks, or a year later, their memory was accessed through a recognition task. The results suggest that multiple and prolonged exposures are required to maintain an image in "very" LTM. Furthermore, although a strong benefit was observed in the meaningful condition when memory was assessed immediately after learning, this benefit disappeared over weeks. Similar patterns were observed regardless of the age of the participants, the implicit or explicit nature of the instruction and the presence/absence of sleep between two learning sessions. Those results suggest that although semantic information enhances considerably the encoding & maintaining of images in a "transitory" LTM system, conceptual and/or verbal codes do not seem to be what remains in LTM over weeks. How declarative and non-declarative memory systems might interact during the encoding and consolidation of memories in visual LTM will be discussed.
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6:00-7:30 PM (5229)

Inconsistent-Handers Have Better Source Memory for Spatial, but Not Temporal, Aspects of Verbal Stimuli. STEPHEN CHRISTMAN, *University of Toledo* – Propper and Christman (2004) reported no differences in recognition accuracy between consistent- and inconsistent-handers. They also found that, for successful recognition, inconsistent-handers reported more "remember" than "know" judgments; consistent-handers had equal numbers of "remember" and "know" responses. This suggests better source memory in inconsistent-handers. However, this could reflect a response bias whereby inconsistent-handers were more prone to say "remember". To address this, we replicated the procedure of Propper and Christman but, instead of asking for "remember" versus "know" judgments, participants were asked to remember, for each recognized item, (i) whether it appeared in the first, second, or third of three lists of stimuli, and (ii) whether it appeared in the top, middle, or bottom of the screen. There were no handedness differences in hit rate, false alarm rate, or memory for temporal

list. However, inconsistent-handers had better memory for stimulus location, suggesting there is a handedness difference in source memory.
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6:00-7:30 PM (5230)

Delta Plot Response Time Analysis of Bias in Recognition Memory. RYAN A. CURL, *Syracuse University*, COREY N. WHITE, *Missouri Western State University*, AMY H. CRISS, *Syracuse University* (Sponsored by Corey White) – It is well established that analysis of response time distributions and accuracy improves understanding of yes/no recognition memory. Sequential sampling models have provided a valuable method of measuring parameters associated with cognitive processing based on RT and accuracy. However, most implementations of these models provide static values for the parameters. For example, the diffusion model provides a static value for bias one that does not describe how bias unfolds over the course of the decision. To better understand how different types of information are evaluated over the course of the decision, we turn to the delta plot analysis technique. We present a delta plot analysis of several recognition memory data sets and consider how they might inform models of recognition memory.
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6:00-7:30 PM (5231)

Comparing Recognition-Memory Models Under Minimal Assumptions: Two-High-Threshold Theory Can Predict Ranking Judgments. SIMONE MALEJKA, *University College London*, DANIEL W. HECK and EDGAR ERDFELDER, *University of Mannheim* – Using a K-alternative ranking task (KART), Kellen and Klauer (2014) compared recognition-memory models with continuous memory strength (signal-detection theory) to models with discrete memory states (two-high-threshold theory). In their experimentum crucis, the conditional probability of targets being assigned Rank 2 given that they were not assigned Rank 1 was higher for strong targets than for weak targets. Because this finding is only predicted by signal-detection theory, the authors suggested to reject threshold theory for this paradigm. However, this conclusion only holds when the probability of lure detection in the threshold model is invariant to changes in target strength. We tested this critical assumption: A model-based test using a new threshold model tailored to KARTs showed that the conditional probability increases with the lure-detection probability, which is higher in the context of strong targets. A model-free test using a new forced-choice-then-ranking task showed that lures are more likely to be detected in the context of strong targets, even when the targets were not detected. Hence, threshold models can predict KART performance as long as the lure-detection probability is allowed to vary with target strength.
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6:00-7:30 PM (5232)

Effects of Reward on Memory for Gist and Detail. LIYANA T. SWIRSKY, *Ryerson University*, RYAN M. MARINACCI, *University of Toronto*, JULIA SPANIOL, *Ryerson University* – Reward influences memory, but its relative effects on different levels of memory representation remain unknown. Recent research suggests that the anterior hippocampus – a region with rich connectivity to the reward circuit - represents gist, whereas posterior hippocampus represents detail. This leads to the prediction that reward may exert greater influence on memory for gist than on memory for detail. In the current study, we tested this hypothesis in an incidental memory paradigm. During encoding, participants (N=50) viewed object pairs and were cued to indicate whether the objects came from the same semantic category (gist) or whether they represented the same object (detail). Potential for virtual points (high vs. low), tied to fast and accurate responding, varied across encoding blocks. Reward modulated recognition of gist items but not of detail items, consistent with the theory of a gist-vs.-detail gradient along the longitudinal axis of the hippocampus.
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6:00-7:30 PM (5233)

The Effects of Emotion-Induced Attentional Focus on Memory Formation. AMABEL JEON, SOLANGE RESNIK, GABRIELLA FEDER, and KYUNGMI KIM, *Wesleyan University* – Past work on the effects of emotion on memory had mainly focused on emotional valence and arousal. An important aspect of emotion that has received little attention is how an inward- vs. outward-directed attentional focus induced by self-conscious emotions (SCE, e.g., shame, pride) vs. basic, non-self-conscious emotions (NSCE, e.g., anger, happiness) may differentially affect individuals' ability to form new memories. We addressed this aspect by first having participants write a passage about a time they felt "very ashamed" (SCE group) or "very angry at someone" (NSCE group), or transcribe a recipe (Control group). Then, in an ostensibly unrelated study, participants incidentally encoded to-be-remembered target words. In a subsequent memory test, we found worse item memory for target words in the SCE group compared to the NSCE and Control groups. Source memory for target words did not significantly differ between the three groups. These findings suggest that emotion-induced attentional focus mainly affects encoding of the "gist" of subsequent experiences. Going beyond emotional valence and arousal by examining the role of emotion-induced attentional focus, our findings advance the understanding of how emotion affects memory.
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STATISTICS AND METHODOLOGY II

6:00-7:30 PM (5234)

Development of Parallel Test Forms for the Berlin Numeracy Test: Measuring Risk Literacy. JINAN N. ALLAN and SAIMA GHAZAL, *University of Oklahoma*, ROCIO GARCIA-RETAMERO, *Universidad de Granada*, EDWARD T. COKELY, *University of Oklahoma* (Sponsored by Edward Cokely) – The Berlin Numeracy Test (BNT) is one of the world's most efficient predictors of skilled decision making and risk literacy. Over the last six years, the BNT has been taken by more than 100,000 people across 36 countries (www.RiskLiteracy.org). To avoid potential item familiarity or confounds with participant

exposure to content, the present studies aim to create and validate two new parallel test forms of the Berlin Numeracy Test. Using a cloning procedure, Classical Test Theory, and Item Response Theory, results demonstrate the new tests satisfy conditions of parallelism (e.g., matching factor structure, reliability, and item and test information functions). Discussion focuses on potential uses of the new measurement tools, including public outreach efforts, and in scientific research and assessment (e.g., longitudinal or training studies).
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6:00-7:30 PM (5235)

Further Investigations of how Rare Disaster Information Affects Risk Taking: A Registered Replication Report. GARSTON LIANG and BEN NEWELL, *University of New South Wales, Sydney*, TIM RAKOW, *Kings College London*, ELDAD YECHIAM, *Technion-Israel Institute of Technology* (Sponsored by Eldad Yechiam) – Across two experiments, Newell, Rakow, Yechiam & Sambur (2016) demonstrated that providing rare disaster information increased people's tolerance for risk-taking. This result was robust over several hundred rounds of choices in a computer controlled micro-world, persisted even when the long-run expected value of the risky choice was substantially lower than the safe choice, and held across population groups (total N = 180) from two different countries. The results also motivated a series of large-N, as yet-unpublished follow-up experiments involving new manipulations. However, the failure to replicate the original finding in these follow-ups has led our confidence in the original effect to wane. In light of new data from a pre-approved registered replication, we aim to reconsider the evidence, published and unpublished, for the rare disaster information effect. A preregistered replication establishes an ideal framework for addressing the current discrepancy between published and unpublished results.
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6:00-7:30 PM (5236)

Connecting Behavior Across Tasks Using Joint Cognitive Models: Impulsivity in Delay Discounting and Cambridge Gambling Tasks. PETER D. KVAM, RICARDO J. ROMEU, and JEROME R. BUSEMEYER, *Indiana University*, JASMIN VASSILEVA, *Virginia Commonwealth University* – Decision-making tasks generate behavioral metrics that can be used to characterize cognitive differences between individuals. These metrics can often be improved by examining the parameters of cognitive models, which quantify behavior in terms of variables like reward sensitivity, memory, or choice variability. Different tasks typically demand different cognitive models, but these models often contain analogous parameters. We propose a method for simultaneously these analogous parameters using a hierarchical Bayesian structural equation model, using the cognitive models as the measurement component describing task performance. Doing so allows us to obtain more precise estimates of the latent traits underlying behavior and assess the quality of our tasks and models by quantifying their connection to these latent traits. We illustrate the power of this approach by modeling substance dependent and control group performance on delay discounting and Cambridge gambling tasks, which both measure impulsivity as discounting of future rewards. The joint model estimates indicate differences in impulsivity estimates between substance dependent and control groups, which cannot be identified by standard behavioral metrics.
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6:00-7:30 PM (5237)

Avoiding Illusory Bayesian Inferences. ALEXANDER ETZ and JOACHIM VANDEKERCKHOVE, *University of California, Irvine* (Sponsored by Joachim Vandekerckhove) – The outcome of a Bayesian statistical analysis is a posterior distribution over all unknown quantities in the model. Researchers usually report a number of simple summary measures of the posterior distribution, such as 95% highest density intervals (HDI) for each parameter. Unfortunately, inferences based on these and other summary measures can be illusory because they depend on arbitrary parameterization choices. Consider a ROPE (region of practical equivalence) test, in which we reject a null parameter value when the HDI falls outside the ROPE. Our inference depends entirely on how we choose to parameterize the model. Data may lead to an HDI outside the ROPE for one parameterization, and hence rejection of the null value. However, for an alternative - equally valid - parameterization the HDI can encompass the entire ROPE, leading to a clear non-rejection of the null. We present a number of problematic posterior summary measures and suggest alternatives that lead to parameterization-invariant inferences.
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6:00-7:30 PM (5238)

Dial M for Monotonic: A Kernel-Based Bayesian Approach to State-Trace Analysis. GREGORY EDWARD COX, *Vanderbilt University*, MICHAEL N. KALISH, *Syracuse University* – A monotonic state-trace implies that a single latent factor is sufficient to explain the joint variation between two outcome variables across a set of conditions. There are, however, few methods available for assessing how much evidence a sample of data provides about whether the variables are truly monotonically related or not. We present a model that allows researchers to estimate the statistic M which reflects the amount of evidence a dataset provides about whether two outcome variables are jointly monotonically related. This model is based on modeling the covariation between outcome measures in terms of a kernel function, which allows for computation of the latent derivatives of each outcome variable with respect to the other. M is the posterior odds that these derivatives are all of the same sign and are thus monotonic. Simulations show that M discriminates between monotonic and non-monotonic state traces and an example illustrates how the model can be applied to both continuous and binomial data from between-subjects, within-subjects, or mixed designs.
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6:00-7:30 PM (5239)

Quantification of Measurement Error in Cognitive Psychology Experiments. AARON MATTHEW SIMMONS and STEVEN J. LUCK, *University of California, Davis* (Sponsored by Steven Luck) – Cognitive psychologists typically

wish to maximize their effect sizes and their statistical power, both of which are determined in part by error variance. Error variance, in turn, can be broken into two components: true score variance (true differences among individuals that are not a result of measurement error) and measurement error variance (which is typically the result of averaging together a finite number of variable single-trial responses). To understand and predict effect sizes and statistical power, it would be helpful if we could separately estimate the true score variance and the measurement error variance. We present a method, in the context of reaction time experiments, for estimating measurement error variance, and by extension true score variance. For each participant in each condition, we quantify measurement error as the standard error of measurement (either analytically or via bootstrapping). This single-participant measure of measurement error can be aggregated across participants in a way that makes it possible to predict how statistical power will change as the number of trials per participant is changed. In principle, this could also be used to exclude participants who show excessive measurement error.
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6:00-7:30 PM (5240)

Psychonomics Journal Articles Often Have Too Little A Priori Power to Reliably Detect Medium, Let Alone Small, Effects. PETER E. MORRIS, *Lancaster University*, CATHERINE O. FRITZ, *University of Northampton* – Low power, often the result of an insufficient number of participants, contributes to replication failures (Button et al., 2013). It is usually recommended that studies have 80%+ chance of identifying an effect. However, for nearly 60 years, reviews have reported that many studies are under-powered. We calculated the power to detect small, medium and large effects of a test from the first study in every empirical Psychonomics Journal article published in 2017 as a snapshot in time. Overall, mean power to detect medium sized effects was only 65%, and two-thirds of papers failed to achieve 80% power. Nearly half of papers in Psychonomic Bulletin & Review and Memory & Cognition achieved the 80% criteria, but other journals were much lower. The mean power to detect small effects was 22%, indicating that they would almost always be missed. To avoiding missing real effects, requires larger samples than generally tested.
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6:00-7:30 PM (5241)

The Effect of Red on Performance in an Achievement Task: Fourth Failure to Replicate. KENNETH M. STEELE, MELISSA N. AMADOR, LAUREN EASTER, and AMANDA I. ROSS, *Appalachian State University* – Elliot et al. (2007, JEP:G) hypothesized that exposure to the color red would impair performance in an achievement task. They reported that brief exposure to the color red reduced the number of correctly-solved anagrams. Steele et al. (2015, 2016, 2017) were unable to replicate the result despite manipulations of color and anagrams. The current experiment investigated a different red used in the original report. Participants (N = 414) were asked to solve as many 5-letter anagrams as possible in a 5-min period; briefly exposed to either red, green, or gray; and then asked to solve as many anagrams as possible in a second 5-min period. Switching to the new color did not produce the priming effect. Pre-color-exposure anagram performance predicted post-color performance but there was no difference among the color conditions on post-color anagram performance. The results constituted the fourth failure to replicate the effect.
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6:00-7:30 PM (5242)

Recollective Experience in Recognition: A Replication of Gardiner and Java (1990). JULIA HAAF, STEPHEN RHODES, TONY SUN, HOPE SNYDER, and MOSHE NAVEH-BENJAMIN, *University of Missouri, Columbia*, JEFFREY ROUDER, *University of California, Irvine* (Presented by Tony Sun) (Sponsored by Jeffrey Rouder) – The dual-process account of memory is both popular and controversial. Perhaps the best behavioral evidence for this account comes from a classic study by Gardiner and Java (1990, Memory and Cognition) who used the remember-know-new procedure with words and nonwords. At test, old words and nonwords and new words and nonwords were presented. For old items, a perfect crossover was observed where old words were more likely recollected and old nonwords were more likely known. For new items, there were no effects of lexicality. The results, therefore, support two processes while ruling out decision-criteria accounts that predict effects for both old and new items. Due to the diagnostic qualities of Gardiner and Java results, we performed three preregistered replication studies and did so across two labs. Although commonly cited, in all three studies, neither the interaction for old items nor, more generally, any effect of lexicality were observed. We show through Bayes factors that our patterns provide evidence for a single-process account.
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6:00-7:30 PM (5243)

Bayes-Factor Hacking. RICHARD B. ANDERSON, *Bowling Green State University* – There has been great concern in the scientific community--particularly in psychology--about the practice of optional stopping in data collection. Within a particular study, optional stopping entails collecting the data incrementally, assessing the statistical significance level at each step, and stopping the data collection once significance is achieved. This has been called a form of "p hacking" when applied to null-hypothesis significance testing, since optional stopping can inflate the number of spurious findings. While it has been argued that optional stopping has different statistical theoretical implications for classic, null-hypothesis testing than for Bayesian analysis, I demonstrate that the practical implication can be similar for the two approaches, and can even be similar for an approach that emphasizes effect sizes over other measures. I propose a solution that starts with the assumption that optional stopping has occurred, but that then defines and indexes the number of exact replications of findings that occur within the data set being analyzed. Under this approach, a high value on the index of the number of exact internal replications mitigates against the inflationary effects of optional stopping.
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6:00-7:30 PM (5244)

Tatool Web: A Web-Based Open-Source Software for Creating and Running Experiments. CLAUDIA C. VON BASTIAN, *University of Sheffield*, ANDRÉ LOCHER, *Tatool Web* – Tatool Web (www.tatool-web.com) is an open-source and freely available framework for creating and running experiments. For a wide range of experiments, Tatool Web requires no programming: its Experiment Editor allows for quickly creating and configuring experiments with just a few clicks. Researchers can also develop entirely new paradigms using the widely-used and easy-to-learn web technologies HTML5, CSS, and JavaScript. Once created, experiments can be distributed via a URL, with features supporting the use of Amazon Mechanical Turk. Participants can complete the experiment in any modern web browser, allowing for online and offline data collection on any operating system and on mobile devices. Automatized data upload and anonymization allows for close monitoring and double-blinding. Sharing of code and materials is facilitated through Tatool Web's Task Library, enhancing research reproducibility and financially independent access to research tools. Tatool Web is a community product and, hence, contributions in any form are highly welcome.
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6:00-7:30 PM (5245)

Improving Millisecond Timing Accuracy of TTL Event Marks in EEG. RICHARD R. PLANT, *The Black Box ToolKit* – A wide variety of researchers need to TTL event mark or receive TTL triggers with sub-millisecond accuracy during their research, e.g. neuroscientists, cognitive psychologists, vision researchers etc. We appreciate that many may have used basic inbuilt event marking functionality provided by their experiment generator or made use of simplistic external hardware. A new 72-channel device, the mBBTK v2, on the other hand is designed to do much more whilst at the same time being quick and easy to use. For example, it can live event mark activity on up to 48x inputs, across various sensors and response devices in real time and simultaneously record all timings with sub-millisecond accuracy for analysis at a later date. Sensors can include mics, opto-detectors, response pads and inputs from other devices. Here we discuss using the mBBTK v2, how it could improve your research and provide working examples of its use in EEG studies.
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6:00-7:30 PM (5246)

Does Self-Report Predict Bilingual Language Use? MICHELLE BRUNI, ALESSANDRA MACBETH, NATSUKI ATAGI, EMILY MECH, and JUSTIN SARKIS, *University of California, Riverside*, JESSICA MONTAG, *University of Illinois at Urbana-Champaign*, ALEXANDER KARAN, MEGAN ROBBINS, and CHRISTINE CHIARELLO, *University of California, Riverside* – Bilingualism research often relies on self-report language history questionnaires to assess bilingual language use. It is difficult to assess the validity of these self-reports without samples of real-word speech. We used the EAR (Electronically Activated Recorder (Mehl et al., 2001) to examine this issue. Heritage bilinguals[MOU1] (mainly English dominant) of a variety of languages wore the EAR for four days and[MOU2] then completed a language history questionnaire. Forty-second auditory samples of speech were recorded every 12 minutes throughout each day. Self-reported non-English proficiency (r=.379) was weakly correlated with actual non-English use. However, self-reported non-English use correlated strongly with actual non-English use (r=.670). Self-reported hours spent speaking non-English languages at home (r=.514) and during freetime (r=.550) most strongly correlated with their non-English language use. Nevertheless, bilinguals tended to overestimate the amount of time they actually use their non-English language.
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A

Abbene, Emily, 5092
Abel, Magdalena, 206, 1192, 3228
Abercrombie, Kyler D., 4140
Abraham, Ashley N., 1026, 1027
Abrams, Lise, 2119, 3123, 3221, 5080
Abrams, Richard A., 2040, 3028, 4065
Abrams, Richard L., 3036
Ackerman, Rakefet, 130, 3194
Ackerman, Thomas E., 5130
Acosta Lane, Gabriella, 3079
Actis-Grosso, Rosanna, 1133
Aczel, Balazs, 3053
Adam, Kirsten, 300
Adamo, Stephen H., 170, 5038
Adams, Eryn, 303
Adams, Jamie, 5219
Aday, Jacob S., 1231, 4070
Agarwal, Arishna, 2145
Agauas, Stephen J., 1156, 4080
Agrawal, Tanushree, 1202
Aguerre, Nuria V., 1008
Aguirre, Cassandra, 1172
Ahsan, Omar J., 5009
Aizpurua, Alaitz, 4173
Aka, Ada, 1191
Akan, Melisa, 4162
Akers-Goodwin, Gabrielle, 4160
Aktunc, Emrah, 1091
Al-Aidroos, Naseem, 4123
Albrecht, Rebecca, 250
Albuquerque, Pedro B., 3223
Alden, McKinley, 1056
Aldercotte, Amanda, 174
Alderete, John, 150
Aldrovandi, Silvio, 1099
Aldugom, Mary, 4206
Aleman, Alex, 1081
Aleman, Roberto, 4242
Alexander, Jade, 4184
Alexander, Jessica E.D., 3156
Alexander, Timothy R., 195, 5165
Alexeeva, Svetlana, 1158
Alferez, Santos, 158
Alkan, Yelda, 2005
Allan, Jinan N., 255, 3057, 5198, 5234
Allen, Laura K., 1114
Allen, Michael G., 2041
Allen, Philip A., 5077
Allen, Todd, 3113
Allopenna, Paul D., 316, 2158
Almor, Amit, 63, 2228, 4049
Alonso, Maria Angeles, 1182
Alshaiba, Fatma A., 2061
Altani, Angeliki, 1
Altarriba, Jeanette, 1112, 2126, 3195, 5194
Altmann, Erik M., 1214, 3214
Altmann, Gerry, 5132
Altshuler, Daniel, 11
Alviar, Camila, 61
Amado, Sonia, 1146
Amador, Melissa N., 5241
Amano, Kinjiro, 227
Amburn, Charles R., 4101
Amer, Lauren, 4124
Anaki, David, 109, 3109
Anchan, Mona, 4085
Anchondo, Alina, 1113
Andan, Qatherine, 2132
Anders-Jefferson, Regina, 42
Anderson, Brian A., 96, 2100
Anderson, Chris, 1012
Anderson, Francis T., 3205
Anderson, Hunter, 5210
Anderson, Nicola C., 5026
Anderson, Richard B., 3208, 5243
Andrew, Kendra, 216, 5137
Andrews, Jan, 3087
Andrews, Sally, 124, 2156
Andrews-Hanna, Jessica R., 4182
Andriyanova, Natalia, 285
Angel, Lucie, 5091
Angelovska, Tanja, 4028
Ansorge, Ulrich, 310
Appel, Rachel, 4019
Arch, Joanna J., 4182
Archer, Stephanie L., 2142
Arciuli, Joanne, 5187, 5188
Arcos, Karen, 4209
Arduino, Lisa S., 2223
Arends, Lidia, 4143
Ariel, Robert, 5208
Armstrong, Blair C., 38
Armstrong, Bonnie Andrea, 5114
Armstrong, Kacie L., 181, 5017
Arndt, Jason, 2166
Arnell, Karen M., 3096
Arnett, Ciera R., 3209
Arnicane, Andra, 3008
Arnold, Kathleen M., 4142
Arnold, Michelle M., 2089
Arora, Swasti, 215
Arreola, Hailey, 1213
Arrington, Catherine M., 139, 4010
Asano, Michiko, 5007
Ash, Ivan K., 5126
Ashby, Jane, 124, 1156
Ashitaka, Yuki, 5050
Asiala, Lillian, 1124
Atagi, Natsuki, 314, 1088, 1089, 5246
Athanasopoulou, Angeliki, 2142
Atiya, Aziz A., 1113
Atkins, Kathryn, 3241
Au Yeung, Ka Man, 4033
Aue, William R., 49, 2176
Aufferman, William, 172
Austerweil, Joseph L., 3163
Autry, Kevin S., 1172
Avcu, Enes, 2134
Avery, Johnathan E., 5156
Avraamides, Marios, 61
Avrahami, Judith, 146, 3052
Awh, Edward, 300, 1201, 3030
Azimi Vahdat, Mohammad M., 2048
Azuma, Miyuki, 224
Azuma, Tamiko, 4030

B

Baart, Martijn, 110, 1075
Bachert, Alexander, 12
Baciero, Ana, 2162
Badali, Sabrina, 5210
Bae, Gi-Yeul, 1223
Baese-Berk, Melissa M., 245
Baess, Pamela, 2207
Bago, Bence, 283
Bahle, Brett, 2038, 5035, 5041
Bailey, Heather R., 5134, 5144
Bailey, Kira, 4015
Bainbridge, Katie, 4114
Bajaj, Nisha, 1082
Bajo, Teresa, 1008, 5186
Bąk, Halszka Kinga, 2126
Bakbani Elkayam, Shirel, 2104
Baker, Alexander J., 5164
Baker, Sarah, 2127
Bakker, Arnold, 5073
Bakuleva, Karina, 285
Balaban, Evan, 317
Balass, Michal, 241, 5161
Balcombe, Faye O., 1040
Ball, Hunter, 306
Ball, Linden J., 2015
Ballard, Timothy, 1107
Ballesteros, Soledad, 43
Balota, David A., 3034, 5071, 5158
Baltaretu, Adriana, 13
Banai, Karen, 247, 2140
Bang, Hyoseok, 5078
Bangert, Ashley S., 2247, 5143
Banks, Jonathan B., 3040, 5062
Bannon, Julie, 4042
Banquer, Alexis, 2206
Barach, Eliza R., 2146
Baraniuk, Richard, 239
Baranova, Victoria, 5105
Barber, Sarah J., 158, 5090
Barbour, Dennis, 3141
Barhorst-Cates, Erica, 2216
Baribault, Beth, 69
Barideaux Jr., Kenneth, 1063
Barker, Brittan A., 311
Barker, Celeste C., 1225
Barker, Emily R., 3140
Barker, Melissa Esme, 2015
Barnes, Kevin, 4109
Barnhart, Anthony S., 1157, 5131

Barrouillet, Pierre, 51, 225, 1206, 1207, 4213
Barshi, Immanuel, 48
Bart, Victoria K.E., 4076
Barth, Hilary, 192, 2079, 4083, 4087
Bartlett, James C., 53, 5215
Bartsch, Lea M., 1217
Barzy, Mahsa, 5155
Barzykowski, Krystian, 4172
Basak, Chandramallika, 53
Başkent, Deniz, 3242
Basnight-Brown, Dana M., 4031, 5194
Batterink, Laura J., 37
Bäuml, Karl-Heinz T., 1185, 3228
Bausenhart, Karin, 5116
Baytimur, Emre, 1091
Beaman, C. Philip, 2202
Beatty-Martínez, Anne L., 1073
Beck, Diane M., 2201, 5015
Beck, Melissa R., 309
Beck, Valerie M., 45
Becker, David Vaughn, 186, 1106
Beda, Zsolt, 321, 2092
Bediou, Benoît, 3243
Bednarek, Hanna, 3003
Beeman, Mark, 2090, 2094
Bego, Campbell, 136
Beier, Eleonora J., 2065
Beighley, Steven, 163
Bejjani, Christina, 5052
Bell, Raoul, 2101, 2197
Belletier, Clément, 225, 298, 1207, 4213
Ben-David, Boaz M., 85, 156, 3157
Benge, Jared, 3207
Ben-Harosh, Inbar Rachel, 77
Benitez, Kevin, 3010
Benjamin, Aaron S., 198, 4162, 4235, 4237
Bennett, Patrick, 2184
Beran, Michael J., 175, 2001, 2002, 2009, 3219
Berent, Iris, 317, 2132, 4057, 5113
Berger, Anja, 1020
Berger, Stephanie A., 4189
Berger, Uri, 3109
Bergman, Shawn M., 4225
Berkhout, Jan, 5019
Berman, Garrett L., 3056, 4151
Berman, Marc G., 4229
Bermeitinger, Christina, 2207
Bernardo, Charmaine, 1116
Berry, Christopher J., 289, 2190
Berry, Jane M., 5088
Berryhill, Marian, 45
Bertenthal, Bennett I., 5
Bertone, Armando, 4224
Bertram, Raymond, 273, 3135
Besken, Miri, 3193
Bex, Peter, 2132
Bhandari, Pratik, 41
Bhangal, Sabrina, 5090
Bhatia, Sudeep, 81, 1103, 1109
Bialek, Michal, 5110
Bialer, Daniel M., 197, 4157
Bice, Kinsey, 5148
Biggs, Adam T., 113, 2233
Bilalic, Merim, 320
Bilge, A. Reyyan, 3105
Binns, Malcolm A., 219
Bireta, Tamra, 3236
Birmingham, Elina, 2033
Biro, Tifani M., 3132, 4246
Bischof, Walter F., 5026
Bjork, Elizabeth Ligon, 2177, 4146, 4148
Bjork, Robert A., 1059, 2177, 3231, 4148
Black, Jo, 5155
Black, Shayna, 1033
Black, Sheila R., 3248
Blackburn, Angelique M., 1081, 2022, 2161
Blacker, Kara J., 113
Blair, Alyssa N., 1023
Blais, Chris, 2205, 3209
Blalock, Lisa D., 3023, 5166
Bliwise, Donald L., 3201
Bloesch, Emily K., 1231, 4070
Blumenthal, Terry D., 2024, 3241
Blush, Jennifer M., 2247
Bobb, Susan C., 3138
Bobbitt, Thomas M., 2180
Boden, Kelly, 2110
Bodenheimer, Bobby, 2245
Bodner, Glen E., 5219
Boduroglu, Aysecan, 3032, 4097, 4179
Boggan, Amy L., 1142
Bohil, Corey, 3076, 4228, 5074
Bolger, Donald J., 1155, 2157, 5161
Bolte, Carol, 270
Boltz, Marilyn G., 2069
Bond, Alesha, 3005
Bonnell, Sarah, 1036
Boomer, Joseph, 3090
Booy, Regard Martijn, 1128
Borbely, Krisztian, 3089
Borda, William, 3188
Bordwell, James, 2243
Borodkin, Katy, 1080
Borst, Grégoire, 283
Bortfeld, Heather, 312
Bosco, Cara, 128
Bosen, Adam K., 3237
Bosley, Amy L., 2067
Boss, Annika, 182
Botella, Juan, 1238, 2196
Botezatu, Mona Roxana, 4051
Bouazzaoui, Badiâa, 5089, 5091
Boucher, Leanne, 1056
Boucher, Troy Q., 2033
Bowen, Casey L., 3212
Bowen, Holly J., 159
Bowles, Anita R., 4124
Bowman, Kristen A., 190, 4052
Bown, Jennifer, 125
Boyce, Michael W., 4101
Boyd-Rogers, Caroline, 3104, 5075
Boyer, Pierrick, 21
Boynton, Geoffrey M., 2057
Brabec, Jordan, 2177
Bradford, Elizabeth, 5040
Bradley-Zrada, Melissa, 4083
Bradlow, Ann, 3153
Bradshaw, Gary L., 4109, 4244, 5163
Brady, Timothy F., 222, 288, 2199
Braem, Senne, 279, 5060
Brainerd, Charles J., 197, 4157, 5180
Braithwaite, David William, 4094
Branch, Jared, 3208
Brashears, Bailey, 58
Brashier, Nadia M., 323
Brass, Marcel, 2023
Brassington, Joanne, 2118
Bratzke, Daniel, 1230
Braun, Blair E., 1179
Braun, David, 4010
Breen, Mara, 202, 2137
Brem, Rachel, 5038
Bretches, Ona M., 3164
Breuer, Friederike, 160
Brewer, Gene A., 306, 2205, 3209, 5119
Bridger, Emma K., 1099
Briere, Jennifer L., 4159, 4193
Brill, John Christopher, 1240, 1241
Briones, Elizabeth M., 1139
Britt, M. Anne, 1022, 1124
Britton, Mark K., 96
Brockmole, James R., 137, 1010
Bröder, Arndt, 10, 1136
Broeren, Marloes, 4143
Broitman, Adam W., 2046
Brooks, Reece M., 1142
Brookshire, Geoffrey, 17
Brosowsky, Nicholaus P., 4231
Brouillette, Robert, 5097
Brown, Adam, 2043
Brown, Gordon, 1105
Brown, Kevin, 316, 2158
Brown, Mary, 1152
Brown, Mitch, 5152
Brown, Norman R., 4189
Brown, Scott D., 211, 1094
Brown, Violet, 3141
Brown, Zachariah, 2066
Brown-Schmidt, Sarah, 2131
Bruening, Jovita, 2056
Bruett, Heather, 3232
Bruine de Bruin, Wandi, 7
Brun, Fanny, 5102
Bruni, Michelle R., 314, 1073, 1088, 1089, 5246
Bruns, Conner R., 164
Brunsdon, Victoria, 5040

Brunstein, Angela, 2112
Brunstein, Joerg, 2112
Brunyé , Tad T., 2042, 4101, 4105
Brysbaert, Marc, 1076
Bub, Daniel N., 2236
Buchanan, Erin M., 4046
Buchin, Zachary L., 2164
Buchli, Dorothy Rose, 1175
Buchner, Axel, 2020, 2101, 2197
Buck-Gengler, Carolyn J., 48
Budde, Emily, 1095
Budescu, David V., 209
Budson, Andrew, 4111
Bueno, Steve, 4075
Buffington, Joshua, 1085
Bugg, Julie M., 2028, 3212
Bui, Dinh, 1082
Bui, Uyen, 1213
Bukach, Cindy M., 5008
Bulevich, John B., 4158
Bull, Ray, 3223
Bundt, Carsten, 2114
Buontempo, Michele, 5105
Buquoi, Yuliya, 4196
Burchardt, Dalton, 2217
Burgoyne, Alexander P., 1214
Burke, Kali, 1153
Burnell, Ryan, 4187
Burnett, Leigh H., 5174
Burnham, Bryan R., 2032
Burns, Devin M., 229
Burry, Claire, 3136
Burte, Heather, 2211, 2224
Buschkuehl, Martin, 161, 4118, 4200
Busemeyer, Jerome R., 5236
Busey, Thomas, 22, 24, 1216
Butler, Andrew C., 265, 1065
Butterfuss, Reese, 3120
Buxó-Lugo, Andrés, 200, 3152
Bye, Jeffrey K., 2097
Byrne, Kaileigh, 2106

C

Caballero-Sanz, Alexandra, 2196
Cabe, Patrick A., 3247
Cadambi, Kriti, 158
Cadogan, Eimer, 1098
Caggiano, Pietro, 2223
Cain, Matthew S., 114
Cain, Sasen S., 114
Calamia, Matthew R., 1202
Calcaterra, Ryan D., 4054
Caldwell-Harris, Catherine L., 2120
Callahan-Flintoft, Chloe, 249, 3020
Callender, Aimee A., 2178, 2179
Calvillo, Dustin P., 5164
Camos, Valérie, 51, 225, 298, 1206, 1207, 4213
Campanelli, Luca, 3171
Campbell, Cassidy G., 1026
Campbell, Jessica Teale, 3221
Campbell, Spencer J., 274
Campbell-Meiklejohn, Daniel, 3171
Canal-Bedia, Ricardo, 1182
Canda, Angela M., 1197
Cane, Elisa, 188
Cao, Rui, 1216
Caplan, Jeremy B., 291
Capodanno, Megan M., 2212, 2219
Carbajal, Ivan, 5207
Carbon, Claus-Christian, 3245
Carbonell, Kathy, 3249
Cardenas, Stephanie Aurora, 4186
Cariño, Joy, 3128
Carleton, Amber, 5224
Carlini, Phoenix M., 2172
Carlson, Curt A., 27, 4165
Carlson, Laura A., 24, 1123
Carlson, Maria A., 27, 4165
Carlson, Richard A., 277, 3043
Carmichael, Owen, 5097
Carney, Russell N., 3164
Carpenter, Alexis C., 1173
Carpenter, Shana K., 1062, 2170, 4107
Carrasco, Omar, 5143
Carrigan, Ann J., 168
Carrillo, Rogelio, 4089
Carruth, Nicholas P., 135
Carsten, Thomas, 2114
Carter, Kelly E., 22, 242
Carvalho, Monique, 2027
Carvalho, Paulo F., 1046
Casado, Alba, 4060
Casasanto, Daniel, 17, 3110
Cash, Daniella K., 5167
Casserly, Elizabeth D., 4082
Casteel, Mark A., 3050
Castel, Alan D., 2062, 3231
Castillo, Daniela, 4038
Castillo, Melissa, 4038
Castro, Nichol, 3183
Cataldo, Andrea M., 196, 282
Catrambone, Richard, 127
Caulfield, Meghan Davis, 2203
Cavallaro, Jon-Paul, 148
Cech, Claude G., 1177
Center, Evan G., 5015
Cerisano, Stefania, 3239
Cevoli, Benedetta, 126
Chalmers, Kerry Ann, 1203
Chamberlain, Brent C., 164
Chambers, Craig G., 13, 5083
Chan, Jason C.K., 2171, 4161, 5222
Chan, Kit-Ying, 1077, 4033
Chan, Queenie, 150
Chandramouli, Suyog, 257
Chandrasekaran, Bharath, 4059
Chang, Kai, 5170, 5178
Chang, M., 197
Chang, Minyu, 5180
Chang, Seah, 2035
Chao, Hsuan-Fu, 4002
Chapman, Curtiss Anthony, 5157
Chatziadamou, Efpraxia, 3137
Chauvel, Guillaume, 21
Chavez-de la Peña, Adriana F., 2004
Chechile, Richard A., 76
Chein, Jason, 1014, 1019
Chen, Dar-Wei, 292
Chen, Eva, 209
Chen, Jenn-Yeu, 3133
Chen, Jessie, 4175
Chen, Keting, 166
Chen, Peiyao, 1145
Chen, Sharon, 49, 3234
Cheng, Lilian (You), 2215
Cheng, Patricia W., 2097
Cheng, Xiaorong, 4014
Cherep, Lucia A., 2218
Cherry, Katie E., 1202
Chesebrough, Christine, 1135
Cheuk, Georgiana, 3224
Chi, Zian, 2154
Chia, Katherine, 3131
Chiappe, Dan, 1213
Chiarello, Christine, 314, 1088, 1089, 2122, 5246
Chiba, Itsuki, 3055
Chidambaram, Vrinda, 1069
Chihak, Benjamin J., 2243
Chin-Parker, Seth, 2096
Chirico, Alice, 3099
Chistopolskaya, Alexandra V., 2086
Chiu, Yi-Chieh, 2201, 5067
Cho, Jinhyo, 3057
Cho, Kit W., 4132
Cho, Sunghun, 2111
Cho, Yang Seok, 2034, 2107, 4012
Choi, Jong Moon, 2107
Choi, Soonja, 310
Choi, William, 246
Choi, Wonil, 2148, 3115, 5003
Chong, Isis, 4064
Chooi, Weng-Tink, 4217
Chow, Julie Yew Li, 1053
Chow, Karen, 84
Chrastil, Elizabeth R., 2215, 4103
Christenfeld, Nicholas, 324, 4168
Christensen, Wayne David, 3018
Christian, Matthew W., 2089
Christianson, Kiel, 62, 1038, 1151
Christidis, Nickolas K., 179
Christman, Stephen, 5229
Christofalos, Andriana L., 274, 5145
Christoff, Kalina, 3044
Christopher, Eddie A., 4011
Chrobak, Quin M., 1179
Chrysikou, Evangelia G., 1129
Chuang, Pei-Jung, 2097

Chubb, Charles, 2076
Chuderski, Adam, 4021
Chung, Andrew, 3096
Chunharas, Chaipat, 5009
Church, Barbara A., 2002, 3090
Cieślicka, Anna B., 1074, 4028
Cipresso, Pietro, 3099
Clapper, John, 3010, 3088
Clark, Joseph D., 1152
Clark, Josie, 4099
Clark, Martyn, 241
Claxton, Alexander B., 2074
Cleary, Anne M., 9, 2074, 3180, 5218
Clegg, Benjamin A., 2055
Clevinger, Amanda M., 4166
Clingan, Samara, 2170
Coane, Jen, 3190, 5170, 5178
Cocchini, Gianna, 2223
Cockrum, Paul D., 4245
Cody, Olivia J., 4102
Cody, Sydney M., 5084
Coggins, Emily, 3128
Cohee, Emily, 5179
Cohen, Andrew L., 128, 282
Cohen, Anna-Lisa, 3204
Cohen, Michael S., 5211
Cohen, Rivka, 1188
Cohen, Trevor, 327
Cokely, Edward T., 255, 3057, 5198, 5234
Colagiuri, Ben, 1053
Colaizzi, Griffin, 4155
Cole, Geoff G., 3
Cole, Zachary J., 5008
Coley, John D., 3079, 3092
Collins, W. Matthew, 1056
Colloff, Melissa F., 4153
Colombel, Fabienne, 1171
Colombo, Lucia, 1164
Colonius, Hans, 278
Colvett, Jackson S., 2028
Colzato, Lorenza S., 132, 1133
Comi-Morag, Marion, 2209
Conley, Patrick, 5032
Constantine, Rodica, 2136
Conway, Andrew R.A., 1021, 4218
Conway, Christopher M., 5153
Cook, Gabriel I., 3203
Cook, Katherine, 4148
Cook, Susan Wagner, 4206
Cooke, Katherine A., 4200
Cookson, Savannah L., 1015
Cooper, Angela, 3144
Cooper, Crystal, 5215
Cooper, Kentrell, 4222
Copeland, David, 1140
Coppola, Marie, 2137
Corddry, Ruth, 4057
Cordell, Clayton W., 2187
Cordes, Sara, 4083
Corley, William B., 5175
Corliss, Stephanie B., 1065
Cornero, Francesca M., 253
Corning, Amy, 207
Cornwall, Astin C., 80, 1104
Corral, Daniel, 2170
Corredor, Javier, 3067
Corter, James E., 129
Cortesa, Cathryn, 162, 2231
Cortina, Kai, 2045
Cosentino, Kyla, 4130
Costa, Paula, 3118
Couperus, Jane W., 5008
Courtney, Susan, 5073
Coutanche, Marc N., 3229, 3232
Coutinho, Mia R., 2203
Couturier, Roxane, 1137
Coverdale, Michelle E., 3217
Cowan, Nelson, 225, 4213
Cowen, Mikaela, 2220
Cox, Gregory Edward, 49, 5238
Cox, Patrick H., 29, 293, 1237
Craig, Lindsay, 5062
Craik, Fergus I.M., 219
Crane, Breanna, 3046
Creamer, Courtney, 2001
Creel, Sarah C., 1084
Creem-Regehr, Sarah, 2216, 2245
Crepaldi, Davide, 326, 1167
Criss, Amy H., 49, 1198, 3234, 5230
Crocco, Stephanie, 270, 2165
Cronin, Deborah A., 5028
Crowe, Emily M., 142, 3244
Crozier, William E., 2044, 4186
Cruit, Jessica, 1097, 5101
Crukley, Jeff, 3239
Crump, Amy, 140
Crump, Matthew J.C., 4231
Crutcher, Jason, 3104
Csik, Abigail M., 2168
Cueva, Sara, 160
Culham, Jody C., 2226
Cully, Tyler, 3062
Cunningham, Arielle, 4046
Curby, Kim M., 112, 168
Curl, Ryan A., 5230
Curley, Taylor, 3183
Curtin, Suzanne, 2142
Cushing, Kathryn, 216, 5137
Cusner, Lauren, 91
Cutting, James E., 181, 5017
Cyr, Andrée-Ann, 5079

D

Dagenbach, Dale, 4171
Dagher, Alain, 5073
Dahan, Delphine, 15
Dahm, Stephan F., 4077
Dai, Ruizhi, 2222
Dale, Rick, 61, 318
Daley, Nola, 1032
Dalton, Polly, 99
Dandignac, Mitchell, 16
D'Angelo, Kristen P., 5166
Daniels, Jonathan S., 4113
Daniels, Katherine, 4137
Darby, Kevin P., 1110, 3169
D'Arcey, J. Trevor, 3116
David, Santiago, 3203
Davidson, Oliver A., 1065
Davis, F. Caroline, 266
Davis, Hanae, 2184
Davis, Hasker, 5098
Davis, Kathryn A., 117
Davis, Sara D., 2171
Davis, Tyler, 80, 1104, 2109, 3080
Davis-Stober, Clintin, 71
Davoli, Christopher C., 1231, 4065, 4070
Day, Alison, 4234
Day, Ruth S., 173
De Beaumont, Louis, 5046
de Bruin, Angela, 1075, 5150
De Houwer, Jan, 1016
De Kock, Rose, 3088
De La Paz, Olivia, 1036
De Lillo, Martina, 5040
de Long, Shauna P.A., 1025
De Los Reyes, Andres, 6
De Neys, Wim, 283
de Nonohay, Roberto Guedes, 1186
de Souza, Guilherme Lannig, 1186
De Stefano, Lisa, 2103
De Vito, Alyssa, 1202
Debraise, Miriam, 1205
DeCaro, Marci S., 4139
DeCaro, Renée, 1170
Decker, Reed, 5099
Dedetas, Hatice, 47
Deffler, Samantha A., 2198, 4192
Deibel, Megan E., 4048
Delaney, Peter F., 3173
Delaney-Rubin, Sierra, 2081
DelGrosso, Elle Marie, 5181
Dell, Gary S., 3130, 3134
Dell'Aqua, Roberto, 3011
Denby, Thomas, 4044
Deng, Rose, 3086
Denison, Stephanie, 2078
Desender, Kobe, 1093
Deshaies, Sarah-Elizabeth, 1038
Desjardins, Martine, 5046
DeSoto, K. Andrew, 121
Dessenberger, Steven J., 1058
Deutsch, Ana, 5008
Dey, Abhishek, 2028
DeYoung, Carlee M., 1195
Dhaim, Ashley, 4081
Dhami, Mandeep K., 8
Di Betta, Anna Maria, 4058
Di Mauro, Alyssa, 5170

Dianiska, Rachel E., 5222
Diard, Julien, 1028, 1148, 1149, 1150
Diaz, Gisella K., 1201
Diaz, Michele T., 5081
Dick, Frederic, 3175
Dickerson, Kelly, 1224
Dickinson, Christopher A., 4225
Dickinson, Joël, 3091
Dickson, Alundra, 140
Didierjean, André, 21, 5012, 5184
Diederich, Adele, 284
Dien, Joseph, 1155, 2157
Dienes, Zoltan, 3041
Díez, Emiliano, 1182
Díez-Álamo, Antonio Manuel, 1182
Diges, Margarita, 1181
Dijkstra, Katinka, 1170
Dilley, Laura, 3155
Dillon, Brian, 2125
Ding, Xianfeng, 4014
Dixit, Anjali, 2188
Dixon, Peter, 295
D'Mello, Sidney K., 137, 1024
Dobbins, Ian G., 2193, 5220
Dobkins, Karen, 3033
Dobson, John, 2169
Dockray, Samantha, 1098
Dodd, Michael D., 3025, 5004
Dodson, Chad S., 25, 3061, 4154
Dodson, Samira, 4185, 4232
Doering, Alexander, 5032
Doherty, Jason M., 225, 4213
Dollois, Michelle A., 3009
Don, Hilary J., 80, 1104
Donaldson, David I., 3226
Donkin, Christopher, 72, 286, 1102, 5104
Donnelly, Kristin, 4168
Donner, Tobias H., 1093
Donovan, Amalia M., 1030, 1039
Dopkins, Stephen, 5006
Doro, Mattia, 3011
Dosi, Ifigenia, 3137
Dougherty, Kasey, 3188
Dougherty, Michael, 4134, 5100
Dowd, Emma Wu, 3019
Dowell, Catherine J., 2248, 3246
Dowell, Nia, 2248, 3044
Doyle, Mario E., 3185
Doyon, Jonathan, 1152
Draheim, Christopher D., 143, 1232
Dreisbach, Gesine, 1020, 5059
Drever, Kathryn, 4159
Drew, Emmaline E., 3181
Drew, Trafton, 172, 5036, 5039
Drieghe, Denis, 124
Driscoll, Anna B., 3086
Drisdelle, Brandi Lee, 5043
Druen, Perri B., 2198
Drummey, Anna B., 216, 5137
Duarte, Shea, 1172
Dubé, Chad, 5016
Duchek, Janet M., 5071
Duckert, Cheyenne, 5131
Dudas-Thomas, Christopher L., 2213
Duff, Margaret, 1224
Duffels, Brian, 5154
Dulany Jr., Donelson E., 236
Dumay, Nicolas, 38, 108
Duñabeitia, Jon Andoni, 5150
Dunlosky, John, 1061, 3189, 4093
Dunn, John C., 73, 82
Durán, Juan I., 1238
Durbin, Kelly A., 1132
Durgin, Frank H., 251, 5013
Durham, Robert, 5098
Durriseau, Jaymes, 5058
Durst, Moritz, 2225
Dussias, Paola E., 1073
Dutra, Camila Arguello, 1186
Dye, Arianna N., 1209
Dykstra, Tobin, 4004

E

Eacrett, Mariah, 3197
Eakin, Deborah K., 3196, 5183
Earles, Julie L., 5141
Easter, Lauren, 5241
Eberhard, Janelle, 1068
Edelsbrunner, Peter A., 1047
Edmunds, Charlotte E.R., 294
Edwards, Erica S., 1153
Eerland, Anita, 213
Eftekhari, Eldar, 219
Egeth, Howard E., 2035
Eglington, Luke Glenn, 1064
Egner, Tobias, 1211, 3001, 5052
Eidels, Ami, 4
Eisenberg, Michelle L., 1189
Eitam, Baruch, 235, 2104, 2115
Ekinci, Öykü, 4178
El Yagoubi, Radouane, 5091
Elashmouny, Sandra, 2226
Elbro, Carsten, 4075
Eldakar, Omar Tonsi, 226
Eldridge, Heidi, 23
Ell, Shawn W., 3086
Ellefson, Michelle, 174, 5147
Ellinghaus, Ruben, 5116
Elliott, Blake L., 2205
Elliott, Emily M., 311, 1202
Ellis, Derek M., 306, 5119
Ellison, Jacquelyn M., 5160
Ellwood-Lowe, Monica, 2081
Elman, Jeffrey L., 179
Elmore, Joann, 171
Elqayam, Shira, 131
El-Said, Dawlat, 1189
Emerick, Brandi, 22
Emerson, Samantha N., 5153
Emery, Lisa, 1144
Emmorey, Karen, 325
Enam, Tasnuva, 5196
England, Benjamin D., 5199
Engle, Randall W., 143, 1006, 1232
Ensor, Kaitlin M., 5168
Ensor, Tyler M., 5216
Eppes, Anna, 5081
Ercegil, Gonca, 1146
Erdfelder, Edgar, 5231
Erel, Hadas, 156
Erengin, Turku, 1091
Erez, Yuval, 145
Erwin, Hillary, 3197
Eskenazi, Michael A., 1026, 1027
Eskew, Jr., Rhea T., 4062
Eskine, Katherine E., 2066
Esparza, Lemira, 3024
Etkin, Amit, 1189
Etz, Alexander, 5237
Evans, Megan Danielle, 3123
Evans, Nathan J., 1094
Evrard, Christelle, 1171
Eyer, Isabel, 2122
Ezrin, Emilia V., 1072

F

Faber, Myrthe, 1010
Faggen, Aubrey, 2066
Faghihi, Nafiseh, 2214, 4230
Fagin, Martin, 205
Fahey, Christina, 2157
Failes, Eric J., 3158
Falkowski, Andrzej, 3068
Fallow, Kaitlyn M., 2189
Fan, Zhao, 4014
Fang, Xiaoping, 3232
Farr, Amanda B., 3156
Farrell, Megan, 2163
Farrell, Simon, 119, 1105, 3069, 3224
Fasano, Regina, 4043
Faubert, Jocelyn, 4224
Faubion, Rebecca, 2070
Faulkenberry, Thomas J., 190, 4052
Faunce, Alex, 3241
Faust, Mark E., 1012
Faust, Miriam, 1080
Fay, Séverine, 5091
Fazio, Lisa K., 269, 1052, 3167
Featherston, Kyle G., 3230
Febre, Karina, 2214
Fechner, Hanna B., 4201
Feder, Gabriella, 5233
Federmeier, Kara, 1111
Feghhi, Iman, 4008
Feitzinger, Paul, 4027
Feldman, Laurie Beth, 318
Feldmann-Wüstefeld, Tobias, 3030
Feller, Daniel P., 3182, 5129

Feltz, Adam, 3057, 5198
Feng, Yi, 5178
Fenn, Elise, 1184
Fenn, Kimberly M., 3214, 4206, 4234, 5181
Fenske, Mark J., 3009
Fenton, Adam W., 1110
Ferber, Susanne, 1204, 4007
Ferguson, Heather J., 5040, 5155
Ferguson, Melanie, 157
Ferguson, Sarah Hargus, 3148
Fernandes, Myra A., 5217
Fernandes, Rachel B., 3101
Fernandez, Angel, 1182
Fernández, Maria, 1182
Fernández-López, María, 329, 1163
Ferré, Pilar, 4060
Ferreira, Fernanda, 201, 2143, 4047
Ferrera, Vincent P., 2005, 4098
Feuer, Shelley, 4241
Fiacconi, Chris M., 3009, 5203
Ficarra, Toni L., 3156
Fickle, Sean E., 5124
Fickling, Logan James, 4191
Fiechter, Joshua, 5204
Fiedler, Susann, 212
Fields, Eric C., 2194
Fifić, Mario, 2059, 2080, 5042
Fillmore, Paul, 3201
Finley, Sara, 2160
Finn, Bridgid, 238
Fiorella, Logan, 4127, 4129
Fischer, Rico, 1017, 1020, 4006, 5063
Fischer-Baum, Simon J., 327, 3160, 4043, 4041
Fisher, Jerry S., 184
Fitzgerald, Elizabeth, 1003
Fitzroy, Ahren B., 2137
Fitzsimmons, Gemma, 124
Flores, Angelica, 5221
Floridou, Georgia Aristi, 5076
Flurry, Ethan, 3196
Foerster, Anna, 5051, 5066
Folk, Charles L., 249, 2030
Folk, Jocelyn R., 1025, 1026, 1027, 4048
Folsom-Kovarik, Jeremiah T., 292
Fones, Devyn, 1183
Foot, June, 134
Foot, Vanessa Lauren, 134, 1054
Foraker, Stephani M., 188
Ford, Jaclyn H., 159
Formica, Silvia, 2023
Forrin, Noah D., 2047, 5189
Fort, Larry Douglas, 3042
Fort, Mathilde, 1150
Foss, Donald J., 4147
Foster, Nathaniel, 2048
Fostick, Leah, 85
Foucart, Alice, 2129
Fowler, Alexandra E., 1129
Fox Tree, Jean E., 1168, 3116
Fox, Amy Rae, 1051
Francis, Andrea P., 4019
Francis, Wendy S., 275, 4040
Francois, Trente, 1177
Franconeri, Steven, 4198
Frank, Colleen C., 3107
Frank, David J., 259, 4119, 4150
Franke, Michael, 1125
Frankenstein, Andrea N., 1055, 2105, 3206
Franklin, Nancy, 5168
Fraundorf, Scott H., 1043, 1118, 1119, 2136
Frazer, Alexandra K., 3064
Freeman, Emily E., 1203
French, Kristin, 2001
Freund, Alexandra M., 305
Frey, Darren, 283
Fricke, Melinda, 272
Frid, Bailey, 1070
Friedman, Sydney, 4182
Friesen, Deanna, 271, 1070
Frischkorn, Gidon T., 5120
Frissen, Ilja, 115
Fritz, Catherine O., 254, 5240
Fröber, Kerstin, 1020, 5059
Froger, Charlotte, 5091
Frömer, Romy, 5059
Frontera, Natasha L., 2028
Frosh, Iska, 1147
Frost, Ram, 319
Fu, Mengzhu, 3025
Fuegen, Kathleen, 2173
Fugelsang, Jonathan A., 5110, 5111
Fuhrman, Jessie, 5195
Fuhrmeister, Pamela, 3151
Fujita, Kazuo, 2011
Fujita, Tetsuya, 3114
Fujiwara, Esther, 291
Fukuda, Keisuke, 4203
Fulton, Erika K., 3072
Fyfe, Emily R., 1050
Fyndanis, Valantis, 3137
Fysh, Matt, 5040

G

Gabay, Bar, 1184
Gabouer, Allison, 312
Gade, Miriam, 2052
Gaggioli, Andrea, 3099
Gagne, Christina L., 3136
Galati, Alexia, 61
Galesic, Mirta, 7
Galin-Corini, Laura, 5079
Galla, Brian, 3097
Gallant, Adèle, 1137
Gallant, Sara N., 1132
Gallego Hiroyasu, Elisa M., 3240
Gallo, David A., 1169, 5174, 5223
Gallup, Andrew C., 226
Galotti, Kathleen M., 3051
Galyer, Darin, 5006
Gao, Chenlu, 3201
Gao, Yang Agnes, 3161
García, Ariana, 1074
Garcia, Dalia, 1069
García, Elva A., 1074
Garcia, Omar, 2214, 4230
García-Bajos, Elvira, 4173
Garcia-Marques, Leonel, 120
Garcia-Retamero, Rocio, 255, 3057, 5198, 5234
Gardony, Aaron L., 2213, 4101, 4105
Garry, Maryanne, 4187, 4188
Garthwaite, Savannah, 3088
Gaskell, M Gareth, 39
Gaspar, John M., 95
Gaspelin, Nicholas, 95, 98, 2037
Gauer, Gustavo, 1186
Gauvrit, Nicolas, 1205
Gaylord, Nicholas, 3080
Gazder, Taranah, 160
Geller, Emma H., 1068
Geller, Jason, 5149, 5151
Gentile, Davide, 2099
Gentner, Dedre, 2087
Georgan, Wendy, 5188
George, Lizzie, 3079
George, Tim, 2083
Georgiou, George, 1
Geraci, Lisa, 5197, 5200
Gerhardstein, Peter, 1224
Gershman, Danielle, 4202
Getz, Laura M., 4061
Geyer, Thomas, 5044
Ghaffari, Minou, 212
Ghattan, Sarvenaz, 3044
Ghazal, Saima, 255, 5234
Ghilic, Irina, 1057
Gibson, Bradley S., 220
Gibson, Olivia, 1003
Giebl, Saskia, 4148
Gier, Vicki S., 4156
Gilbert, Annie C., 4034
Gilet, Anne-Laure, 1171
Gill, Devin M., 261
Gillenwaters, Amber M., 4046
Gilzow, Holly, 4170
Ginestet, Emilie, 1028
Ginter, Filip, 3135
Ginther, Matthew, 3047
Giovannone, Nikole, 2137
Girard, Sandrine, 5191
Gladden, Aliya, 5179
Glanc, Gina A., 1127
Glass, Brian, 3080
Glavan, Joseph J., 1206
Gleason, Liam J., 4023

Glenberg, Arthur M., 20, 4072
Glick, Casey, 3123
Glorioso, Gabrielle, 1176
Glover, Scott, 295
Goddard, Perilou, 2173
Goetschalckx, Lore, 5002
Gokce, Ahu, 5044
Goldinger, Stephen D., 5045
Goldman, Susan R., 1023
Goldrick, Matt, 149, 4044
Goldstone, Robert L., 4092
Goldwater, Micah, 1053, 3080
Gollan, Tamar H., 40, 149, 1071, 4024, 4035, 4039
Goller, Florian, 310
Goller, Haley G., 5062
Golomb, Julie D., 3019
Gomez, Pablo, 94, 2162
Gómez-Ariza, Carlos J., 1008, 5186
Gondoli, Dawn M., 220
González-García, Carlos, 2023
Goodale, Melvyn A., 2226
Goodbourn, Patrick T., 4219
Goodfriend, Julie, 2166
Goodman, Jade B., 1203
Goodman, Sara G., 4120
Goodsell, Charles A., 4164
Goodwin, Kerri, 3042, 5179
Goold, Jessica E., 5003
Gopnik, Alison, 2081
Goralski, Thomas, 2080
Gordon, Leamarie T., 1170, 4158
Gordon, Peter C., 3115
Gorin, Simon, 51, 2075
Goring, Sara Anne, 1021
Gosch, Nora, 1004
Gosling, Samuel, 2099
Goto, Nobuhiko, 4116
Goujon, Annabelle, 5184, 5228
Gouravajhala, Reshma, 59, 3085
Gow, David W., 3142
Gowan, Erica, 1012
Grabman, Jesse H., 4154
Grady, Cheryl L., 159
Grage, Tobias, 1234
Graham, Erin N., 5193
Graham, Loranel M., 3095
Granson, Matt, 1012
Grant, Lauren D., 1015
Gray, Nicholas, 3168
Gray, Zachary, 140
Green, Elizabeth A., 5206
Green, Isis B.F., 5055
Green, Marshall L., 4221
Greenaway, Justine K., 3165
Greene, Ciara M., 194, 1002, 1174
Greene, Nathaniel R., 5093
Greene, Sophie, 11
Greenspon, Emma B., 2239
Greenwald, Cassie, 5220
Gregg, Julie, 1024, 1154
Gregg, Melissa, 5224
Gretz, Matthew R., 177
Griffin, Emily, 2066
Griffin, Thomas D., 1034
Griffin-Oliver, Courtney, 2232
Griffiths, Tom, 263
Grillo, Joseph, 3188
Grimaldi, Phillip, 239
Grimshaw, Gina M., 2098
Grinschgl, Sandra, 4205
Grondin, Simon, 3243
Gronlund, Scott D., 2186, 4164
Gross, Marina P., 2193
Grossi, Giordana, 2151
Grossman, Emily D., 4209
Growns, Bethany, 4112
Grunewald, Kristin, 2090
Gualtieri, Samantha, 2078
Guedea, Erika L., 275
Guediche, Sara, 1075
Guerrero, Brenda L., 1081, 2161
Guerrero, Tricia A., 1034
Guevara Pinto, Juan D., 3213
Gugerty, Leo, 2093, 2095
Guild, Alexandria, 2001
Guisuraga-Fernández, Zoila, 1182
Gulacsik, Gala, 3065
Gullifer, Jason W., 271, 1086
Gunalp, Peri, 4103, 4198
Gunawan, David, 211
Gunstad, John, 5082
Guo, Jianfei, 2235
Guo, Taomei, 272
Guo, Xinqi, 3033
Guo, Yaling, 4074
Gurrola, Bianca V., 4040
Gustavson, Daniel E., 135
Gutchess, Angela, 2194, 4111
Guyton, Alexis, 5057
Gyurkovics, Mate, 4009

H

Haaf, Julia M., 32, 5242
Hacibektasoglu, Deniz, 4179
Hacker, Jessica Y., 304
Hagemann, Dirk, 5120
Hagenah, Sara, 1035
Hager, Gregory, 162, 2231
Hagopian, Lara, 5009
Hagstrom, Alexis, 166
Hahn, Amanda C., 187
Hahn, Sowon, 5078, 5112
Hajnal, Alen, 1152
Hakim, Nicole, 300, 3030
Hale, Sandra, 3230
Haley, Elizabeth, 3232
Hall, Michael D., 1077
Halpern, Andrea R., 87, 5076
Halvorson, Kimberly M., 1187
Hamaker, Monica S., 1141
Hambrick, David Z., 1214
Hamilton, Antonia, 103
Hamilton, Kristy, 4237
Hamm, Alfons, 1017
Hammerly, Christopher, 2125
Hammerton, Holly, 3038
Hampson, Elizabeth, 4100
Han, Chao, 2134
Han, Linfeng, 3108
Hancock, Peter A., 1097, 1240, 1241, 5101
Hancock, Thomas, 3063
Hanczakowski, Maciej, 178, 2202
Handschke, Tamiqua, 1179
Handy, Todd C., 1130
Hannula, Deborah E., 2036
Hansen, Alexis, 2080
Hanson, Derek J., 4126
Hanson, Jacob, 1221
Hao, Han, 4218
Harada, Etsuko T., 5072
Harada, Yuhki, 5072
Harding, Sam, 2049
Harding, Samuel M., 5, 5029
Hargis, Mary B., 3231
Harmon, Eva, 1120
Harmon, Zara, 151
Harper, David, 4124
Harper, Nesha R., 1183
Harrell, Kristen, 4222
Harrigan, Isabelle, 4117
Harrington, Erin, 3210
Harris, Alison, 3098
Harris, Irina M., 46
Harris, Justin A., 46
Harris, R. Luke, 5154
Harrison, Alan, 2204
Harrison, Chrystal T., 1141
Hart, Einav, 2113
Hartsough, Lauren, 3047
Hartsuiker, Robert J., 2129
Harvey, Christina, 4158
Harvey, Nigel, 1101
Hasak, Lindsey R., 2119
Hasenäcker, Jana, 64
Hashemi, Ali, 2184
Hasher, Lynn, 3166
Hataji, Yuya, 2011
Hatano, Aya, 4116
Hatherley, Joshua, 58
Hausman, Hannah, 4144
Hawkins, Guy E., 148, 1094
Hayakawa, Sayuri, 243
Hayes, Brett, 256
Hayes, Taylor, 2143
Hayes, William, 3045
Hays, Matthew Jensen, 4236
Hazar, Ceren, 1091
Hazeltine, Eliot, 1031, 4004, 4005

He, Jinzhou, 5176
He, Lisheng, 1103
Heald, Shannon L.M., 1228
Healey, M. Karl, 220
Healy, Alice F., 48, 2149
Heathcote, Andrew, 79, 1108
Heaton, Rachel Flood, 3026
Hebert, Katherine P., 5045
Hebert, Taylor, 1177
Heck, Daniel W., 258, 5231
Hedley, Sophie E., 2098
Heffner, Christopher C., 3159
Heflin, Jeff, 152
Hegarty, Mary, 2215, 4103, 4198
Heijltjes, Anita, 4143
Heilman, Renata, 5105
Heinke, Dietmar, 105
Heinrich, Antje, 157
Heisick, Laura L., 3211
Heit, Evan, 5135
Helfrich, Maxwell R., 3103
Helie, Sebastien, 3086
Hemed, Eitan, 2115
Hemmatian, Babak, 3078
Hemmer, Pernille, 144, 1196, 5106
Hendel, Dalit, 4105
Hendel, Emalie, 3091
Henderson, Eric, 4222
Henderson, John M., 2143, 5003
Henik, Avishai, 3100
Henkel, Linda A., 4233
Henne, Trevor R., 1179
Henninger, Felix, 1236
Hensley, Cody J., 1141
Hepner, Christopher Richardson, 1220
Herbort, Oliver, 1004
Herd, Wendy, 3128
Heredia, Roberto R., 1074, 4028
Hermann, Mary M., 5142
Hernandez, Alan, 321, 2092
Hernandez, Arturo E., 44
Hernandez, Dacia Carolina, 1113
Herr, Thomas M., 3064
Herrera, Mario E., 4184
Hertzog, Christopher, 3183
Hess, Michael, 249
Hestvik, Arild, 2134
Hetzel, Sabrina, 190
Hickok, Greg, 2076
Hicks, Jason L., 2204, 3200, 3204, 3211, 3213
Hicks, John M., 5030
Hieb, Jeffrey, 136
Higby, Eve, 4038
Higgs, Karyn, 3182
Hilbig, Benjamin E., 1236
Hilchey, Matthew D., 2234, 3028, 3029
Hilliard, Meredith, 3128
Hills, Thomas, 3218
Hilverman, Caitlin, 1187
Hinault, Thomas Thierry, 5073
Hindy, Nicholas C., 5175
Hines, Jarrod C., 3177
Hinkson, Jessica, 2017
Hino, Yasushi, 2152, 2153, 3126
Hinson, John M., 5069
Hinze, Scott R., 3122
Hirsch, Gabriella V., 1169
Hirsch, Patricia, 5065
Hirst, Jennifer, 128
Hirst, William, 205, 4138, 4194
Hitchcock, Olivia, 3024
Ho, Joselyn, 2076
Hockley, William E., 3185, 5182, 5216
Hocut, Joy, 5075
Hodel, Amy, 5172
Hodges, Bert, 2238
Hoffman, James E., 2019, 2039
Hoffman, Michael, 127
Hoffmann, Janina A., 250, 5109
Hoffmann, Mareike Amelie, 3016
Hoffstein Grady, Rebecca, 194
Hofmann, Markus, 2155
Hofstein Grady, Rebecca, 1174
Hogenhuis, Alexander, 2166
Hogeveen, Jeremy, 3013
Holcombe, Alex O., 4219
Holden, Mark P., 166, 4099, 4100
Hollan, James D., 1051
Hollingworth, Andrew, 5035, 5041
Hollins, Timothy J., 289
Hollis, Geoff, 65, 2013
Holloway, Charli, 4043
Holloway, Eleanor, 79
Holm, Suvi K., 14
Holt, Lori L., 3175
Holtzman, Amanda S., 5062
Homer, Bruce, 4115
Hommel, Bernhard, 18, 102, 132
Hong, MinKyung Clair, 1052
Hong, Yoolim, 5226
Hong, Youngji, 1134
Hood, Audrey V.B., 3040, 5062
Hopke, Tabetha, 4046
Hopkins, Robin, 136
Hopman, Rachel J., 4017
Hopper, William J., 267, 3235
Horace, Janet L., 3073
Horn, Sebastian S., 305
Hornburg, Caroline Byrd, 2176
Horne, Autumn, 3129
Horne, Murray R., 2221
Horne, Zachary, 2108
Horner, Carlene A., 4101
Horwood, Bridget, 5178
Hoshino, Noriko, 4036
Hosokawa, Aya, 5087
Hotaling, Jared M., 286, 1092
Hou, Yvette, 5083
Houck, Lindsay, 2208
Houdé, Olivier, 283
Houpt, Joseph W., 1206
Houston, James R., 5077
Hout, Michael Craig, 5031, 5047
Hovakimyan, Naira, 4240
Hsieh, Cheng-Ju, 2059
Hsieh, Shulan, 5070
Hsu, Dong-Bo, 4045
Huang, Chun-Yuan, 5042
Huang, Jie, 4104
Huang, Mengjie, 112
Huang, Yi Ting, 5162
Hubbard, Timothy L., 230
Huber, David E., 267, 3235
Huebert, Andrew M., 9, 5218
Huebner, Matthew G., 4090
Huestegge, Lynn, 1004, 3016, 5064
Huff, Mark J., 177, 1152, 4130, 5170
Huff, Markus, 5138
Huffman, Greg, 2234
Hughes, Bryn, 2071
Hughes, Gregory Isaac, 3184
Hughes, Matthew L., 4150
Hughes, Michelle L., 5077
Hummel, John E., 3026
Humphreys, Karin R., 1009, 3239, 4042
Hund, Alycia M., 4102
Hung, Daisy, 2159
Hupbach, Almut, 152
Hurlstone, Mark, 1105, 3224
Hurst, Austin J., 2016
Hussey, Erika, 2042
Hutcheon, Thomas G., 1003
Hutchison, Keith A., 3040, 4054, 5071
Hutson, John P., 5025
Hutt, Stephen, 137
Hutton, Allyson, 2211, 2224
Huynh, Alex C., 2047
Hyman, Ira E., 26

I

Iarocci, Grace, 2033
Ibragimova, Manzura, 5175
Ibrahim, Mariamme, 1082
Imai, Fumihito, 3021
Imaizumi, Shu, 4063
Imashita, Mizuki, 5123
Imbault, Constance, 2099
Imbrigiotta, Sarah N., 2145
Incekara, Eda, 5073
Incera, Sara, 3101, 5146
Ingvalson, Erin M., 244
Inhoff, Albrecht, 1154
Innes, Reilly, 148
Intraub, Helene, 163
Ionin, Tania, 1151
Iordan, Alexandru D., 3107, 4200
Ireland, Molly, 3080
Ireland, Zachary, 3155

Iricinschi, Catalina, 3106
Irons, Sarah T., 3156, 4041
Irwin, David E., 5028
Ishibashi, Ryo, 1212
Ishiguchi, Akira, 1226, 3074, 3093
Ishiguro, Sho, 4212
Ishikawa, Kenta, 1138
Isingrini, Michel L., 5089
Isurin, Ludmila, 4196
Itakura, Shoji, 5095
Ithisuphalap, Jaruda, 1178
Ito, Shogo, 5018, 5021
Itthipuripat, Sirawaj, 185
Ivanova, Iva, 1113
Ives, Lindsay, 4182

J

Jablonska, Magdalena, 3068
Jackson, Brooke N., 2002
Jackson, Corai, 4184
Jacobs, Cassandra L., 203, 3130
Jacques, Brandon G., 1110
Jaeger, Allison J., 1033
Jaeger, Christopher Brett, 4096
Jaeggi, Susanne M., 161, 4118, 4200, 4209
Jafferani, Asiya Ayoob, 4031
Jäger, Gerhard, 1125
Jaggy, Oliver, 180
Jakubiel-Smith, Zofia, 4058
Jalbert, Madeline, 5103
Jamal-Orozco, Nabila, 3097
James, Brielle T., 2001, 2009
James, Ericka, 5075
James, Kelsey K., 1067
James, Lori E., 153, 5080
Janakiefski, Laura, 5225
Jäncke, Lutz, 1217
Janczyk, Markus, 1125, 1239, 2225
Janes, Jessica L., 1061, 3189
Jang, Yoonhee, 1194, 5117
Jaranilla, Karen, 272
Jared, Debra, 92, 271, 2123
Jaroslawska, Agnieszka J., 225, 4199, 4213
Jarosz, Andrew F., 5128
Jarrold, Christopher, 4210, 5068
Jarvstad, Andreas, 286
Jasinska, Kaja, 2137
Jasnow, Aaron, 1061
Jeanneret, Stephanie, 2195
Jennings, Janine M., 1062
Jensen, Ashley, 1179
Jensen, Greg, 2005, 4098
Jent, Kelly, 3063
Jeon, Amabel, 5233
Jeye, Brittany M., 1190, 4018
Jia, Ning, 4073, 4074
Jiang, Gaofang, 4073
Jiang, Huangqi, 5053
Jim, Ariane, 1016
Job, Remo, 3094
Jobson, Katie R., 5048
Jobst, Barbara C., 117
Joergensen, Gitte, 5132
John, Richard, 3066
Johndro, Hunter, 4111
Johnson, Alexander A., 1121
Johnson, Amber, 189
Johnson, Elizabeth K., 3144
Johnson, Emily A., 2144
Johnson, Jeffrey D., 78, 5221
Johnson, Jennifer, 3005
Johnson, Matthew R., 1209
Johnson, Rebecca L., 1160
Jolicoeur, Pierre, 3011, 4214, 5043, 5046
Jonczyk, Rafal, 2130
Jones, Alyssa R., 27, 4165
Jones, Benedict C., 187
Jones, Brady K., 4176
Jones, Dylan M., 2202
Jones, Jonahthan, 162
Jones, Kristyn A., 2044
Jones, Michael N., 5156
Jones, Raeshaun, 1036
Jones, Winston E., 302, 3207
Jong, Fitria, 3010
Jonides, John, 161, 4118, 4200
Jordan, Kayla, 4188
Joseph, Jessica, 315
Joshi, Miti, 2245
Joslyn, Susan, 3065
Jovanov, Kimberley, 4079
Jovelett, Jarrett T., 260
Juhasz, Barbara J., 1165
Juola, James F., 2196
Jyotishi, Manya, 1115

K

Kaakinen, Johanna K., 14
Kabasa, Misty, 4067
Kabir, Russell Sarwar, 5171
Kacinik, Natalie A., 3117, 4075
Kadel, Allison, 117
Kahana, Michael J.**, 117, 1188, 1191, 1199, 1200, 4191
Kahle, Ryan, 5133
Kahn, Mallory, 5179
Kaiser, Nechama, 4227
Kałamała, Patrycja, 4021
Kalish, Michael L., 3077
Kalish, Michael N., 5238
Kamaraj, Deepan, 3232
Kaminske, Althea, 2043
Kan, Irene P., 216, 2203, 5137
Kana, Rajesh, 3111
Kanaya, Hidetoshi, 2244
Kane, Michael J., 135, 195, 232, 1021, 2050, 3039
Kaneda, Mizuki, 224
Kaneko, Ryosuke, 3179
Kang, Jeein, 2238
Kang, Jinwon, 2111
Kang, Kathleen, 2111
Kang, Sean H.K., 1064, 5205
Kantner, Justin, 5220
Kao, Tina, 4098
Kapatsinski, Vsevolod, 151
Kaplan, Alexandra D., 1240, 1241
Kaplan, Simon M., 5011
Kapnoula, Efthymia C., 5150
Kappers, Astrid M.L., 3246
Kapucu, Aycan, 1146
Karaca, Meltem, 4135
Karan, Alexander, 314, 1088, 1089, 5246
Karanian, Jessica M., 1190, 3186
Karbach, Julia, 5065
Kardan, Omid, 4229
Kareev, Yaakov, 146, 3052
Karpicke, Jeffrey D., 2176, 4145, 5208
Karsh, Noam, 2115
Karvetski, Christopher, 8
Kasai, Tetsuko, 4069
Kaschak, Michael P., 20, 3131
Kashihara, Shiho, 5171
Kaszowska, Aleksandra, 2211, 2213
Kato, Mizuki, 3114
Katopodi, Katerina, 1
Katz, Albert N., 3014
Katz, Benjamin, 4118, 4200
Kaveladze, Benjamin, 106
Kawaguchi, Jun, 3216, 4195
Kawahara, Jun I., 3021, 5001
Kawakami, Naoaki, 2244
Kawasaki, Yayoi, 5173
Kazanas, Stephanie A., 1112, 2067, 4023, 5194
Kazi, Samreen, 1082
Keefer, Lucas A., 5152
Keetels, Mirjam, 110
Keezing, Umi, 5013
Kellen, David, 73, 2060, 4220
Keller, Jeffrey, 5097
Kelley, Amanda C., 3134
Kelley, Colleen, 3168
Kelley, Colleen M., 5202
Kelley, Matthew R., 1222
Kelley, Timothy, 2109
Kellner, Courtney, 1122
Kelly, Andrew J., 3219
Kelly, Jonathan W., 2218, 4107
Kelly, Laura J., 5135
Kelty-Stephen, Damian, 3139
Kemp, Lisa S., 3125
Kendeou, Panayiota (Pani), 3120
Kenett, Yoed N., 3082
Kennedy, Briana L., 2053
Kennedy, Jarrah, 24
Kennison, Shelia, 5159
Kent, Christopher, 142, 3244

Kershaw, Trina C., 5118
Kersten, Alan W., 5141
Kessler, Brett, 91
Kessler, Theresa T., 1240, 1241
Key, Kylie N., 2186
Keysar, Boaz, 5174
Khadjevand, Fatemeh, 117
Khaw, Kimberley L.C., 4219
Khudanpur, Sanjeev, 162
Kiesel, Andrea, 262
Kieslich, Pascal J., 1234, 1236
Kikumoto, Atsushi, 280, 4203, 5056
Kilic, Asli, 47
Killingly, Callula, 2068
Killingsworth, Clay, 3076
Kilshaw, Robyn E., 33
Kim, Andrew, 1154
Kim, Haena, 96, 2100
Kim, Jasmine, 3120
Kim, Jung Won, 3111
Kim, Junwoo, 2111
Kim, Kyungmi, 2206, 5233
Kim, Minwoo, 2039
Kim, Nayoung, 62
Kim, Ruth, 1007
Kim, Woojae, 38
Kim, Ye Eun, 2034
Kimball, Daniel R., 2180
Kimchi, Ruth, 234
King-Shepard, Quentin, 2110, 4068
Kingstone, Alan, 4242, 5026
Kinoshita, Sachiko, 90
Kirby, Bridget, 1095
Kirby, Krystal, 5097
Kirchhoff, Alison L., 3164
Kiribayashi, Asaki, 5123
Kirkby, Julie A., 1041, 1042
Kirkpatrick, Ryan P., 1110
Kirsh, David, 2041
Kiyokawa, Sachiko, 2084, 5123
Klapatch, Lukas, 3203
Kleider-Offutt, Heather M., 2212, 2219, 3076, 4166
Klein, Raymond M., 215, 2016
Kleinman, Daniel, 4024
Kleinsmith, Abigail L., 2063
Kliegl, Oliver, 1185
Knapp, William H., 4065
Knight, Rebekah, 1144
Knoeferle, Pia, 2128
Knowlton, Barbara, 5192
Kobayashi, Akihiro, 1138
Kobayashi, Masanori, 3216
Koch, Christopher, 4003
Koch, Griffin E., 3229
Koch, Iring, 276, 1005, 4076, 5065
Kocsis, Marton F., 3069
Koedinger, Kenneth R., 1046
Koehler, Derek J., 5110, 5111
Koesterer, Dianna E., 3132
Kohn, Robert, 211
Kole, James A., 48, 1090
Kolesari, Jennifer, 1123
Kondrad, Robyn L., 3075
Konovalova, Elizaveta, 1096
Konstantinidis, Emmanouil, 1100, 1101
Koop, Gregory J., 2187
Kopatich, Ryan D., 3182
Kornell, Nate, 4155, 5204
Korovkin, Sergei Y., 5127
Koshino, Hideya, 2054, 3010
Kovács, Kristóf, 4218
Kovacs, Marton, 3053
Kozhevnikov, Maria, 299
Kozlik, Julia, 5063
Kozloff, Violet, 5187
Kraemer, Kyle R., 3248
Kragel, James E., 117
Kramer, Michelle R., 29, 293, 1237
Krasich, Kristina, 137, 1010
Krass, Kyra, 5132
Kravitz, Dwight J., 29, 293, 1215, 1237, 5011
Krawczyk, Daniel, 53
Krebs, Ruth, 2114
Krefeld-Schwalb, Antonia, 1235
Kreiner, David S., 4156
Kremer, Gül E., 2130
Krestar, Maura L., 2127
Kreuz, Roger J., 1121
Kroeker, Travis David, 5073
Kroger, Carolyn K., 3147
Krogulska, Aleksandra, 178
Kroll, Judith F., 272, 1069, 1082, 1087, 2122, 4051, 5148
Kroneisen, Meike, 2200
Krueger, Lacy E., 2172
Krug, Marie, 3013
Krull, Doug, 2173
Krupinski, Elizabeth, 167
Krupskyy, Taras, 4109
Kuepper-Tetzel, Carolina E., 4140
Kuhlmann, Beatrice G., 3176, 3200
Kuhlmann, Shelbi, 4127
Kuhn, Gustav, 5012
Kuhns, Jack, 5085
Kumar, Abhilasha A., 5158
Kumar, Kiran, 301, 2049, 2051
Kunde, Wilfried, 1004, 5051
Kuo, Eric, 2110, 4068
Kuperman, Victor, 319, 2099, 3135
Kurby, Christopher A., 2191, 5130, 5139, 5143
Kurinec, Courtney A., 302, 4169
Kuroshima, Hika, 2011
Kurtz, Kenneth J., 55, 3083, 3087
Kurum, Esra, 5148
Kurumada, Chigusa, 200, 3152
Kusev, Petko, 5105, 5107
Kusunose, Yuu, 2153
Kuzmak, Sylvia, 2085
Kuzmickaite, Brigita, 4082
Kvam, Peter D., 5236
Kvavilashvili, Lia, 5076
Kwon, Joy, 4067
Kwon, Mijin, 5112
Kyröläinen, Aki-Juhani, 3135
Kytola, Keri, 3210

L

Lacherez, Philippe, 2068
LaCour, Mark, 4086
Laeng, Bruno, 3031
Laflamme, Vincent, 3243
Lagroix, Hayley E.P., 4007
Lai, Yun-Hsuan, 228
Laidlaw, Kaitlin E.W., 2226
Lakens, Daniël, 20
Lakshmanan, Usha, 2124
Lam, Tuan Q., 243
Lampinen, James, 303
Lamy, Dominique, 308, 5024
Lan, Andrew, 239
Lanagan-Leitzel, Lyndsey K., 5037
Lancaster, Alia, 241
Landau, Barbara, 162, 2231
Landi, Nicole, 2137
Landrigan, Jon-Frederick, 5149
Landy, David, 4092
Lane, Sean M., 5167
Lange, Nicholas, 289
Langerock, Naomi, 54
Langston, William, 1147
Lansford, Kaitlin L., 244
Lapa, Ana, 120
Lappe, Markus, 5020
Larson, Kathleen G., 1140
Lash, Amanda, 3148
Laskowitz, Sarah, 5008
Lau, Zen, 160
Laukkonen, Ruben, 106
Laurienti, Paul J., 4171
Laursen, Skylar, 5203
Lauterman, Tirza, 130
Lavie, Limor, 247, 3157
Layher, Evan, 2188
Lazareva, Natalia Yur'evna, 2086
Le Mens, Gael, 146
Le Pelley, Mike E., 2, 4001
Le, Anh, 2102
Le, Ni La, 3147
Lea, Brooke, 1120
Learmonth, Amy, 5214
Leber, Andrew B., 5226
Lebkuecher, Amy, 315, 4067
Lednicky, Sylvie, 4175
Lee Jobson, Kristee, 4
Lee, Christopher, 5217
Lee, Donghoon, 3102

Lee, Heungchul, 1194, 5117
Lee, Hyosun, 2148, 3115
Lee, Jae Hyeon, 5078
Lee, Jungsoo, 3102
Lee, Kimberly D., 5126
Lee, Yoon Kyung, 5078
Lee, Yoonhyoung, 1134
Lees, Mary Beth, 5177
Lefebvre, Christine, 5046
LeFevre, Jo-Anne, 4090
Leffers, Jessica S., 3092
Lega, Brad C.K., 117
Lehet, Matthew, 3155, 3175
Lehtonen, Minna, 273
Leib, Elena, 4094
Leiker, Emily K., 78
Leinenger, Mallorie, 2163
Lelonkiewicz, Jarosław R., 326
Lemaire, Benoît, 1205
León, José Antonio, 1044
Leonard, Carly J., 189
Leong, Lim M., 3048
Leontyev, Anton, 3004, 5061
Lerand, Haley, 4242
Leshikar, Eric D., 1055, 2105, 3206
Letang, Sarah K., 3112
Leventon, Jacqueline S., 1143
Levin, Daniel T., 242, 4096
Levin, Joel R., 3164
Levine, Linda, 194, 1174
Levine, William H., 1117
Levita, Liat, 4009
Levy, Ana, 5098
Lewandowsky, Stephan, 214
Lewis, Joanna, 4228, 5074
Lewis-Peacock, Jarrod A., 1217, 2195, 2201, 4204
Li, Bohan G., 5023
Li, Changrui, 4148
Li, Chuchu, 40, 4039
Li, Hongxiang, 4014
Li, Juan, 3166
Li, Luhe, 5018
Li, Ming-Hui, 3049
Li, Monica Y.C., 3142, 3150
Li, Shu, 3058
Li, Ying, 3218
Li, Yingge, 2227
Li, Yuxuan, 1200
Lian, Yu-Huei, 2159
Liang, Garston, 5235
Liang, Zhu-Yuan, 3058
Liefooghe, Baptist, 218, 1016, 2023
Lien, Mei-Ching, 2017, 2026
Liesefeld, Heinrich René, 1239
Likens, Aaron D., 1114, 3121
Lilburn, Simon, 287
Lilienthal, Lindsey, 4223
Lim, Alex F., 4107
Lim, Chae-Eun, 4012
Lim, Yuan Rong, 5176
Lin, Pei-Ying, 4029
Lin, Wenbo, 4163
Lin, Yu-Cheng, 4029
Linck, Jared A., 241, 4124
Linderholm, Tracy, 2169
Lindsay, D. Stephen, 2189
Lindsey, Dakota, 3220
Lingle, Jeremy, 127
Lintz, Evan N., 1209
Liou, Kai-Zhen, 5176
Lipowski, Stacy L., 1197
Lippelt, Dominique, 132
Litchman, Emma, 4202
Lithander, Marcus, 4135
Little, Daniel, 287
Little, Jeri L., 268, 1060
Little, Joshua W., 242
Liu, Audrey, 1192
Liu, Fang-chun, 2230
Liu, Hong-Zhi, 3054
Liu, JingYi, 4146
Liu, Qingfang, 281
Liu, Shiau-hua, 2230
Liu, Shuchen, 2240
Liu, Siqi, 3098
Liu, Xianyun, 4104
Liu, Xinge, 5010
Liu, Yang, 4083
Liu, Yanjun, 116
Liu, Yushuang, 2141
Live, Iris, 3194
Liversedge, Simon P., 1042
Livesey, Evan J., 46, 1053, 3165
Livny-Ezer, Abigail, 1080
Ljungberg, Jessica K., 4026
Lloyd, Marianne E., 5214
Lo, Yi-Pei, 3190
Loaiza, Vanessa M., 297, 1217
Locher, André, 5244
Lockamyeir, Robert F., 27, 4165
Loehr, Abbey, 3167
Loftus, Elizabeth, 194, 1174
Logan, Gordon, 3220
Logie, Matthew R., 1212
Logie, Robert H., 50, 225, 1212, 4213, 4217
LoGiudice, Andrew B., 3225
Lohani, Monika, 3148
Lohmar, Sabine, 3123
Lolli, Sydney L., 2058
Lombrozo, Tania, 2081
Lompado, Alyssa, 2019
Long, Michael D., 1056
López, Belem G., 1079, 4245
Lopez, Joshua, 3203
Lopez, Noelle, 158
Lorentz, Lisa, 2021
Loschky, Lester C., 5025
LoTemplio, Sara B., 1111, 4017
Lotto, Andrew, 1229, 3249
Loucks, Torrey, 3130
Lovaas, Alexis N., 4151
Love, Bradley C., 2185
Love, Melany, 3005
Lovelett, Jarrett T., 2175, 4122
Lowder, Matthew W., 4047
Lu, Aitao, 2238
Lu, Shuting, 145
Lu, Xinyi, 5205
Lu, Zhongyi, 4073, 4074
Luck, Steven J., 95, 98, 1223, 5122, 5239
Luckasen, Mary C., 3237
Lukaszewski, Danielle, 2151
Luke, Steven G., 125
Lundberg, Emily, 2238
Luneva, Alexandra R., 5127
Lupker, Stephen J., 2147, 2150, 2154, 3014
Luque, Alicia, 4032
Lurie, Rebecca, 4185, 4232
Lurquin, John H., 135
Lute, Sara, 5077
Luthra, Sahil, 1166, 3150
Luttenberger, Deanna, 5172
Lyday, Robert G., 4171
Lyle, Keith, 136

M

Ma, Ke, 18
Maass, Jaclyn K., 4053
Macbeth, Alessandra, 314, 1088, 1089, 5246
MacDonald, Maryellen C., 1219, 4067
MacEachern, Steve, 70
MacGyvers, Valanne L., 1177
Machlab, Karla, 4007
Machluf, Karin, 187
Macias, Gia M., 2054
MacLeod, Colin M., 2047, 5189
Macnamara, Brooke N., 259, 4113, 4119, 5053
MacNamera, Andrew, 4115
Madan, Christopher R., 291
Madden, Hannah, 2070
Maddox, Geoffrey B., 3104, 5075
Madison, Erin, 3072
Mado, Marijn, 4138
Madrid, Jessica, 5031
Madsen, Jens, 214
Magaldino, Corey M., 3247
Magán-Maganto, Maria, 1182
Magen, Hagit, 77
Magliano, Joseph P., 5129, 5130
Magnuson, James S., 316, 1166, 2158, 3142, 3150
Mahlke, Anne-Kathrin, 182
Maiello, Michele, 3094
Maillet, David, 3039
Majima, Yoshimasa, 2088

Makarov, Igor N., 2082
Makinae, Shiika, 4069
Makori, Cindy, 5179
Makovski, Tal, 4216, 5024
Malavanti, Karenna F., 4152
Malcolm, George L., 3027
Malejka, Simone, 5231
Malkin, Gali, 156
Mallett, Remington, 2195, 4204
Malley, Kaitlyn, 1095
Mallikarjun, Amritha, 2007, 2008
Malone, Avery, 2135
Malpani, Anand, 2231
Malt, Barbara C., 315
Mandel, David R., 8
Manelis, Anna, 296
Mangano, Serena, 1139
Mangels, Jennifer A., 5212
Manke, Kody J., 1046
Manley, Krista D., 4161
Mannering, Fred, 22
Mannering, Willa, 22
Mantell, James T., 2048, 2070
Manzey, Dietrich, 2056, 2229
Maquestiaux, François, 21
Maraver, Maria Jesus, 1133
Marcet, Ana, 329, 1163
Marche, Tammy A., 4159, 4193, 5180
Marchegiani, Sarah J., 1225
Marghetis, Tyler, 4092
Marian, Viorica, 243, 1145
Marinacci, Ryan M., 5232
Marinova, Mila, 191
Maritato, Antonella, 2223
Markant, Douglas, 5213
Markina, Polina N., 2082
Marks, Linnéa R., 2191
Marmurek, Harvey, 2027
Marois, Alexandre, 4117
Marois, René, 3047
Marsh, Elizabeth J., 323, 3181, 4142, 4192
Marsh, Jessecae, 6
Marsh, John Everett, 2015
Marshall, Anna M., 242
Marshall, Philip H., 1139
Martin, Jennifer M., 1112, 3195
Martin, Jessie, 143, 3017
Martin, Randi, 3129, 5157
Martin, Rose, 5107
Martin, Samuel, 5177
Martin, Sophia, 3036
Martin, Stephan, 2112
Martin-Arnal, Lorena Alicia, 1044
Martín-Cillerosa, Maria Victoria, 1182
Martínez, Michelle, 4040
Martire, Kristy A., 4112
Martis, Shaina B., 4105
Marton, Klara, 3171, 4022
Marukawa, Yuka, 5123
Mashburn, Cody A., 143, 1142, 1232
Mason, Alice, 1105
Mason, Andrea, 4067
Mason, Lauren, 42
Masoura, Elvira, 3137
Masson, Michael E.J., 33, 2236
Masson, Sandrine, 4088
Masters, Megan, 241
Masuoka, Tomoe, 5014
Mather, Mara, 1132, 2053
Matheson, Heath, 5154
Mathot, Sebastiaan, 4013
Mathy, Fabien, 1205, 3127
Matilla, Laura, 1182
Matsukura, Michi, 52
Matsuo, Saki, 5123
Matsuyama, Lisa, 3197
Mattys, Sven, 157
Maturi, Kinnera S., 2064
Matzke, Dora, 256, 1108
Mauner, Gail, 2135
Mavritsaki, Eirini, 1099
Max, Ricardo, 2031
Maxcey, Ashleigh M., 290, 5225, 5226
Maximo, Jose Omar, 3111
Maxwell, Joshua, 2037
Maxwell, Nicholas P., 4046
Mayer, Katja, 5020
Mayer, Richard E., 4114, 4115, 4243
Mayr, Susanne, 2020
Mayr, Ulrich, 280, 4203, 5056
Mazerolle, Marie, 21
Mazzoni, Giuliana, 4172
McAdoo, Ryan M., 2186, 4164
McAndrews, Mary Pat, 4181
McAuley, John Devin, 3147
McAuley, Tara, 2078
McBeath, Michael, 4072
McBeath, Michael K., 231
McBride, Dawn M., 5178
McCain, Jason, 5223
McCarthy, Kathryn S., 3122
McClure, Kenneth, 2220
McClure, Samuel M., 281, 2205
McCool, Ross Allen, 5163
McCormick, Colin R., 215
McCoy, Anthony W., 210
McCrudden, Matthew T., 3122
McCurdy, Matthew P., 1055, 2105, 3206
McDaniel, Mark A., 59, 3085, 3205
McDermott, Kathleen B., 1193
McDonald, Janet L., 2121, 3125
McDonough, Ian M., 3112, 5196
McGhee, Anna K., 78
McGillivray, Shannon, 5210
McGrew, Shelby J., 5152
McKenzie, Craig R.M., 3048
McKinley, Geoffrey L., 4235
McLaughlin, Drew J., 3143
McLennan, Conor T., 1126, 3101
McMullen, Jake, 4094
McMurray, Bob, 1031
McNamara, Danielle S., 1114, 3121, 3122
McNamara, Timothy P., 2218
McNeely-White, Katherine L., 9, 2074
McNorgan, Chris, 1153
McPartland, James C., 1118, 1119
McRae, Ken, 179, 2158
McWilliams, Thomas, 2042
Meacham, Ashley, 3076
Meade, Michelle L., 1180
Meaders, Elizabeth, 4003
Mech, Emily, 314, 1082, 1088, 1089, 5246
Medellín, Priscilla, 4040
Medina, Kelly, 4038
Meeks, Joseph Thadeus, 1183
Megherbi, Hakima, 4075
Megla, Emma, 5225
Mehiel, Nicholas, 4202
Meier, Matt E., 232
Meissner, Christian A., 4167, 5222
Meldrum, Sheila R., 5215
Mellers, Barbara, 209
Mello, Kristin, 3138
Mena, Stefany, 1059, 4148
Menekse, Muhsin, 2110
Menzel, Charles R., 2009
Merck, Clinton, 4194
Merkle, Edgar C., 5221
Merkt, Martin, 5138
Merrill, Edward, 5049
Mert, Nazike, 4190
Mertens, Ulf K., 1236
Messer, Rachel, 5159
Metcalfe, Janet, 237, 2182, 4133
Metzger, Mitchell, 2003
Metzger, Richard, 4202
Meunier, Fanny, 3127
Meuter, Renata, 2068, 2118
Meyer, Austin C., 2102
Meyerhoff, Hauke S., 180, 4198, 4205
Meyers, Ethan A., 5110, 5111
Michael, Robert B., 1176
Michaelcheck, Charlotte E., 4098
Michal, Audrey, 5115
Michimata, Chikashi, 3022
Mickes, Laura*, 5169
Mielicki, Marta K., 5121
Mieth, Laura, 2101, 2197
Migueles, Malen, 4173
Mikels, Joseph A., 3107
Mikhail, Monica, 1082
Milbradt, Alexa, 2220
Miles, James D., 2242
Millar, Madeleine, 108
Millar, Peter R., 5071
Miller, Carol A., 4051
Miller, Daniel P., 3113
Miller, Jeff, 30, 31
Miller, Kevin, 2045
Miller, Kevin Francis, 183

Miller, Krista A., 274, 1116
Miller, Michael B., 74, 2188
Miller, Rachel, 4177
Miller, Robert, 3202
Miller, Stuart S., 5025
Millett, Abbie C., 3
Milliken, Anna L., 4233
Milliken, Bruce, 2021, 2184
Millis, Keith K., 1022
Mills, Caitlin, 3044
Mills, Luke, 90
Mills, Mark, 2234
Mills, Megan, 172
Milshtein, Dalit, 3100
Milton, Fraser, 294
Min, Inah, 183
Minda, John Paul, 58, 1013
Minear, Meredith, 2220
Minor, Greta N., 2036
Miranda, Wilford, 1056
Mirkovic, Jelena, 39
Mirman, Daniel, 5149, 5151
Mishra, Ramesh, 41, 3037
Misra, Maya, 4051
Mitchel, Aaron D., 1225
Mitchell, Karen J., 3188
Mitchum, Ainsley, 5202
Mitroff, Stephen R., 29, 170, 293, 1237, 5038
Mitton, Evan, 5203
Miyake, Akira, 135
Miyatani, Makoto, 5171
Miyazaki, Yuki, 5001
Mizrahi, Reina, 1084
Mızrak, Eda, 4207
Mo, Lei, 1208
Moen, Katherine C., 309
Moerel, Denise, 112, 168
Moes, Paul, 5033
Moffitt, Chad, 3006
Mohammed, Shafee, 4118
Moher, Jeff, 104
Möller, Malte, 2020
Molloy, Fiona, 281
Moment, Jackie R., 3246
Monnier, Anne, 3011
Montag, Jessica, 314, 1088, 5246
Montagliani, Amanda, 5182
Moore, Cathleen M., 2057
Moore, DeWayne, 2095
Moore, Isabelle L., 2194
Moore, Kara, 303
Moore, Katherine S., 5048, 5055
Moored, Kyle D., 4200
Mora, Laura, 2223
Morales-Media, Roxana A., 2004
Morcom, Alexa M., 160
Mordkoff, Jonathan Toby, 5035
Moreau, David, 4113
Morehead, Kayla, 4093
Moreno, Amparo, 1181
Morett, Laura M., 1118, 1119
Morey, Richard D., 20, 68
Morgan, David Philip, 5169
Morgan, Reed, 3036
Morgan-Short, Kara, 1085, 4032
Moro, Anna, 1083
Morozova, Ekaterina N., 5127
Morris, Bradley J., 5125
Morris, Daniel, 2166
Morris, Joanna, 11
Morris, Peter E., 254, 5240
Morrison, Alexandra B., 1014, 1019
Möschl, Marcus, 3202
Moscovitch, Morris, 109, 4181
Moser, Alecia, 1224
Moss, Jarrod, 1037, 4109, 5058
Moss, Melissa E., 5056
Most, Steve, 2
Mou, Weimin, 165
Mousikou, Petroula, 64
Moyal, Roy, 5023
Mozel, Anne E., 5137
Mozer, Michael, 239
Mueller, Ronja, 3245
Muir, Lauryn, 5057
Mukherjee, Chandrama, 166
Mulatti, Claudio, 3094
Muller, MIchael, 3188
Mulligan, Neil W., 2164, 3199
Multhaup, Kristi S., 1012, 2209
Mummaneni, Anurima, 4204
Mungan, Esra, 3154
Munger, Margaret P., 2209
Muñoz-Garcia, Adrián R., 2196
Münster, Katja, 2128
Muramoto, Toshiaki, 2183
Murphy, Gillian, 194, 1174
Murphy, Lisa, 1098
Murphy, Sandra, 99
Murray, Jamie G., 3226
Murray, Samuel F., 1010
Musolino, Julien, 1196
Myer, Rachel A., 4091
Myers, Emily B., 35, 3151, 3159
Myers, Linda J., 1036
Myers, Matthew R., 2087
Myers, Sarah J., 3187

N

Nagai, Masayoshi, 2244
Nah, Joseph C., 3027
Naigles, Letitia, 1115
Nairne, James S., 3217
Najjab, Aysha, 5215
Nakamura, Hiroko, 2088, 4195
Nakamura, K., 197
Nakamura, Kuninori, 3060
Nakamura, Megan, 2122
Nakao, Takashi, 5171
Nakayama, Mariko, 2147
Nam, Hosung, 316
Nam, Kichun, 2111
Namba, Shushi, 5171
Naparstek, Sharon, 1189
Nardi, Daniele, 4099
Nash, Antonia, 108
Nathoo, Farouk S., 33
Navarro-Torres, Christian A., 1069, 1073
Naveh-Benjamin, Moshe, 225, 4213, 5092, 5093, 5099, 5242
Nayda, Diane, 107
Neal, Jane, 3081
Nebel, Cynthia, 133
Neely, James H., 270, 2165
Negron, Joseph A., 4040
Neider, Mark, 4228, 5074
Nelson, Kyle, 125
Nelson, Monica, 1012
Nelson, Tina, 2006
Nesbitt, Brittany N., 4152
Nesmith, Blake, 3063
Nespodzany, Ashley, 3017
Neuhoff, John G., 248
Neville, Khrista Emmleea, 5146
New, Joshua J., 4227
Newberry, Kimberly M., 5134, 5144
Newell, Benjamin R., 193, 286, 1092, 5104, 5235
Newman, Eryn, 5103
Newman, Phillip M., 4139
Newman, Rochelle S., 2007, 2008
Ng, Tiffani, 2094
Ngiam, William X.Q., 4219
Ngo, Jeremy, 1102
Nguyen, Allison G.H., 1168
Nguyen, An, 5187, 5188
Nguyen, Anna, 3023
Nguyen, Nancy, 1176
Nguyen, Rosalind, 5100
Nguyen, Viet Han H., 4070
Nickel, Allison E., 2036
Nicora, Grace L., 5039
Nicosia, Jessica L., 3034, 5071
Niedźwieńska, Agnieszka, 4172
Nieuwenstein, Mark R., 141, 4013
Niikuni, Keiyu, 2183
Niimi, Ryosuke, 5027
Nikolas, Molly, 4005
Nikolova, Mirela, 1042
Nir, Bracha, 2140
Nira, Yurika, 5123
Nisbet, Kelly, 319
Nishiguchi, Yuki, 4063
Nishimura, Takuto, 3059
Nishiyama, Megumi, 5014
Nishizaki, Yukiko, 2244
Nitsan, Gal, 3157
Niven, Elaine H., 4177

Nix, Bailey, 1026
Nobuta, Takuya, 5007
Noe, Colin, 3160
Noh, Ji Yeong, 2107
Noh, Sharon Mina, 2185,
Nokes-Malach, Timothy J., 2110, 3097, 4068, 4128
Norberg, Kole, 1043
Norman, Geoffrey R., 3225
Norman, Hideko F., 3246
Norman, J. Farley, 3246
Norris, Megan N., 3075
Northern, Paige E., 2174
Nosofsky, Robert, 56, 1216
Notebaert, Wim, 5060
Novick, Jared, 5162
Nozari, Nazbanou, 154, 1220, 3124
Nüesch, Lorena, 64
Nusbaum, Amy T., 5069
Nusbaum, Howard Charles, 1228, 2072
Nygaard, Lynne, 3145
Nyman, Sandra, 4123

O

O'Toole-Fehlmann, Angelica, 3006
Oakhill, Jane, 4075
Oberauer, Klaus, 75, 223, 1217, 2052, 3008, 4201
Ocampo, Derrick B., 1143
O'Day, Garrett M., 4145
Odegard, Timothy, 5215
Odermatt, Reto, 5102
O'Donnell, Hayley, 1129
O'Donnell, Kathleen A., 2054
O'Donnell, Marike, 5068
Oehrlein, Elizabeth C., 1160
O'Hara, Ruth, 1189
Ohlsson, Stellan, 2091
Okada, Brooke, 88
Okubo, Matia, 1138, 2018, 3031, 5173
Oller, Stephen D., 2127
Olmos, Ricardo, 1044
Olmstead, Anne, 2151, 3132
Olmstead, Annie J., 313, 4037
Olpin, Zachary, 261
Olschewski, Sebastian, 193
Olsen, Sarah, 1224
Olson, Daniel J., 4025
Olszewska, Justyna M., 3003, 3068, 5172
Omaki, Akira, 154
O'Malley, Josephine, 4027
Omar, Niveen, 2140
Omerzu, Tjasa, 5109
Onken, Emily L., 3177
Oppenheimer, Nicole, 5214
Oraby, Shereen, 3116
O'Rear, Andrea E., 5140
Orscheschek, Franziska, 4149
Ortegren, Francesca, 4137
Orzechowski, Jaroslaw, 3003
Osaka, Mariko, 224
Osaka, Naoyuki, 224
O'Seaghdha, Padraig, 152
Osman, Allen, 5094
Ostarek, Markus, 66
Osth, Adam F., 287
Ostrand, Rachel, 5082
Otani, Hajime, 1141
Otsuka, Sachio, 5190
Otsuka, Yuki, 5095
Otto, A. Ross, 1104
Ou, Lu, 252
Ouyang, Tianyin, 1155
Ovans, Zoe, 5162
Overkott, Clara S.R., 223, 4211
Overoye, Acacia L., 1066
Owczarek, Monique, 12
Oyama, Takato, 1138, 2018, 3031
Özçalışkan, Şeyda, 5153
Ozmen, Karya Anya, 3036
Özsoy, Sumru A., 3154

P

Paap, Kenneth R., 42
Pachai, Amy A., 1057
Pachur, Thorsten, 155, 1096, 1235
Pacione, Sandra, 4078, 4079
Padfield, William E., 4046
Paes, Tanya Maria, 5147
Pagan Camacho, Ascension, 1156
Pahor, Anja, 161
Palada, Hector, 1107
Palaganas, Eufrocina, 1082
Palavamäki, Maria, 5025
Palfi, Bence, 3041
Paller, Ken A., 2090
Palma, Pauline, 271
Palmer, John, 2057
Palmer, Shannon B., 4070
Pambuccian, Felix S., 1162
Pan, Steven C., 2175, 4122
Pan, Xuan, 2123, 2154
Pan, Yue, 5174
Pandeirada, Josefa N.S., 3217
Pandza, Nick B., 4124
Paneerselvam, Bavani, 2178, 2179
Pansuwan, Tanrada, 160
Paolieri, Daniela, 4060
Paolizzi, Sophie G., 3043
Papaioannou, Orestis, 5122
Papenmeier, Frank, 180, 182, 4108, 4205, 5138
Papesh, Megan H., 3213
Pappas, Nicholas, 2060
Pardo, Jennifer S., 12
Parihar, Sushmeena A., 1222
Paris, Richard, 2245
Park, Bo Youn, 2034
Park, George D., 4071
Park, Juana, 3136
Park, Juyoung, 4012
Park, Su Hyoun, 45, 3172
Parker, Adam J., 93, 1041, 1042
Parker, Andrew M., 7
Parks, Colleen M., 4215
Parlett, Chelsea, 4118
Parmelee, Patricia A., 3112
Parong, Jocelyn, 4243
Parr, Teresa, 174
Parris, Ben, 3041
Parrish, Audrey E., 175, 2001
Pascual-Leone, Alvaro, 317
Pashler, Harold, 239
Patalano, Andrea, 2058, 2079, 4083, 4087
Patel, Jwalin, 174
Patel, Pooja, 4228
Patel, Shikha, 4078, 4079
Paterson, Kevin B., 1029
Pathak, Aarohi, 4078, 4079
Patihis, Lawrence, 4184
Patterson, John D., 3087
Patton, Chelsi L., 3180
Paucarpura, Giuseppe, 5210
Paul, Joanna, 4083, 4087
Pauljohn, George, 12
Paulo, Rui, 3223
Paulus, John P., 3229
Paxton, Alexandra, 263
Payne, Alexis E., 5183
Payne, Brennan R., 1111, 3148
Pazdera, Jesse K., 1199
Pazos, Laura A., 5152
Pearlmutter, Neal J., 4062
Pearson, Daniel, 2, 4001
Pecher, Diane, 19
Peláez, Miriam, 1181
Peltier, Chad, 2233
Peltier, Scott J., 4200
Penney, Trevor B., 5205
Pepe, Nicholas, 3215
Pepperberg, Irene M., 253
Perdue, Bonnie M., 175
Perea, Manuel, 329, 1163
Pereira, Olivia, 3161
Peressotti, Francesca, 1164
Perez-Calzada, Mario, 2004
Pérez-Mata, Nieves, 1181
Perret, Cecile A., 3121
Perry, Jonathan, 5141
Persson, Annabel, 1107
Peters, Sarah L., 5086
Peterson, Daniel J., 1049, 4174
Peterson, Dwight J., 1221
Peterson, Mary A., 111
Pettijohn, Kyle A., 113, 2233
Petty, Miranda, 2057
Pexman, Penny M., 2142, 5154
Peynircioğlu, Zehra F., 86, 3198

Pfeuffer, Christina U., 262
Pfister, Roland, 5051, 5066
Pfordresher, Peter Q., 84, 87, 2239
Phénix, Thierry, 1028, 1148, 1149, 1150
Philbeck, John, 2208
Philipp, Andrea M., 276
Phillips, Flip, 3246
Phillips, Mary L., 296
Phun, Vicky, 4122
Pieczykolan, Aleks, 1004, 3016
Pierce, Benton H., 3227, 5223
Pilditch, Toby D., 214
Pilegard, Celeste, 4141
Pinet, Svetlana, 3124
Pirozzolo, Joseph W., 4147
Pitt, Mark A., 38, 3162
Pittrich, Katharina, 328
Pizarro, Diana, 5151
Plancher, Gaen Sarah, 301
Plant, Richard R., 5245
Plass, Jan, 4115
Plater, Lindsay, 4123
Platt, Melanie, 317
Plessow, Franziska, 4006
Ploran, Elisabeth J., 4160
Pointon, Grant, 2241, 2245
Poirier, Rachel, 4043
Polk, Thad A., 4200
Pollock, Hannah, 5177
Poloczek, Sebastian, 4210
Porter, Nicole A., 2194
Portrat, Sophie, 1205
Posey, Zachary, 1183
Potter, Ansley, 4049
Potter, Jeff, 2099
Potts, Cory A., 277, 3043
Potvin, Jenna M., 4136
Poulet, Sarah, 5184
Pourpirali, Soha, 26
Pozzi, Alessandro, 4117
Prasad, Seema, 41, 3037
Pratt, Jay, 1204, 2234, 3028, 3029, 4007
Pratte, Michael S., 221, 4221, 5183
Prescott, Kim, 2006
Preston, Alison R., 2185
Price, Jodi, 1036
Price, Mason H., 78, 5221
Prike, Toby, 2089
Privado, Jesús, 1238
Prochazkova, Luisa, 132
Proctor, Robert W., 2017, 2025, 2210, 2232, 4064
Protopapas, Athanassios, 1, 1018
Przedniczek, Magdalena, 3003
Ptok, Melissa J., 240, 1007, 1009
Pugh, Zachary, 4150
Puig Rivera, Vannia A., 5136
Purcell, Dean G., 1131
Putnam, Adam L., 4183
Pyc, Mary A., 1197

Q

Qi, Zhenghan, 5187, 5188
Quamme, Joel R., 2191

R

Race, Elizabeth, 3186
Radach, Ralph, 2155
Raden, Megan J., 5128
Radenovic, Marija, 3239
Radovic, Tara, 2229
Radvansky, Gabriel A., 184, 2168, 5140
Rago, Anett, 3089
Ragozina, Valeriya, 1082
Raines, Savannah K., 1117
Rajaram, Suparna, 204, 3215
Rajsic, Jason, 1218, 3029
Rakow, Tim, 5235
Ralston, Patricia, 136
Ramachandran, Vilayanur S., 5009
Ramakrishnapillai, Sreekrishna, 5097
Ramasubramanian, Madhuri, 3057
Ramirez, Chantal, 1079
Ramirez, Valentina, 226
Ramlow, Elena, 1060
Rand, Kristina M., 2241
Raney, Gary, 5145
Raney, Gary E., 274, 1116, 1162
Rangel, Mildred, 2122
Ranieri, Andrea, 147
Rann, Jonathan, 2228
Rao, Li-Lin, 82, 3049, 3054
Rapp, David N., 1030, 1039, 4131
Rastle, Kathleen, 34, 126, 1161
Ratcliff, Roger, 83
Rathbun, Zoe, 4198
Ratiu, Ileana, 4030
Ravizza, Susan M., 2014, 4234
Rawson, Katherine A., 1032, 1045, 1061
Rayburn-Reeves, Rebecca, 2006
Razi, Atiya, 3233
Read, Kirsten, 4125
Reber, Paul J., 5211
Redden, Ralph S., 2016
Redick, Thomas S., 1011, 4011
Redondo, Rachel Anne, 4132
Reed, Catherine L., 3098, 5008
Reed, Mallory, 4222
Reeder, Joanna, 5210
Reese-Melancon, Celinda, 3210
Reeves, Adam, 227
Rehan, Sana, 215
Rehrig, Gwendolyn L., 2143
Reichelson, Sheri, 2079
Remington, Roger W., 2030
Renaldi, Andhika, 2159
Renger, Jessica, 4182
Rentfrow, Jason, 2099
Resnik, Solange, 5233
Reuter-Lorenz, Patricia A., 161, 3107, 4200
Revill, Kate Pirog, 89
Reyes, Alexandra, 2022
Rey-Mermet, Alodie, 2052
Reyna, Valerie F., 16, 145, 197
Reynolds, Brooke L., 3180
Reynolds, Olivia C., 4171
Reynvoet, Bert, 191
Rhee, Yong-Eun, 5112
Rheem, Hansol, 1106
Rhodes, Matthew G., 3187, 4144
Rhodes, Ryan, 2134
Rhodes, Stephen, 225, 4199, 4213, 5092, 5242
Rhoten, Stephanie, 2103
Riano Rincon, Cesar, 274
Ricciardelli, Paola, 1133
Rice, Rachael, 1183
Rich, Anina N., 168
Rich, Patrick R., 1039, 1178
Richie, Russell, 2137
Rickard, Timothy, 4122, 4149
Rickard, Timothy C., 260, 2175
Rickles, Benjamin, 5161
Ricks, Travis Rex, 5195
Riddell, Hugh, 5020
Riechelmann, Eva, 5064
Rieger, Martina, 4076, 4077
Rieker, Jennifer, 43
Riley, Sean, 1177
Rindal, Eric, 5177
Riordan, Monica, 4056
Ritov, Ilana, 284
Rittle-Johnson, Bethany, 3167
Rivas, Nayeli, 2022
Rivers, Michelle L., 3189
Rizzi, Emanuele, 3015
Rizzuto, Daniel S., 117
Roark, Casey L., 3175
Robbins, Megan, 314, 1088, 1089, 5246
Robbins, Steven J., 5055
Robbins, Talia, 144, 5106
Roberson, Daniel, 4244
Roberts, Brady R.T., 5189
Roberts, Lynae, 3201
Robertson, Stephanie, 4052
Robey, Alison, 4134
Robinson, John, 3065
Robinson, Rochelle, 26
Robinson, Trent, 5049
Robison, Matthew K., 1210
Roche, Jennifer, 1119
Roche, William L., 1160
Rocks, Eva-Marie, 2030
Rodas, Jose A., 1002
Rodgers, Erin, 296
Rodrigo Cristobal, Laura, 4036
Rodrigo-Tamarit, Maria, 3119

Rodriguez Verdin, Brianda, 1082
Rodriguez, Christian, 281
Rodriguez, Janelli, 2028
Rodriguez, Vanessa, 324
Roediger, III, Henry L., 121, 206, 2167, 2181, 4163
Roelke, Andre, 2155
Roembke, Tanja C., 1031
Röer, Jan P., 2015
Rogers, Leeland L., 3172
Rohaly, Thomas, 1077
Rolack, Crishauna, 4142
Romero, Kristoffer, 5079
Romeu, Ricardo J., 5236
Rosales, Nicole, 91
Rose, Suzanne, 2238
Rosenbaum, David A., 101, 4008
Roskos, Beverly, 2217, 3073
Ross, Amanda I., 5241
Ross, Morgan Q., 4183
Ross, Tyler J., 2089
Rossi, Eleonora, 2122, 5132, 5148
Rotello, Caren M., 196
Rothermich, Kathrin, 3138
Rothweiler, Jesse N., 4167
Rottman, Ben, 1053
Rouder, Jeffrey N., 32, 94, 5242
Roush, Grant, 113
Roy-Charland, Annie, 1137, 3091
Ruan, Wenxuan, 5176
Rubin, Mark, 4
Rubinstein, Joshua, 3007
Rueckl, Jay G., 123
Ruiz Pardo, Ana Cecilia, 1013
Rummel, Jan, 3038, 3200, 3203
Rumschik, Danielle M., 4151
Runge, Nichole, 3238
Ruppel, Susan E., 230
Russell, Marissa, 3145
Russo, Gabrielle Rae, 3097
Russo, Nicole M., 2145
Russo, Taylor R., 1190
Ruthruff, Eric, 2026, 2037
Ryals, Anthony J., 3180, 5207
Ryan, Colleen, 226
Ryan, Michael P., 3118
Ryczek, Cameron A., 2221
Ryu, Jachun, 2111
Ryu, Jaehee, 2111

S

Saad, Aiya, 183
Saban, William, 156
Sabine, Sarena, 3079
Sacher, Mathilde, 5089, 5091
Sackur, Jérôme, 1001
Saeki, Erina, 4020
Saenz, Gabriel D., 5200
Sagi, Eyal, 4176
Sahakian, Mineh, 1184
Sahakyan, Lili, 2201, 5067
Sahar, Tomer, 5024
Saint-Aubin, Jean, 4117
Saito, Ryo, 2183
Saito, Satoru, 4020
Sakai, Hiromu, 4036
Salamanca, J. Antonio, 2010
Saldivar, Selina, 1127
Sali, Anthony W., 3001
Salmela, Rosa, 273
Salmon, David P., 40
Salomon-Amend, Meghan M., 5108
Salovich, Nikita A., 4131
Saltzman, Elliot, 2158
Samper, Jamielyn R., 1014, 1019
Samuel, Arthur G., 245, 246, 1075
Sana, Faria, 1048, 1054, 3136
Sanchez Araujo, Yoel, 5188
Sanchez-Mora, Johanna, 5185
Sanders, Craig, 56
Sanders, Edie, 5088
Sanders, Lisa D., 3242
Sandoboe, Gwendolyn, 5113
Saneyoshi, Ayako H., 3022, 3031
Sanford, Emily, 1120
Sanislow, Charles A., 2058
Sansevere, Kayla S., 5055
Sanson, Mevagh, 4180
Santamaría-García, Hernando, 2129
Santos, Alejandra, 2022
Santuzzi, Alecia, 3182
Saphan, LinDa, 4189
Sargent, Jesse Q., 4222
Sarkis, Justin, 314, 1088, 1089, 5246
Sarno, Dawn, 4228, 5074
Saryazdi, Raheleh, 5083
Sasanguie, Delphine, 191
Sato, Ayumi, 5095
Sato, Chiho, 3021
Satoru, Saito, 4212
Saucier, Donald A., 5025
Sauer, Jim, 79
Saunders, Tamara, 153
Savani, Krishna, 3215
Savic, Olivera, 57
Savinova, Anna D., 5127
Savoie, Renee, 3086
Saw, Rebecca, 5068
Sawczak, Caspian M., 4181
Scarince, Collin, 5047
Schacherer, Jonathan, 4005
Schacter, Daniel L., 1173, 3039, 3222
Schapiro, Anna, 36
Scharf, Sophie, 2192
Scheer, Tobias, 3127
Scheerer, Nichole E., 2033
Scheibehenne, Benjamin, 193, 1235, 5102
Scherbaum, Stefan, 1234
Schertz, Jessamyn, 3249
Schertz, Kathryn E., 4229
Scherzer, Johannes, 115
Schloss, Karen B., 228
Schmank, Christopher J., 1021
Schmidt, Constance R., 4239
Schmidt, Stephen R., 4239
Schmidtke, Daniel, 1083
Schmiedek, Florian, 4201
Schneider, Cosima, 1125
Schneider, Darryl W., 5054
Schneider, Sandra L., 147, 4095
Schneider, Vivian I., 48
Schober, Michael F., 1122, 4241
Schoemann, Martin, 1234
Scholz, Agnes, 3174
Schonard, Carolin, 1125
Schooler, Jonathan W., 106, 3039
Schorn, Julia, 5192
Schotter, Elizabeth R., 122, 2144
Schroeder, Jennifer, 2172
Schroeder, Sascha, 64, 328
Schroeder, Scott R., 243
Schubert, Anna-Lena, 5120
Schubert, Teresa M., 327
Schubert, Torsten, 4149
Schulz, Annabell K., 2026
Schumacher, Eric H., 4004
Schuman, Howard, 207
Schurgin, Mark W., 222, 288, 2199
Schwan, Stephan, 5129
Schwartz, Ana I., 2247
Schwartz, Bennett L., 86
Schwartzer, Sarah, 3153
Schwarz, Katharina A., 5066
Schwarz, Norbert, 5103
Schweickert, Richard, 1233
Schweitzer, Maurice E., 2113
Schwering, Steven, 1219
Schwob, Natalie, 4067
Scoboria, Alan, 178
Scofield, John E., 5221
Scott, Emily E., 4017
Scott, Ryan, 3171
Scotto, Marissa, 3117
Scullin, Michael K., 302, 304, 3201, 3207
Scully, Iiona D., 315
Seale-Carlisle, Travis, 5169
Searston, Rachel A., 1107
Sederberg, Per B., 1110, 3169, 4016
Segal, Dorit, 1071
Segal, Lily R.W., 2058
Seger, Carol A., 1208
Segerink, Lieke J., 66
Sehyr, Zed Sevcikova, 325
Seiffert, Adriane E., 242
Seigneuric, Alix, 4075
Seitz, Aaron, 161
Seli, Paul, 3039
Sellers II, P. Douglas, 187
Selvam, Surya Rajan, 5175

Sen, Umay, 4097
Senderecka, Magdalena, 4021
Sennette, Jennifer, 2172
Seo, Osung, 3077
Seong, Eunjin, 2148, 3115
Serafinski, Rachel, 3056
Serpell, Zewelanji, 174
Serra, Michael J., 1195, 4086, 5199, 5206
Seth, Anil, 3171
Seymour, Travis L., 1168, 4120
Shaffer, Olivia, 1120
Shafto, Meredith A., 5080
Shah, Priti, 161, 4118, 5115
Shahin, Antoine, 3162
Shain, Lindsey M., 3246
Shanks, David R., 1100
Sharan, Ashwini D., 117
Shatzer, Hannah, 3162
Shaw, Carmen N., 2002
Shedden, Judith, 1007, 1009
Shedlosky-Shoemaker, Randi, 2198
Sheldon, Signy, 3170, 5086
Shelton, Amy, 162, 2231
Shelton, Jill T., 304
Shepherdson, Peter, 4201, 4207
Sheridan, Heather, 2063, 2064, 2146
Sherman, Jessica, 3128
Shevchenko, Yury, 1136, 1236
Sheya, Adam, 4081
Shiffrin, Richard M., 67, 257, 301, 1216, 2049, 2051, 5029
Shigemasu, Hiroaki, 4116
Shih, Shao Fu, 5176
Shimada, Hiroyuki, 5050
Shimi, Andria, 4208
Shin, Jacqueline C., 4110
Shin, Seulgi, 4246
Shinkareva, Svetlana V., 2117
Shipley, Margaux, 108
Shipley, Thomas F., 1033, 4091
Shipstead, Zach, 3017
Shizawa, Miho, 5095
Shlanta, Pete, 1156
Shomstein, Sarah, 3027
Shore, David I., 1057
Shorter, Paul L., 4101
Shreeves, Michael, 2093, 2095
Shrikanth, Sushmita, 4197
Shugars, William, 5101
Shultz, Erika, 4015
Shum, Yu-Hei, 1077
Shurkova, Ekaterina Y., 5126
Siakaluk, Paul D., 5154
Sibrel, Shannon, 228
Siddique, Zahed, 2130
Sidhu, David M., 2142
Sidoruk-Blach, Maria, 3068
Siegel, Alexander L.M., 2062
Siegelman, Noam, 319
Siegler, Robert S., 4094
Siew, Cynthia S.Q., 4050
Sikich, Taylor N., 248
Silang, Joshua, 4202
Silcox, Jack, 3148
Siler, Jessica, 4237
Silliman, Daniel, 55
Sim, Luke, 2227, 2237
Simal, Amour, 4214
Simmering, Vanessa R., 252
Simmons, Aaron Matthew, 5239
Simmons, Christopher C., 5118
Simpson, Annabelle, 108
Singer, Murray, 3119
Singh, Amritpal, 3110
Singh, Garima, 3072
Singmann, Henrik, 73, 1047, 2052, 4201, 4220
Sisso, Itay, 5102
Sivakumar, Aparna, 2024
Sjoerds, Zsuzsika, 132
Sklenar, Allison M., 1055, 2105, 3206
Skocypec, Rachel, 111
Skora, Lina, 3171
Slane, Crystal R., 3061
Slattery, Timothy J., 93, 1040, 1041, 1042, 1159
Slevc, L. Robert, 88
Slifkin, Andrew B., 2227, 2237
Sloman, Steven, 3078
Slotnick, Scott D., 1190, 4018, 4106
Sloutsky, Vladimir, 57
Smallwood, Jonathan, 3039
Smeekens, Bridget A., 232, 2050
Smeets, Guus, 4143
Smilek, Daniel, 2047, 3039
Smith Randle, Terumi, 2166
Smith, Albert F., 2145
Smith, Allison, 1179
Smith, Alyssa C., 2047
Smith, Amy, 266
Smith, Amy M., 1170
Smith, Andrew M., 4090
Smith, C.A.P., 2055
Smith, Cameron M., 63
Smith, Charles, 4236
Smith, David B., 3086
Smith, Derek M., 4004
Smith, Evan T., 53
Smith, Gabriel King, 3044
Smith, J. David, 2002, 3090
Smith, Joseph Landry, 4130
Smith, Kendra C., 4065
Smith, Mackenzie, 2009
Smith, Maverick E., 5134
Smith, Steven M., 321, 2092
Smith, Thea, 2006
Smith, Tim J., 5025
Smith, Troy A., 5209
Smith, Wyatt G., 3173
Snefjella, Bryor, 4055
Snijder, Jean-Paul, 4218
Snipes, Lawrence B., 2024
Snyder, Hope, 5242
Soares, Julia S., 4238
Sohn, Myeong-Ho, 1134
Solanki, Prachi S., 2108
Solomon, Marjorie, 3013
Sommer, Joseph, 1196
Sommer, Tobias, 291
Sommers, Mitchell S., 3158, 3238
Sommers, Samuel R., 4158
Song, Bingxin, 5057
Song, Joo-Hyun, 100, 2235, 5034
Sorace, Antonella, 1069
Sorenson, Parker, 5202
Sörman, Daniel Eriksson, 4026
Soto, Fabian A., 5005
Souza, Alessandra S., 223, 3008, 4211
Souza, Pamela, 3153
Sovansky, Erin E., 2091
Soylu, Firat, 4085
Sozer, Elif Ece, 4138
Spahr, Kimberly S., 2055, 3006
Spalding, Thomas L., 3136
Spalek, Thomas, 1128
Spaniol, Julia, 159, 3166, 5114, 5232
Spanos, Natalie, 1120
Spanton, Rory W., 2190
Sparck, Erin M., 4146
Sparrow, Erika, 5114
Spear, Jackie, 3119
Speekenbrink, Maarten, 1100, 5109
Spellman, Barbara A., 23
Sperling, Michael R., 117
Spets, Dylan S., 4106
Spinelli, Giacomo, 3014
Spitler, Samantha N., 3204
Srinivasan, Mahesh, 2081
St. Hilaire, Kyle J., 1062
Stafford, Tom, 4009
Stainrod, Cortnee R., 4101
Stanko, Katie, 1202
Starns, Jeffrey J., 128, 196, 2204
Stasenko, Alena, 40, 4035
Staub, Adrian, 2125
Staugaard, Søren Risløv, 4172
Stawarczyk, David, 5133
Steele, Kenneth M., 3247, 4225, 5241
Steenbergen, Laura, 1133
Stefanucci, Jeanine K., 261, 2216, 2245, 5039
Steffens, Brent, 1022
Steindorf, Lena, 3038
Steiner, Rachael J., 2158, 3150
Stenson, Anthony, 5069
Stepan, Michelle E., 3214
Stephan, Denise Nadine, 1005
Stephens, Natalia G., 5175
Stephens, Rachel, 256
Sterling, Elizabeth K., 5019

Sterling-Maisel, Olivia A., 4183
Stevens, Amanda R., 3227
Stevens, Jeffrey R., 2012, 3062
Stevens, Katrina, 2151
Stewart, Alan L., 1131
Steyvers, Mark, 198, 4118, 5158
Stibolt, Olivia, 2019
Stieff, Mike, 4198
Still, Jeremiah D., 5030
Still, Mary L., 5030
Stilwell, Brad T., 2038
Stoeckenius, Derek, 2175
Stokes, Dustin, 5039
Stolz, Jennifer A., 5111
Stone, Gregory, 1157
Stone, Sean M., 3192
Stoops, Anastasia A., 1151
Storm, Benjamin C., 1066, 1067, 3192, 4238
Stoudt, Sarah, 2151
Strain, Megan L., 5025
Strand, Julia Feld, 3141
Strand, Sarah, 1221
Strange, Deryn, 2044, 4186
Strayer, David L., 4017
Streeper, Emily, 3212
Streicher, Corinne, 3155
Strejc, Madison, 1222
Strobach, Tilo, 3245, 4149
Strori, Dorina, 3153
Strudwicke, Henry W., 2089
Strybel, Thomas Z., 1213
Stürmer, Birgit, 5059
Su, Chung-I Erica, 3146
Su, Cindy, 1213
Sudevan, Padmanabhan, 5032
Suero, Manuel, 1238, 2196
Suh, Jihyun, 2040
Sullivan, Abigail, 1003
Sullivan, Jaclynn V., 4136
Sulpizio, Simone, 1164
Sumeracki, Megan A., 133, 4135
Sun, Baihu, 4104
Sun, Pei, 2240, 3108
Sun, Tony, 5242
Surber, Tyler Addison, 1152
Surprenant, Aimee M., 5216
Surrey, Caroline, 3202
Sutherland, Steven C., 210
Suto, Satoru, 5072
Suzuki, Hikaru, 1138, 3031
Swaffer, Matthew, 1090
Swallow, Khena M., 2046, 5023
Swanson, Lillian, 160
Swartz, Holly A., 296
Swets, Benjamin, 5139
Swirsky, Liyana T., 5232
Symeonidou, Angelina, 61
Szabo, Eszter Dora, 3089
Szaflarski, Jerzy P., 5151
Szaszi, Barnabas, 3053
Szewczyk, Jakub, 4021
Szollosi, Aba, 5104
Szpunar, Karl K.*, 208, 4197, 4242, 5136

T

Taconnat, Laurence, 5089, 5091
Tagai, Keiko, 3021
Tahir, Sanna, 2122
Takahashi, Yoshifumi, 3179, 3191
Takahesu Tabori, Andrea, 1087
Takarangi, Melanie K.T., 107, 4180, 4188
Takayama, Ryota, 3022
Takeda, Yuji, 3055
Talboy, Alaina N., 4095
Tamayo, Ricardo M., 5185
Tamminen, Jakke, 126, 5169
Tan, Lishi, 3215
Tanabe-Ishibashi, Azumi, 1212
Tang, Janice, 4001
Tang, Jianling, 5010
Tang, Ty Y., 231
Tanno, Yoshihiko, 4063
Tao, Liang, 2149
Taraban, Roman, 2139, 4089
Tarder-Stoll, Hannah, 109
Tarpinian, Lindsey, 145
Tatz, Joshua R., 86, 3198
Tauber, Sarah "Uma", 2174, 3178, 5207
Taul, Marissa, 1183
Taylor, Andrea, 4188
Taylor, Holly A., 2211, 2213, 2222, 2224, 4105
Taylor, Lesli, 4142
Taylor, Megan, 160
Tedder, Laura J., 3024
Tekcan, Ali, 4178, 4190
Tekin, Eylul, 121, 2167, 2181, 4163
Telli, Busra, 3105
Tellinghuisen, Donald J., 5033
Teng, Chunyue, 1215, 5011
Terasawa, Takafumi, 5014
Terrace, Herbert, 2005, 4098
Terrazas, Gabriela, 2133
Teskey, Morgan, 2236
Tessmer, Rachel, 4059
Thakur, Vaibhav, 5192
Thapar, Anjali, 5094
Thayer, Daniel, 5035
Thayer, Elise R., 2012
Theeuwes, Jan, 97
Theodore, Rachel, 317
Thevenot, Catherine, 4088
Thiede, Keith, 1035
Thiessen, Erik, 5191
Thomas, Ayanna K., 266, 1170, 2222, 3184, 3186, 4158
Thomas, Cyril, 5012
Thomas, Laura E., 4080
Thomas, Ruthann C., 140
Thompson, Chelsey, 2245
Thompson, Clarissa A., 4093
Thompson, Matthew B., 1107
Thompson, William B., 261
Thompson-Schill, Sharon L.**, 3082
Thorstad, Robert S., 60
Threadgold, Emma, 2015
Thye, Melissa, 5151
Tice, James, 5101
Timm, J. David, 4108
Tio, Yee Pin, 2124
Tirso, Robert, 5197
Titone, Debra, 271, 1086, 4034
Tjarks, Michele, 3197
Tobayama, Lisa, 2077
Todaro, Rachael D., 5125
Todd, Rebecca M., 1130
Todorovic, Kristina, 4151
Togato, Giulia, 1073
Toglia, Michael P., 4151
Toi, Chiharu, 3074
Tokaç, Züheyra, 3154
Tokita, Midori, 3093
Tokowicz, Natasha, 2133
Tomida, Makiko, 5087
Tomlin, Damon, 5098
Tomlinson, Tracy, 241
Tong, Ke, 5016
Tong, Xiuli, 246
Tooley, Kristen M., 3103
Toscano, Joseph C., 3161, 4061
Toups, Marisa, 5215
Touron, Dayna R., 4150, 5085
Towner, Emily, 2182
Townsend, James T., 116
Tran, Dominic M.D., 46
Tran, Ngoc-Han, 1108
Treccani, Barbara, 3094
Treiman, Rebecca, 91
Tremblay, Annie, 4246
Tremblay, Luc, 4078
Tremblay-McGaw, Alexandra Georgina, 4174
Tribout, Nicolas, 5228
Trilone, Bethany, 12
Trinckes, Brian A., 2227
Troupe, Chloe E., 5124
Trout, Paige E., 4053
Trueblood, Jennifer, 3046
Truong, Grace, 1130
Tsai, Alicia, 1192
Tsai, Jie-Li, 3146
Tsal, Yehoshua, 2031
Tsapali, Maria, 174
Tsarfaty, Galia, 1080
Tse, Chun-Yu, 1077
Tsosie, Megan D., 1180
Tsubomi, Hiroyuki, 4203
Tsukahara, Jason, 143

Tsukahara, Jason S., 1006
Tsuzuki, Takashi, 3055
Tuft, Samantha E., 1126, 3101
Tullis, Jonathan, 176, 2246
Tullo, Domenico, 4224
Turner, Brandon, 281, 1110, 4016
Turpin, Martin H., 5110, 5111
Tversky, Barbara, 4083
Twal, Leena, 1131
Twyman, Alexandra D., 166, 4099
Tzeng, Christina, 3145

U

Ueda, Sachiyo, 1226
Ueda, Yoshiyuki, 5022
Ueno, Taiji, 3216
Uittenhove, Kim, 54
Ulicheva, Anastasia, 1161
Ulrich, Rolf, 30, 31, 1230, 5116
Umanath, Sharda, 206, 1192, 3190
Umscheid, Valerie A., 3051
Undorf, Monika, 10, 3194, 3198
Uner, Oyku, 2167
Unsworth, Nash, 1210
Utz, Sandra, 3245
Uysal, Beste, 1091

V

Vachon, Francois, 4117
Vaid, Jyotsna, 2214, 4230
Vainio, Seppo, 273
Valdez, Gerardo E., 3090
Valdois, Sylviane, 1028, 1148, 1149, 1150
Valecha, Akshu, 4123
Valentine, K. D., 4046
Valian, Virginia, 4027
Valle Flores, Dorosi, 2166
Valle, Tania M., 5186
Vallet, William Maurice, 3243
Van Allen, Jason, 2109
van Charldorp, Tessa, 213
Van den Driessche, Charlotte, 1001
van der Wel, Robrecht P., 4226
Van Engen, Kristin J., 3143
Van Gemmert, Arend, 5097
van Genugten, Ruben D.I., 3222
van Halm, Hannah H., 66
Van Hedger, Stephen C., 1228, 2072
van Hell, Janet, 2130, 2141
van Heugten, Marieke, 3140
van Maanen, Leendert, 1108
Van Nuland, Abigail, 4046
van Rij, Jacolien, 318
van Schaik, Paul, 5107
van 't Wout, Felice, 5068
Van Zandt, Trish, 70
VanArsdall, Joshua E., 3233
Vandekerckhove, Joachim, 69, 4201, 5237
Vander Beken, Heleen, 1076
Vangsness, Lisa, 2116
Vanunu, Yonatan, 1092
VanWormer, Lisa A., 3023
Varao-Sousa, Trish L., 4242
Vardavas, Raffaele, 7
Varga, Mate, 3089
Vargas Restrepo, Camila, 4142
Vasilyeva, Nadya, 2081
Vassileva, Jasmin, 5236
Vaughn, Kalif E., 2173
Vecera, Shaun P., 2038
Veldre, Aaron, 124, 2156
Ventura, Jesse, 3088
Ventura-Brot, Carlos, 1017
Verbruggen, Frederick, 2114
Vergauwe, Evie, 54
Verguts, Tom, 1093
Verkoeijen, Peter, 4143
Verma, Vipin, 1106
Vermeylen, Luc, 5060
Veronelli, Laura, 2223
Verwey, Willem B., 307
Vest, Nicholas A., 1050
Vickery, Timothy J., 45, 3172, 5004
Vidal, Julie, 283
Vidal, Yamil, 1167
Viechtbauer, Wolfgang, 1055
Vinals, Lydia, 126
Vingron, Naomi, 271
Viswanathan, Navin, 313, 3132, 4037
Vitrano, Deana, 270, 2165
Vladimirov, Ilya Yur'evich, 2082, 2086
Vogel, Alexandra L., 2203
Vogel, Anne E., 306, 3209
Vogel, Edward K., 300, 1201, 3030, 4203
Vogelsang, Macgregor, 22
Volante, William G., 1097, 5101
von Bastian, Claudia C., 269, 5244
von Helversen, Bettina, 212, 250, 3174
Vorwerk, Thomas, 304
Vroomen, Jean, 110
Vu, Kim-Phuong L., 1213, 2210
Vul, Edward*, 260, 324
Vuorre, Matti, 237, 4133
Vuvan, Dominique, 2071

W

Wada, Kazushige, 5050
Wada, Yuichi, 2183
Wadhera, Deepti, 4022
Waer, Melissa, 4226
Wagemans, Johan, 5002
Wagner, Anita, 3242
Wagner, Richard B., 4225
Wahlheim, Christopher N., 195, 3085, 5084, 5133, 5165
Walasek, Lukasz, 81
Walenchok, Stephen C., 5045
Walker, Alexander C., 5111
Walker, Caren M., 1051
Walker, Drew Ellen, 324
Wall, Laura, 211
Wallace, Tanner, 2110
Walser, Moritz, 3202
Walsh, Cole, 3190, 5170
Walsh, Jenny, 1177
Walts, Zoe L., 1222
Wan, Shan, 2120
Wanda, Paul A., 117
Wang, Benchi, 97
Wang, Haotong, 4159
Wang, Jun, 1227
Wang, Lisi, 5201
Wang, Qi, 1227, 3110
Wang, Ranxiao Frances, 3035, 4240
Wang, Tracy H., 2201
Wang, Yang, 1077
Ward, Geoff, 1105
Ward, Nathan, 2042
Ward, Rachel, 3139
Ware, Stephen Le Vern, 3010
Warford, Khira S., 3024
Warker, Jill A., 4043
Warner, Kathy M., 3164
Warren, Rik, 1140
Warriner, Amy Beth, 1083
Warrington, Kayleigh L., 1029
Was, Christopher A., 5193
Washburn, David A., 2010, 3005
Wassenberg, Anna, 166
Watson, Duane G., 199, 3130
Watson, Jason M., 3006
Watson, Poppy, 2, 4001
Watter, Scott, 240, 1007, 1009, 3225, 3239
Weatherford, Dawn R., 3024
Weaver, Alexandria Nicole, 3097
Weaver, Charles A., 4152, 4169
Weber, Christine E., 2117
Wedell, Douglas H., 2117, 3045
Wehe, Hillary, 2006
Weichart, Emily R., 1110, 4016
Weidemann, Christoph T., 117
Weidler, Blaire J., 2234, 3028, 3029
Weinstein, Yana, 133, 4135
Weiss, Daniel, 4067
Weiss, Michaela, 2112
Weiss-Cohen, Leonardo, 1101
Weissman, Daniel H., 138, 1015
Welch, Leslie, 228
Weldon, Rebecca B., 145, 1134, 2102
Welhaf, Matthew S., 232, 2050
Weller, Lisa, 5066
Wells, Ashleigh K., 4115
Wells, Gary L., 4161
Welsh, Timothy, 100, 4078, 4079
Wendell, Dawn M., 114
Wenger, Michael, 2103

Wenner, Julianne, 1035
Werner, Laura, 4215
Wertsch, James V., 206
West, John T., 3199
West, Robert, 1095
Westbury, Chris, 65
Westerberg, Carmen E., 5124
Westerman, Deanne L., 4232
Wetzel, Matt, 3083
Weymar, Mathias, 1017
Wheaton, Danielle, 5032
Whillock, Summer R., 1180
Whitaker, Mirinda, 2241
White, Corey N., 28, 5057, 5230
White, Holly A., 2061
White, Katherine M., 3104, 3123, 5218
White, Sarah J., 1029, 1040
Whitehead, Peter S., 1211
Whitfield, Caitlyn, 3072
Whitford, Veronica, 271
Whitham, Will, 2010
Whitlock, Jonathon, 5067
Whitney, Paul, 5069
Whittington, Jane E., 27
Wickens, Christopher D., 2055
Widdowson, Christopher J., 4240
Wiemer, Katja, 1124, 3081, 5129
Wiemers, Elizabeth A., 1011
Wiens, Kira, 4123
Wiers, Reinout W., 102
Wierzchoń, Michał, 233
Wieth, Mareike B., 4019
Wikowsky, Addie, 4046
Wilburn, Hanne, 4202
Wilck, Allison M., 1112, 3195
Wilcox, Ramsey R., 4182
Wiley, Jennifer, 1034, 1135, 2083, 5121
Wilkinson, Andrea, 3166
Williams, Carrick C., 4170
Williams, David, 5155
Williams, Helen L., 5219
Williams, Katherine, 2079, 4087
Williams, Lauren H., 172, 5036
Williams, Ryan S., 1204
Williams, Sarah, 3076
Williamson, Casey M., 5212
Williamson, Victoria, 5076
Wills, Andy J., 294
Wills, Katelyn, 2014
Wilming, Niklas, 1093
Wilmott, James, 5034
Wilson, Brent M., 4168
Wilson, Cristina G., 3002
Wilson, Jack, 49, 1198
Wilson, Joseph Clarence, 4185, 4232
Wilson, Mara, 160
Wilson, Marc S., 2098
Winchell, Adam, 239
Windsor, Phyllis M., 3226
Wingfield, Arthur, 3157
Winiger, Samuel, 73, 4220
Winston, Payne, 3197
Winston-Lindeboom, Payne, 1036
Wiradhany, Wisnu, 4013
Wirth, Robert, 5051, 5066
Wiseheart, Melody, 134, 1054
Wissman, Kathryn T., 1049
Witherby, Amber E., 2174, 3178, 5207
Witt, Jessica K., 2055
Wixted, John T., 121, 222, 288, 4153, 4168
Wodniecka, Zofia, 4021
Wojcik, Dominika Zofia, 1182
Wolf VII, Henry, 123
Wolf, Joshua, 5055
Wolfe, Christopher R., 16
Wolfe, Jeremy M., 169, 217
Wolff, Phillip, 60, 5160
Wolford, George L., 2213
Wolters, Maria K., 2073
Wong, Aaron, 1037, 4109
Wong, Claudia, 5005
Wong, Roslyn, 2156
Woo, Hyunjeong, 1134
Wood, Ashley, 5170
Wood, Christina, 3236
Wood, Sandra, 2137
Woodman, Geoffrey F., 185, 1216
Woodward, Nathaniel Raley, 1065
Worrell, Gregory A., 117
Worth, Tory, 2103
Worthy, Darrell A., 80, 1104, 2029, 3080
Woytaszek, Ron, 141
Wraga, Maryjane, 4175
Wright, Katherine, 1035
Wright, Kelsey, 5177
Wright, Lauren, 4142
Wright, Lindsey, 5209
Wu, Chia-Chen, 217
Wu, Denise, 2159
Wu, Dennis, 1087
Wu, Juliana, 2166
Wu, Lesley, 3011
Wujcik, Radoslaw, 3003
Wulff, Alia N., 3186
Wulff, Liliane, 2192
Wyble, Brad, 249, 3020
Wyszynski, Marc, 284

X

Xiang, Dan, 1155
Xie, Zilong, 4059
Xing, Chenmu, 129, 4083
Xiong, Aiping, 2025, 2210
Xu, Ingrid, 2166
Xu, Shuofeng, 5170, 5178
Xue, Junyi, 2152, 3126

Y

Yakushijin, Reiko, 1226
Yakushijn, Reiko, 4121
Yamada, Yohei, 2244
Yamagishi, Kimihiko, 3059
Yamaguchi, Tsuyoshi, 3179
Yamakawa, Mayu, 2084
Yamauchi, Takashi, 3004, 5061
Yan, Veronica, 1048, 4126, 5201
Yancey, Tai, 4222
Yang, Aspen, 287
Yang, Brenda W., 4192
Yang, Cheng-Ta, 2059, 5042, 5070
Yang, Dong-Yu David, 2029
Yang, Huilan, 2150
Yang, Hyeonbo, 3102
Yang, Kunning, 4037
Yang, Lee-Xieng, 3084
Yang, Li, 1208
Yang, Lixia, 3166
Yang, Nancy, 3212
Yang, Yi, 3093
Yao, Hsin-Yun, 115
Yaoi, Ken, 224
Yap, Defu, 17
Yates, Mark, 1159
Ybarra, Vincent T., 3057, 5198
Ye, Yuchen, 2073
Yechiam, Eldad, 5235
Yeh, Li-Hao, 5176
Yeung, Henny, 150
Yip, Michael C.W., 2138
Yokosawa, Kazuhiko, 2077, 5007
Yonelinas, Andrew P., 118
Yoon, Hyung-Jin, 4240
Yoon, Si On, 2131
Yoruk, Harun, 3032
Yoshihara, Masahiro, 2147, 2152, 3126
Yotsumoto, Yuko, 3240, 5018, 5021
You, Heejo, 316, 1166, 3150
Young, Andrew G., 252
Young, Michael E., 210, 2116
Yousefi-Rizi, Leila, 1082
Yoxon, Emma, 4079
Yu, Christine, 4072
Yu, Yen-Ting, 5070
Yuan, Yi, 1229
Yuksel, Ezgi Melisa, 47

Z

Zacka, Edward, 5062
Zacks, Jeffrey M., 5133, 5142
Zahner, Doris C., 129
Zajac, Rachel, 4188
Zak, Uri, 3052
Zakrzewski, Alexandria C., 5088
Zamary, Amanda, 1045

Zambrana, Imac M., 3079
Zamora-Arevalo, Oscar, 2004
Zaragoza, Maria S., 1178, 5177
Zawadzka, Katarzyna, 178, 2202
Zax, Alexandra, 2079, 4083, 4087
Zeelenberg, Rene, 19
Zeidan, Cloe, 5132
Zekveld, Adriana, 85
Zelaznik, Howard N., 2025
Zeller, Kimberly, 24
Zemla, Jeffrey C., 3163
Zeng, Yuyu, 4246
Zepeda, Cristina D., 4128
Zerr, Christopher L., 1193
Zeveney, Andrew, 6
Zevin, Jason D., 123
Zhang, Dan, 3108
Zhang, Di, 2246
Zhang, Han, 2045
Zhang, Haoyun, 5081
Zhang, Qian, 4129
Zhang, Ru, 116
Zhang, Wanbing, 4111
Zhang, Yang-Yang, 3058
Zhang, Yizhi (Roxanne), 209
Zhang, Zhaoqi, 272
Zhang, Zhijie, 4073
Zhang, Zhuoran, 4110
Zhao, Kun-Yang, 1077
Zhao, Mengtian, 3066
Zhao, Wenjia Joyce, 81, 1103, 1109
Zheng, Xiaofang, 1233
Zhong, Qi, 2210
Zhou, Guomei, 5010
Zhou, Yingzhao, 4062
Zhu, Tina O., 251
Ziaka, Laoura, 1018
Zilcha Mano, Sigal, 2104
Zilker, Veronika, 155
Zimiga, Brandon, 42
Zirnstein, Megan, 272, 5132
Zivony, Alon, 308
Zobel, Benjamin H., 3242
Zosky, Joshua E., 5004
Zukosky, Meera, 3035
Zwaan, Rolf A., 20, 66
Zwenger, Anastasia, 1056

2D motion, 2011

A

A dual process theory, 5072
Abbreviations, 93
Abrupt onset, 2031, 2037
Absolute pitch, 2070, 2072, 2077
Abstract concept, 3081, 3110
Abstract letter representation, 2147
Abstract rules, 280, 4057
Academic performance, 4136
Academic procrastination, 135
Accent, 1077, 3143
Accented speech, 244, 3156
Accessory stimulus effect, 2024
Accuracy, 209, 3226, 4167
Acoustic cue encoding, 3161
Action, 277, 4063
Action and volition, 3041
Action control, 262, 5064
Action observation, 2236
Action planning, 4067
Action sequences, 151
Action tendencies, 2114
Action-sentence compatibility effect, 20
Active learning, 5213
ACT-R, 1206
Acute stress, 3202
Adaptation, 2136
Adaptation to foreign-accented speech, 4058
Adaption, 2131
ADHD, 220, 4005, 5061
Adjunct questions, 1068
Adversarial collaboration, 4213
Aesthetics, 1117
Affect, 323, 1140, 3043, 3045
Affect judgment, 4230
Affective context, 1020
Affective forecasting, 3107
Affective priming, 3100
Affective states, 2117
Affordance judgments, 2241
Affordances, 1152
After, 1123
After effects, 110, 1226, 3245
Agency, 2115, 3043, 4096
Agent-based models, 214
Age-related sensory and cognitive decline, 5099
Aging, 43, 149, 155, 159, 1029, 1132, 1169, 1170, 1171, 3008, 3034, 3085, 3158, 3201, 3221, 3240, 3242, 3246, 4199, 4201, 5073, 5074, 5076, 5077, 5078, 5080, 5081, 5084, 5088, 5089, 5091, 5092, 5093, 5094, 5095, 5098, 5134
Aging and Alzheimer disease, 5071
Agreement, 154, 2125, 4062
Aha moment, 1135
Alexithymia, 3105
Algorithmic Bayesian modeling, 1148, 1149, 1150
Alignment, 61
Alignment in dialogue, 1113
Allocentric Simon effect, 2207
All-of-the-above questions, 2178, 2179
Alpha span, 4202
Alphanumeric symbols, 327
Alternative displays of information, 173
Alzheimer's disease, 3207, 5082
American Sign Language, 2137
Amnestic mild cognitive impairment, 4111
Amplitude envelope, 1229
Analogical problem solving, 1049
Analogical reasoning, 2096, 5186
Analogical transfer, 5124
Analogy, 2087
Analysis, 4155
Anaphor, 1074
Anchoring and adjustment, 3059
Anger inferiority, 1131
Animacy, 1195, 3233
Animal cognition, 253
Animal use, 2003
Anthropomorphization, 4079
Anticipated response outcomes, 2242
Anticipation, 296
Antisaccade, 96, 4011, 4013
Anxiety, 1144, 2054, 2203, 3113
Apparent motion, 3025
Applications, 4236
Applied memory, 1184
Appraisal, 4184
Argumentation, 127
Arithmetic, 4085
Arousal, 1017, 1132, 1144, 3023, 3180
Articulatory rehearsal, 51
Articulatory suppression, 5123
Artificial grammar learning, 1140, 2134
Artificial language learning, 2160
Artificial orthography, 328
Association memory, 291
Associations, 3185
Associative deficit, 5075
Associative inference, 1173
Associative learning, 48
Associative memory, 3169, 5088, 5215
Associative recognition, 2187, 2191
Athlete cognition, 2241
Attention, 2, 3, 4, 26, 42, 54, 142, 155, 186, 187, 189, 215, 217, 220, 249, 298, 303, 306, 310, 1003, 1006, 1090, 1130, 1209, 1210, 1215, 2032, 2033, 2035, 2036, 2042, 2043, 2045, 2046, 2049, 2051, 2053, 2054, 2057, 2060, 2094, 2144, 2185, 2228, 3001, 3011, 3020, 3025, 3026, 3027, 3028, 3029, 3030, 3095, 3145, 3188, 4016, 4023, 4198, 4239, 5006, 5023, 5027, 5032, 5033, 5035, 5041, 5052
Attention allocation, 3058, 3213
Attention and action, 3015
Attention and emotion, 2017
Attention attraction, 307
Attention capture, 95, 96, 97, 308, 2026, 2030, 2034, 2038, 2039, 2040, 4001
Attention contagion, 2047
Attention control, 224, 1204, 1232, 2028, 2052, 3008, 3017
Attention mode, 5022
Attention orienting, 216
Attention regulation, 1007
Attention restoration, 4017, 4229
Attentional bias, 2014, 4013, 4063
Attentional blink, 2019, 4007, ,
Attentional cues, 5024
Attentional decoupling, 3200
Attentional engagement and disengagement, 308, 3020
Attentional focus, 5233
Attentional inhibition, 1002
Attentional remapping, 3019
Attentional shifts, 2018, 3019
Attitudes, 4231
Attraction effect, 3055
Attractiveness, 248
Attribute substitution effect, 5012
Attribution, 324
Audiovisual, 2069
Audiovisual integration, 3141, 3162
Audiovisual interactions, 180
Audition, 3239
Auditory cues, 4099
Auditory distraction, 2015, 2202
Auditory dominance, 2069
Auditory feedback, 84
Auditory feedback perturbation, 1228
Auditory imagery, 2239
Auditory memory, 5224
Auditory processing, 3130, 4070
Auditory short-term memory, 2239
Auditory working memory, 1228
Auditory-visual integration, 1229
Augmented perception, 229
Augmented reality, 2245
Autism, 1182, 2127, 5155
Autism spectrum disorder, 1115, 3013, 3111
Autobiographical, 4189

Autobiographical memory, 194, 4172, 4173, 4175, 4178, 4185, 4186, 4187, 4190, 4192, 4193, 4194, 4196, 5086, 5140
Autobiographical narrative, 5087
Automatic, 302
Automatic processing, 1126, 1216
Automatic retrieval, 321
Automaticity, 1, 75, 218, 1016, 1227, 2039, 3018, 3127
Autonomic nervous system, 3009
Autonomous vehicles, 5107
Availability, 4183
Avatar, 3021
Awareness, 233, 2019
AX-CPT, 5053

B

Back-vowel fronting, 3128
Backward crosstalk, 2225
Backward priming, 4054
Ba-construction, 4045
Balance, 229
Bandit problems, 146
Basal ganglia, 3240
Basketball arguments, 231
Bayes factor, 190, 258, 5243
Bayesian, 1110, 5242
Bayesian analysis, 32
Bayesian hierarchical modeling, 1047
Bayesian highest-density intervals, 33
Bayesian inference, 257, 1108, 3074, 5114
Bayesian models, 190, 198, 263, 1028, 5106
Bayesian reasoning, 128, 4095
Bayesian statistics, 5237, 5238
Beat gesture, 1118, 1119
Before, 1123
Behavioral economics, 3067
Behavioral inhibition, 3113
Being moved, 3108
Beliefs, 1178, 1195, 2089, 3193
Bias, 257, 324, 1102, 3076, 4204, 5019
Bidirectional mapping, 4073
Big data, 29, 60, 2099
Bigrams, 1167
Bilingual, 41, 1074, 2123, 4040, 4085
Bilingual advantage, 4021
Bilingual Alzheimer's disease, 40
Bilingual context, 1081
Bilingual experience, 5132
Bilingual language processing, 4032
Bilingual proficiency, 3171
Bilingual reading, 271
Bilingual sentence processing, 4028
Bilingual spoken word recognition, 4029
Bilingual word production, 4036
Bilingualism, 41, 42, 43, 44, 62, 243, 272, 274, 275, 314, 1069, 1070, 1071, 1072, 1073, 1076, 1079, 1080, 1082, 1083, 1084, 1086, 1087, 1088, 1089, 1113, 2119, 2120, 2247, 3249, 4021, 4022, 4023, 4024, 4025, 4027, 4030, 4034, 4035, 4038, 4051, 4060, 5174, 5246
Bilingualism-cognitive control, 276
Bilingualism-production, 276,
Binding, 1221
Binocular coordination, 1042
Biofeedback training, 2230
Biological motion, 5020
Blinded experiment, 196
Body parts, 5027
Body representation, 2223
Body schema, 4078, 4079
Body-part compatibility, 4079
Bottleneck models, 4149
Bottom-up, 2031
Bouba/kiki effect, 2119
Boundary extension, 2209
Bounded rationality, 3067
Brain imaging, 1153
Brain stimulation, 1133, 2042
Brain training games, 4114

C

Caffeine, 3214
Camera angle, 3106
Canine lexical decision task, 1139
Canines, 2008
Capacity limits, 217
Capture, 98, 2032
Carryover effects, 1237
Categorical boundaries, 2028
Categorical perception, 3102
Categories, 3078, 3088
Categorization, 45, 56, 57, 294, 3080, 3083, 3086, 5041, 5054
Categorized words, 5182
Category clustering recall, 3223
Category induction, 2139
Category learning, 55, 58, 2185, 3077, 3084, 3085, 3087, 3089, 3090, 3175, 4116, 5205
Causal connectives, 1124
Causal induction, 2097
Causal information, 1039
Causal invariance, 2097
Causal judgment, 1053
Causal learning, 1064
Causal reasoning, 2095
Causality, 2087, 5115
Cell phone, 2043, 4239
Central executive, 1220
Centroid perception, 114
Change comprehension, 5133
Change detection, 3023, 4080, 5084, 5165
Chaotic cognition, 2061
Cheater detection, 2200
Cheating, 5066
Chess expertise, 53
Chess tournaments, 3052
Children, 174, 1160, 1197, 3167, 4069, 4078
Chills, 2065
Chimpanzees, 175, 2009
Chinese, 1155, 2123
Chinese orthography, 2159
Chinese radicals, 2154
Chinese spoken word recognition, 3146
Chinese word production, 3133
Choice, 82, 3217
Choice blindness, 1091
Choice function, 1235
Choice strategy, 147
Circadian variation, 4006
Classification, 3076
Classroom, 134, 1061
Classroom learning, 1048, 4244
Clefts, 1043
Climate science, 5110
Cloze sentences, 1112
Cluster analysis, 2116
Coaching in category learning, 59
Coarticulation, 3139
Cocktail party , 115, 2008
Code-switching, 1081, 4028
Cognition, 29, 242, 276, 1013, 1127, 2022, 2027, 2132, 4214, 4226
Cognition and emotion, 2127
Cognition-cognitive control, 276, 3006
Cognition-metacognition, 173
Cognitive aging, 156, 160, 3176, 3177, 3248, 4200, 5079, 5083, 5085, 5086, 5087
Cognitive assessment, 1110
Cognitive bias, 5113
Cognitive conflict, 5066
Cognitive control, 44, 140, 141, 218, 232, 240, 277, 279, 1001, 1005, 1007, 1008, 1009, 1013, 1069, 1133, 1134, 1211, 1214, 2050, 2184, 3003, 3006, 3009, 3013, 3018, 3171, 3203, 4002, 4004, 4009, 4010, 4021, 4065, 4109, 4225, 5053, 5058, 5060, 5063, 5069, 5073, 5132, 5149, 5162
Cognitive decline, 5082
Cognitive depletion, 3203
Cognitive development, 192, 2078
Cognitive ecology, 4092
Cognitive effort, 2006
Cognitive flexibility, 279, 1129, 2122, 3001
Cognitive function, 5146
Cognitive interview, 3223
Cognitive load, 89, 157, 301, 1092, 1106, 2228, 4141

Cognitive modeling, 148, 258, 294, 1094, 1100, 4201, 5236
Cognitive offloading, 1057, 4205, 4232, 4235
Cognitive processes, 2129
Cognitive reflection test, 5072, 5126
Cognitive resources, 1220, 3055, 3239, 4123
Cognitive strategies, 50
Cognitive style, 3099, 5070
Cognitive theories, 225
Cognitive training, 161, 4114, 4118
Coherence, 4188
Cohort density, 3146
Collaboration, 252
Collaborative inhibition, 120, 1180
Collaborative memory, 1180, 5212
Collaborative remembering, 204
Collapsing thresholds, 1094
Collective cognition, 208, 4197
Collective future thinking, 4197
Collective memory, 204, 205, 206, 207, 208, 1192, 4138, 4183, 4197
College students, 3051
Color, 227, 301, 1142, 4014, 5017, 5055, 5241
Color cognition, 228
Color constancy, 5048
Color preference, 5007
Color-word contingency effect, 90
Combined expectations, 4014
Comic, 1044
Commission errors, 3204, 3212
Commonality search, 2084
Communication, 24, 2118
Communicative ability, 1086
Community-drawn sample, 1202
Comparative cognition, 2002, 2010, 3005
Comparative decisions, 191
Comparison, 3087
Compatibility, 4011
Compatibility effect, 2210
Competition, 2195
Complex span, 4210
Complex span task, 1205
Compound, 3135
Compound remote associates, 5119, 5126
Comprehension, 16, 272, 1034, 1045, 1072, 1114, 2180, 3119, 3121, 3122, 4131, 5163
Computational, 4016
Computational linguistics, 2248, 3044
Computational modeling, 123, 316, 1092, 1206, 1235, 2186, 3150, 4094
Computerized, 1189
Computer-mediated communication, 4056, 4230
Concept, 249
Concept learning, 2170
Concept mapping, 4145, 4146
Concepts, 1045, 3088, 4068
Conceptual alignment, 1122
Conceptual change, 265, 1047
Conceptual combination, 66, 3082
Conceptual development, 3079
Conceptual metaphor, 251
Conceptual pact, 15
Concurrent attention, 2041
Conditioning, 46
Confidence, 25, 79, 4133, 4154, 4167, 4220, 5197, 5198, 5204
Confidence accuracy characteristic plot, 121
Confidence and recognition, 121
Confidence interval, 254
Confidence judgment, 175, 3194, 4163
Confidence-accuracy relationship, 3186
Configuration, 4097
Conflict, 1020
Conflict adaptation, 138, 1012, 1017, 1134, 3014, 5059
Conflict as aversive signal, 5059
Conflict-triggered memory, 3014
Congruency sequence effect, 138, 1015, 3123, 4009, 4012
Congruity, 3217
Conjunction errors, 5167
Connectionist models, 55
Connectives, 1043
Connectivity, 5073
Conscious experience, 3033
Consciousness, 232, 233, 234, 235, 3042
Consciousness in metatheories, 236
Consolidation, 118, 2141, 3229, 4123, 4211, 4221
Consonant and vowel, 2007, 2150
Constancy, 227
Consumer choice, 148
Content analysis, 5087
Context, 178, 1123, 2201, 3158, 3166, 5067, 5216
Context change, 195
Context effects, 282, 3170, 3200, 4154
Context reinstatement, 5217
Context specific control, 1020
Context-specific proportion congruence, 2028
Contextual associations, 5167
Contextual cueing, 304, 5184
Contextual influence, 1237
Contextual similarity, 2020
Contextual variability, 3168, 3238
Contingency learning, 1053, 5189
Contingent capture, 2030
Continued influence, 1039
Continued influence effect, 1172, 1178
Continuous evaluations, 183
Continuous memory updating, 48
Continuous search, 2051
Contralateral delay activity, 300, 1218, 4203
Control, , 1003
Control deprivation, 5105
Control processes, 2186
Control-learning, 5052
Controlled processing, 1126, 3016
Convergent thinking, 4019
Conversation, 13, 181
Conversational interaction, 12
Cooperation, 212, 2101
Coordination, 15
Correction, 1039
Cost-benefit framework of control, 3002
Counterpredictive cue, 2018
Course evaluations, 183
Courtroom questioning, 1179
Covert retrieval practice, 2174
CPT, 2060
Creativity, 132, 2083, 2084, 2092, 2094, 2098, 2130, 3038, 3094, 4019, 4245, 5077, 5118
Criterion shifting, 74, 2188
Critical decision method, 1097
Critical thinking, 134, 1168
Cross race effect, 4166
Cross-cultural, 2065, 3215, 5194
Cross-language, 4037
Cross-language syntax, 271
Cross-linguistic, 319
Crossmodal, 1226
Cross-modal attention, 1224
Cross-modal correspondence, 1227, 2142
Cross-modal learning, 110
Cross-race effect, 4167
Cross-situational learning, 2138
Crowding, 2151
Cue competition, 151, 3165
Cue salience, 2233
Cue use, 4134
Cued recall, 49, 3118
Cueing effects, 5044
Cue-transparency, 4020
Cultural difference, 1145, 3110
Culture, 3166, 5017
Cumulative rehearsal, 4210
Curiosity, 2182, 4142
Cursor movement, 2049
Cybersecurity, 5074

D

Dancers, 2216
Data analytics, 292
Deafness, 325, 2144
Decay, 4215
Decay rule, 1104
Deception, 1184
Decision confidence, 1093
Decision context, 147

Decision making, 22, 79, 80, 82, 148, 211, 255, 282, 286, 1079, 1094, 1095, 1098, 1101, 1108, 1111, 2006, 2029, 2079, 2080, 2103, 2106, 2213, 3045, 3046, 3053, 3057, 3063, 3065, 4052, 4086, 5100, 5104, 5108, 5135, 5235, 5236
Decision making under risk, 4083
Decision thresholds, 3047
Decisions from experience, 286, 1136
Declarative memory, 5181
Deja vu, 9
Delay, 5166
Delay discounting, 2102, 4195, 5069
Delayed judgments of learning, 2181
Delay-induced forgetting, 1185
Delta plots, 5230
Delta rule, 1104
Delta-P, 2115
Dependent model, 278
Depletion, 1018
Depression, 107, 1128, 2104, 3191, 5215
Depth perception, 2240
Derived lists, 4098
Description-experience gap, 1101
Desirable difficulties, 240, 1009, 1168,
Development, 77, 166, 252, 328, 1084, 2142, 5162
Developmental dyslexia, 1150
Developmental trajectory analysis, 1181
Diagnostic feature-detection hypothesis, 4165
Diagnostic reasoning, 2093
Diagrams, 129
Dialect variation, 3128
Dialogue, 61
Different script, 4036
Different-script bilinguals, 2147
Diffusion model, 83, 1047, 1102, 2125
Dimensional relevance shift, 3077
Directed forgetting, 2201, 5067, 5182
Direction of eye gaze, 5
Disclosure, 4190, 4241
Discourse, 63, 1121, 2118, 3119
Discourse analysis, 16
Discourse biases, 1177
Discourse markers, 1115
Discourse processes, 4056
Discourse processing, 1023
Discrete capacity, 221
Discrete positive emotions, 3099
Discrete representation, 4062
Discrete-state models, 4220
Discrimination, 2203
Discriminative learning, 2013
Disease memory, 177
Diseases and need, 284
Disfluency, 2131
Dishonesty, 5051
Disorientation, 2213
Disposition, 3099
Dissociations, 256
Distance, 5006
Distance perception, 2208
Distinct vs. common features, 3068
Distinctiveness, 3236
Distracted walking, 4227, 5097
Distractibility, 5033
Distraction, 138, 140, 4204
Distractor rejection, 2038
Distractor suppression, 1204, 2035, 4001
Distractors, 188
Diurnal variability, 5172
DIVA, 3083
Divergent thinking, 2061, 2094, 4245
Divided attention, 141, 157, 219, 2062, 2145, 2164, 3239
Dog, 2007
Domain sharing, 4067
Domain specificity, 1098, 3032
Domain-specific deficits, 5083
Dopamine, 2205
Dot perspective task, 3
Doublespeak, 5111
D-prime, 1238
Drawing, 1035
Drift diffusion model, 81, 1093, 1109, 3171
Driving training measures, 1097
DRM, 5176
DRM paradigm, 5178
Drone, 4240
Dropout, 198
DSP sequence learning, 307
Dual mechanisms, 5053
Dual process theory, 283, 5094
Dual task, 5097
Dualism, 5113
Dual-memory retrieval, 4149
Dual-process theories, 256
Dual-systems models, 145
Dual-task performance, 4005, 4006
Dual-tasking, 2225
Duration judgment, 5101
Duration-based priming, 3154
Dynamic modeling, 1157, 5029
Dynamic touch, 3247
Dynamical systems modeling, 263
Dyscalculia, 4088

E

Ease-of-retrieval, 4187
Ecological thinking, 3079
Education, 133, 135, 136, 2047, 4126, 4135, 4136, 5146, 5193
Educational technology, 4124
EEG, 283, 1186, 1216, 2134, 3108, 3160, 3243, 4016, 5018, 5245
EEG decoding, 280, 1223, 2034
Effect size, 254, 1240, 5240
Effectiveness, 2104
Efficient coding, 5056
Effort, 2106, 4008, 4010
Effortful search, 5043
Effortfulness hypothesis, 3148
Ego depletion, 1127
Egocentric Simon effect, 2207
Einstellung (set) effect, 320
Elaboration, 1032
E-learning, 4236
Electroencephalography, 3162
Electrophysiology, 2130, 3011, 4060, 4214
Embodied cognition, 20, 21, 4064, 4065, 4068, 4072, 4075, 4081
Embodied cue, 4069
Embodied experience, 2215
Emergency decision making, 3050
Emergent systems, 3067
Emoji, 1187, 4230
Emotion, 14, 108, 109, 158, 291, 1082, 1090, 1133, 1141, 1142, 1188, 2039, 2054, 2073, 2106, 3095, 3096, 3105, 3107, 3109, 3178, 3179, 3218, 3243, 4031, 4072, 5009, 5044, 5075
Emotion perception, 2126
Emotion recognition, 1146, 1225, 5008
Emotion regulation, 1129, 3097
Emotion word processing, 3103
Emotional arousal, 3114
Emotional body movement, 3098
Emotional context, 3104
Emotional design, 4115
Emotional expression, 5005
Emotional face perception, 1146
Emotional intensity, 194
Emotional memory, 2062
Emotional stimulus, 1134
Emotional valence, 3196, 5062
Emotionality, 4196
Emotion-language interface, 2126
Empathy, 4138, 4181
Empirical knowledge, 2097
Empirically suspect belief, 2088
Encoding, 302, 1067, 4221
Encoding mode, 5223
Encoding specificity, 2067
Encoding strategy, 3176
Encoding variability, 4147
Engagement, 4120, 5105
Enhanced cognitive states, 299
Ensemble perception, 114, 5010, 5016, 5022
Ensemble processing, 4170
Environment, 4229
Environment learning, 2222
Environmental exposure, 4017
Episodic counterfactuals, 3208
Episodic future thinking, 4179

Episodic memory, 47, 78, 117, 119, 220, 297, 1173, 1191, 1198, 2199, 3013, 3112, 3170, 3208, 3222, 3228, 3229, 3233, 4171, 4195, 5091, 5137, 5213, 5221
Episodic prediction, 5133
Episodic retrieval, 2020
Episodic simulation, 4181
Episodic specificity, 3222
ERP, 98, 1012, 1095, 1154, 2129, 2157, 2194, 3109, 4015, 5091
ERP technique, 3161
Error correction, 4144
Error-driven learning, 2135
Errorless learning, 4144
Errors, 3167
Essentialism, 3092
Estimation, 192, 4090
Ethnic minorities, 3112
Evaluation, 3069
Evaluative conditioning, 2117
Evaluative information about dogs, 1139
Event, 5129
Event boundaries, 5143
Event cognition, 179, 2168, 5130, 5138, 5143
Event construal, 3110
Event dimensions, 5140
Event files, 2021
Event integration, 2021
Event knowledge, 179
Event memory, 206, 1192, 5133, 5141, 5142
Event model, 182
Event perception, 5131, 5142
Event processing, 5132
Event recall, 4177
Event related potentials, 5046
Event segmentation, 2191, 5130, 5134, 5135, 5139
Event-related potentials, 1073, 1218, 2137, 5070
Evidence accumulation, 1107, 1108
Evidence assimilation, 2108
Evidence evaluation, 5115
Evoked pupil response, 2184
Evolution, 187, 5009
Evolutionary psychology, 248, 1191
Examples, 1045, 5125
Executive attention, 3005, 4011
Executive control, 41, 43, 241, 2098, 3041, 5068
Executive function, 42, 1129, 1232, 2052, 2078, 2082, 3004, 4027, 5095, 5120
Exemplar models, 55
Exercise, 1056
Expectancy, 4130
Expectations, 303, 2113
Experience sampling, 314, 3033, 3205, 4182
Experience-based learning, 5114
Experiment software, 5244
Experimental controversies, 236
Experimental design, 1234, 1236
Experimental psychology, 1241
Experimental setting, 1091
Expert judgment, 8
Expertise, 2231, 3232, 5039, 5144
Explanation, 1022, 2081, 2096, 3078
Explicit and implicit processes, 236
Explicit knowledge, 2237
Exploration, 1136, 2029
Exploratory factor analysis, 2116
Extended cognition, 4205
Eye movements, 5, 14, 93, 242, 262, 271, 273, 309, 319, 320, 328, 1024, 1026, 1040, 1041, 1044, 1156, 1160, 1165, 2063, 2064, 2131, 2146, 2148, 2156, 2163, 2232, 4048, 5003, 5025, 5026, 5064, 5067, 5139
Eye movements and attention, 3174
Eye movements and pupillometry, 2183
Eye movements during reading, 4047
Eye tracking, 125, 188, 1027, 1037, 1118, 1151, 2045, 2211, 3054, 3157, 4225, 4246, 5040, 5207
Eyewitness, 1176, 4152, 4155, 4158
Eyewitness accuracy, 1179
Eyewitness identification, 25, 27, 3061, 4153, 4154, 4157, 4161, 4163, 4164
Eyewitness interviewing, 4159, 4193
Eyewitness memory, 26, 3186, 3223, 4162, 4166, 4168
Eyewitness misidentification, 4151
Eyewitness testimony, 4159, 4160

F

Face, 3021, 5001
Face adaptation, 3245
Face identity, 5005
Face memory, 25, 5168
Face perception, 186, 3211, 3245, 5005
Face processing, 112, 2033
Face recognition, 2200, 2212, 3031, 4156, 4161, 4162, 4166, 5008, 5217
Facial affect, 1131
Facial attractiveness, 5010
Facial expression, 1138, 1146, 5009, 5017, 5022, 5063
Facial recognition, 3092
Fake news, 3066, 4131
False action-memory, 5171
False consensus, 7
False fame effect, 1175
False memory, 160, 1169, 1171, 1173, 1174, 1179, 1182, 1183, 3042, 4185, 5164, 5167, 5168, 5170, 5172, 5173, 5174, 5175, 5176, 5177, 5182
False negatives, 31
False positives, 31
False recall, 1180
False recognition, 160
False recollection, 5183
Familiarity, 75, 2074, 4162, 5072, 5168, 5218, 5219
Family size/frequency effects, 2152
Fast mapping, 216
Feature autocorrelation, 3020
Feature binding, 3019, 3237
Feature integration, 2234, 3028, 3029
Features of similarity, 3068
Feedback, 1050, 2111, 3175, 4093, 4110, 4130, 4144, 5109
Feeling of knowing (FOK) judgments, 5089, 5196
Field dependence/independence, 3003
Figurative language, 274, 1120
Figure assignment, 111
Fillers, 3116
Film narration, 3106
Filmed narrative, 5130
Fingerprint classification, 1107
Finnish, 3135
Fixation, 321, 2090, 2092
Fixation-related NIRS, 2155
Flanker task, 4015
Flashbulb memory, 194
Flicker-induced time dilation, 5018
Flow, 5101
Fluency, 1036, 1117, 2161, 3091, 4126, 4188, 5196
fMRI, 296, 1075, 1080, 2100, 2109
Focused attention, 299
Font size, 3197
Food behaviors, 1112
Forecasting, 209
Foreign accent, 2129
Foreign-accent adaptation, 4246
Foreign-accented speech, 3153
Foreign-directed speech, 3138
Forensic science expertise, 4112
Forensics, 22
Foreperiods, 3244
Forgetting, 184, 205, 290, 2195, 3216, 3228, 5222, 5226
Forward inference, 3058
Forward testing effect, 2171, 2180
Fractions, 4094
Framing, 3062
Framing effect, 3048
Framing in risky decisions, 284
Free choice, 1004, 3037
Free recall, 117, 195, 1199, 1200, 3219
Frequency, 4089
Function words, 2149
Functional equivalence, 4099
Functional fixedness, 3024
Functional MRI, 1217
Future thinking, 208, 3206, 5136

Fuzzy trace theory, 16, 5180

G

Gains and losses, 305
Games for learning, 4115
Gaming, 299
Gap interception, 2243
Garner paradigm, 4
Gaussian processes, 5238
Gaze, 3021, 4241
Gaze direction, 2018
Gaze-contingent manipulation, 3054
Gender, 1050, 2003, 2101, 2220, 3091, 5077, 5195
Gender bias, 183
Gender differences, 1138, 3111, 5065
Generalisation, 126
Generation constraint, 1055
Generation effect, 1055
Generative transmission, 230
Gesture, 17, 1187, 4083, 4206, 5166
Gist, 1169
Global matching models, 287
Global updating, 182
Go/no-go, 210, 2225, 5057
Goal adjustment, 2112
Goal change, 182
Goal setting, 4120
Goal-directed learning, 2222
Goals, 1022
Golf, 21
Grammar, 315, 1219, 4122
Grammatical gender, 1073, 4060
Grammaticality judgment, 2121
Graph comprehension, 1051
Grasping affordance, 2025
Gratitude, 2058
Grief, 153
Grit, 1008
Grounded cognition, 19, 5154
Group communication analysis, 2248
Group decision making, 2059
Group interaction, 2248
Group membership, 5063
Group perception, 5010
Groups, 209
Guessing bias, 2197

H

Habitual prospective memory, 3209
Habituation, 3241
Hand representation, 2223
Handedness, 2214, 2215
Handgrip force, 2244
Haptic perception, 3246, 3247
Harmony, 2071
Health decision making, 144
Hearing, 157
Hebb repetition effect, 3224, 4117
Hemi-image, 2214
Hemisphere processing, 1071
Hemispheres, 5145
Hemispheric difference, 5046
Heuristics, 130, 323
Heuristics and biases, 3059
Hidden Markov model, 2049
High school students, 3051
Higher education, 1065, 4143
Higher-order learning, 3164
Highlighting, 239
Hippocampus, 4181
Hiring discrimination, 3073
History learning, 4138
Holistic processing, 112, 5039
Homeostasis, 226
Homesickness, 4175
Hormones, 4100
Human causal learning, 3165
Human development index, 3049
Human error, 3053
Human learning, 4132, 4140
Human machine teaming, 114
Human memory, 4189
Human performance, 2055
Human-animal interaction, 2012
Humor, 5118
Hybrid search, 5042
Hypercorrection, 2182, 5212
Hypothesis testing, 258

I

IAT, 3109, 4003
Iconic memory, 5184
Ideomotor learning, 5064
Idiom processing, 1120
Idiomatic, 1074
Idioms, 1116
Illusion of explanatory depth, 4169
Illusions, 2001
Illusory causation, 1053
Image memorability, 5002
Imagery, 291
Imagery ability, 2212, 2219
Imagery training, 2230
Imagination, 2041
Immersion, 272
Impasse, 2082
Implicit, 2140, 2220, 4231
Implicit and explicit knowledge, 2237, 4121
Implicit and explicit language learning, 2124
Implicit association, 251
Implicit category learning, 3090
Implicit learning, 1140, 3134, 3171, 5184, 5188, 5193
Implicit memory, 293, 5185, 5189, 5190, 5192
Impression memory, 2105
Impulsivity, 210, 2102
Inaccurate information, 1030
Inattention, 4019
Inattentional blindness, 26, 5164
Inattentional deafness, 5033
Inattentional numbness, 99
Incidental affect, 5114
Incidental encoding, 3213, 5181
Incidental learning, 2067, 3175, 3232
Incidental word learning, 1025
Inconsistency, 1022
Incremental learning, 152
Indecisiveness, 2058
Indirect recognition procedure, 5014
Individual data analysis, 5117
Individual differences, 28, 44, 74, 88, 123, 143, 189, 216, 241, 293, 1052, 1059, 1083, 1147, 1193, 2050, 2052, 2053, 2055, 2061, 2093, 2095, 2133, 2198, 3004, 3006, 3082, 3085, 3096, 3115, 3159, 4034, 4094, 4097, 4104, 4109, 4208, 4218, 5036, 5119, 5187, 5209, 5229
Individual preferences, 2056
Individual variability, 50
Inertia, 3247
Infant, 3140
Inferences, 32, 324, 1034, 5163
Informant discrepancy, 6
Information, 2029
Information integration, 5109
Information processing, 4226
Information security, 1095
Informational masking, 3242
Inhibition, 281, 1001, 4018, 4024, 4076, 4077, 4215
Inhibition of return, 2016
Inhibitory control, 154, 2100, 5057, 5150, 5186
Input familiarity, 1145
Insight, 2082, 2086, 5127
Insight problem solving, 106, 1051, 5123, 5126
Instruction, 3072, 4127, 4129, 4139
Instruction implementation, 218
Instruction manipulations, 4149
Instructional effect, 1137
Instructional technology, 241
Instructions, 1016, 2023
Instructor feedback, 4137
Instrumental music, 2068
Integral affect and incidental affect, 5112
Integration, 6, 4174
Intelligence, 1214, 4218, 5120
Interactive context, 41
Interception, 4119
Intercultural differences, 2073

Interference, 1, 5222
Interference-induced forgetting, 1185
Interlanguage speech intelligibility benefit, 1077
Interleaved practice, 4122, 5121
Interleaving, 1031, 1048, 4122, 5125, 5192
Internal attention, 1012
Internal context shift, 1175
Internal reference, 5116
Internet, 3192
Interoception, 3171
Interpersonal coordination, 263
Interruption, 2229, 3030
Interstimulus interval, 3241
Intertemporal choice, 1103, 3046, 3058, 3062, 5108
Intertextual integration, 3121
Intervention, 5200
Intracranial EEG, 5151
Intragroup racism, 3073
Intuitive judgements, 2231
Invariance in psychological science, 116
Involuntary memory, 4180
Involuntary musical imagery, 2068
Involuntary retrieval, 4172
Iowa gambling task, 3045
Irony, 1122
Irrelevant sound effect, 311, 1014, 1019
Irrelevant speech, 311
Isolation effect, 3236
Item, 2204
Item memory and source memory, 5233
Item properties, 47
Item-to-item associations, 3220

J

Japanese Kanji words, 3126
Japanese words, 2153
Joint action, 2226
Joint attention, 312
Judgment, 6, 10, 250, 3064, 4086, 5100, 5104, 5106, 5109, 5110, 5111, 5112
Judgment accuracy, 8
Judgment and decision making, 193, 2044, 3048
Judgment reactivity, 3189
Judgments, 213, 1036, 5206
Judgments of learning, 2169, 2171, 3177, 3178, 3179, 3184, 3187, 3189, 3196, 3197, 3198, 3227, 5203, 5207, 5208
Juror decision making, 3056, 3061
Jurors, 4152

K

Keyword method, 3164
Knowledge, 269, 3181
Knowledge illusions, 1177
Knowledge partitioning, 3084
Korean, 2148

L

L2 acquisition, 273, 2122
L2 pronunciation, 4033
Label entrenchment, 3078
Label feedback, 5045
Labeling, 3102
Lack of control, 3094
Landmark, 165
Language, 65, 66, 91, 310, 1043, 1089, 1219, 2118, 2132, 4049, 4231, 5080
Language acquisition, 5147
Language and cognition, 2124
Language brokering, 1079, 4245
Language change, 3135
Language change detection, 2247
Language comprehension, 213, 2125, 2128, 2136, 3117, 3152, 4062, 5162
Language control, 4039
Language development, 312, 3144
Language diversity, 1086
Language immersion, 1087
Language learning, 326, 2121, 2139
Language methods, 314
Language monitoring, 4039
Language perception, 2127
Language planning, 4067
Language processing, 20, 1082, 5150, 5151
Language processing and social perception, 5155
Language production, 149, 1087, 2143, 3127, 3130, 3131, 3134, 4024, 4035, 5081
Language skills, 5147
Latent semantic analysis, 4176
Latent variable analysis, 1203
Law of practice, 260
Learned associations, 5189
Learning, 57, 126, 133, 137, 184, 242, 252, 259, 1030, 1034, 1046, 1050, 1052, 1058, 1059, 1063, 1066, 1100, 1135, 1167, 2110, 2111, 2176, 3001, 3086, 3097, 4044, 4083, 4105, 4121, 4126, 4128, 4133, 4139, 4142, 4145, 4150, 4169, 4191, 4234, 4242, 4243, 5200
Learning and memory, 1023, 3174
Learning and motivation, 135
Learning effect, 3093
Learning from errors, 237
Learning mode, 3087
Learning process, 250, 5228
Learning quality, 4118
Learning rate, 1056, 1193, 3209
Learning strategies, 2172, 3089, 4127, 4129, 5201
Learning styles, 5210
Learning transfer, 4113, 4117
Left digit effect, 4087
Legal decision making, 3047
Legally blind, 4209
Lethal force decision making, 113
Letter legibility, 1158
Letter position, 1166
Letter processing, 94, 327
Letter recognition, 4219
Levels of processing, 2193, 3156, 4130
Levels of representation, 5232
Lexical access, 329, 1113, 1158, 1163, 4025
Lexical acquisition, 1026
Lexical decision, 329, 1159, 1163, 2157, 4052
Lexical encoding, 4047
Lexical processing, 5157
Lexical quality, 325
Lexical semantics, 4055
Lexical stress, 246
Lexicon, 4038
Lifeguarding, 5037
Life-history theory, 3049
Lifespan, 5098
Lifespan motivation, 305
Liking, 2117
Linear mixed modelling, 4090
Lineup fairness, 27, 4165
Lineups, 4153
Linguistics, 1114, 4047
Listening effort, 3141
Literacy, 1088, 2022, 2161
Literacy acquisition, 2159
Longitudinal, 4026
Long-term memory, 180, 185, 297, 1209, 2036, 2199, 3198, 5143
Long-term retention, 4194
Loss aversion, 81
Love, 4184
Low-level and high-level cognitive processes, 2086
LRP, 5059
Lying, 4160, 5051, 5177

M

Machine learning, 1024, 5160
Magic, 5012, 5131
Magnitude effect, 2238
Manual aiming, 2227
Masked priming, 92, 2147, 2150, 2154, 3037
Masking, 4221
Masled priming, 1163
Matching task, 4112
Math cognition, 4085
Math learning, 2224, 4206
Mathematical model, 80, 289
Mathematical problem solving, 5121
Mathematics, 237

McGurk effect, 243, 4061
Meaning, 2151, 5152
Measurement, 215, 1232, 3187
Measurement error, 5239
Measurement models, 73
Measurement/psychometrics, 255
Measures of performance, 3052
Measuring attention control, 143
Mediator effectiveness hypothesis, 2165
Medical cognition, 173
Meditation, 3035, 4070
Megastudy, 2158, 4050
Memory, 10, 60, 109, 140, 159, 207, 212, 1036, 1038, 1056, 1058, 1059, 1060, 1064, 1066, 1105, 1141, 1143, 1152, 1187, 1188, 1193, 1195, 1196, 2027, 2046, 2047, 2178, 2185, 2194, 2246, 3069, 3119, 3185, 3217, 3218, 3226, 3227, 3231, 3236, 4018, 4023, 4026, 4131, 4133, 4140, 4142, 4152, 4163, 4169, 4174, 4191, 4198, 4233, 4238, 4239, 5023, 5025, 5052, 5092, 5093, 5098, 5100, 5144, 5179, 5191, 5195, 5217, 5242
Memory accessibility, 5186
Memory accuracy, 3225
Memory and aging, 5099
Memory binding, 5214
Memory characteristics, 4180
Memory coding, 5116, 5178
Memory consolidation, 108
Memory distortion, 197
Memory encoding, 3166
Memory errors, 5214
Memory for text, 1076
Memory functions, 4187
Memory impairment, 3163
Memory interference, 2009
Memory journal, 4194
Memory judgment, 3191
Memory maintenance, 3214
Memory models, 49, 267, 1198, 2196
Memory of emotion, 4184
Memory of images, 5228
Memory organization, 5086
Memory predictions, 4173
Memory retrieval, 219, 1190, 3228, 4235
Memory search, 119, 1216, 5156
Memory selectivity, 1132
Memory suppression, 1186, 1190
Mental context reinstatement, 4186
Mental fixation, 2083
Mental imagery, 2041
Mental infernences, 5040
Mental models, 4150
Mental representation, 4101
Mental rotation, 2215, 2221, 2235, 4069
Mental set, 2091
Mental time travel, 3208
Mental unfolding test, 2211
Mentalizing, 3222
Mere exposure effect, 285
Meta-accuracy, 3072
Meta-analysis, 32, 1055, 1238, 1240, 1241
Metacognition, 10, 77, 86, 121, 130, 174, 175, 176, 238, 277, 1035, 1093, 1213, 2002, 2182, 3072, 3176, 3177, 3181, 3184, 3185, 3187, 3192, 3194, 3195, 4008, 4128, 4132, 4134, 5088, 5090, 5103, 5197, 5198, 5199, 5200, 5206, 5209, 5212, 5213
Metacognitive knowledge, 5201
Metacognitive strategies, 3182
Metacomprehension, 1035, 1037, 5206, 5208
Metacontrol, 18
Metamemory, 86, 2177, 2181, 3179, 3183, 3184, 3192, 3193, 3196, 3199, 3210, 3227, 5196, 5197, 5199, 5202, 5203, 5204, 5210
Metamemory resolution, 5211
Metaphor, 11, 17, 274, 1071, 1162, 2130, 5145
Metaphor conventionality, 3136
Metaphor production, 3136
Metareasoning, 130, 131, 283
Methodology, 1085
Methods, 1239, 5237
Migration, 2099
Mind perception, 2088
Mind wandering, 107, 137, 1001, 1006, 1010, 2050, 3035, 3038, 3039, 3040, 4242, 5062, 5136
Mindfulness, 1007, 1183, 3097, 5176, 5179
Mindfulness meditation, 3010
Mind wandering, 232, 1011, 3008, 3033, 3034, 3044, 4009, 4128
Misinformation, 1023, 1170, 1172, 1176, 1178, 2009, 2044, 3120, 3186, 4158, 4159, 5165, 5166, 5169, 5177, 5223
Misperception, 1154
Mistakes, 3053
Mixed emotion, 3108
Mixture modeling, 288, 5024
Mnemonic, 1060
Mnemonic strategy, 3164
Mnemonic techniques, 2229
Mobile application, 4229
Mobile phones, 4013
Mock trial, 3063
Modality congruence, 4160
Modality effect, 1199, 5172
Model, 49, 94, 2162, 3224, 5156
Model comparison, 5231
Model mimicry, 1103
Modeling, 222, 281, 3083, 3218, 5047
Models of cognition, 1096
Modes of response, 1137
Momentary thoughts, 3205
Monitoring, 176, 262, 3124, 3194, 5051, 5174
Mood, 1136, 1188, 3040
Mood and emotion, 1183
Moral cognition, 4074
Moral decision making, 5107
Moral emotion, 4074
Moral-vertical metaphor, 4073, 4074
Morphemic processing, 2152
Morphology, 64, 92, 273, 318, 2160, 3137
Moses illusion, 3117
Motion perception, 2011
Motion quality, 2231
Motion representation, 5141
Motion typology, 5153
Motivated attention, 2058
Motivated reasoning, 2089, 2108
Motivation, 2104, 2110, 2112, 2113, 2114, 3034, 5232
Motivation-cognition interaction, 5078
Motor affordances, 19
Motor control, 1005, 3015, 5061
Motor excitability, 2114
Motor imagery, 1016, 4076, 4077
Motor learning, 5192
Motor preparation, 46
Motor simulation, 317, 4057
Motor training, 2235
Mouse tracking, 2187, 2192, 2247, 3101, 5135
Mouse trajectory, 2051
Mouse-cursor motion, 3004
Mouse-tracking, 1125, 1234
Mouse-tracking paradigm, 1106
Movement imagery, 2216
Movement variability, 2227, 2237
Movies, 181
MPT model, 5171
Mu suppression, 3098
Multi-alternative decision making, 3055
Multi-attribute choice, 1109
Multidimensional scaling, 56
Multilingualism, 4026, 4031
Multimedia learning, 1068, 4114
Multimodal communication, 312
Multinomial processing tree, 1233
Multiple choice, 268, 2171
Multiple document, 3121
Multiple eyewitnesses, 3061
Multiple object tracking, 142, 217
Multiple systems, 58, 3089
Multisensory, 4209
Multisensory emotion, 1145
Multisensory imagery, 3100
Multisensory integration, 243, 1225, 3074, 3198
Multisensory perception, 3174
Multitasking, 1212, 2042, 2056, 3016, 4006, 5065
Music, 85, 2065, 2066, 2067, 2071, 4140

Music cognition, 86, 2072, 2074
Music memory, 87
Music perception, 2070, 2073, 2076
Music reading, 2063, 2064
Musical ability, 88
Musicianship, 4058

N

N2pc, 249, 308, 2026
N2pc and N2pb, 3011
N2pc/PCN, 5043
N400, 5153
Naming, 1080
Naming tasks, 1
Narrative, 1117, 4192
Narrative analysis, 4176
Natural frequency hypothesis, 4089
Natural scene viewing, 5026
Natural speech, 1088
Naturalistic category learning, 59
Naturalistic tasks, 5083
Navigation, 164, 165, 2213, 2217, 4099
Near-hand space, 1231
Near-infrared spectroscopy, 5154
Negation, 1172
Negation effect, 5222
Negative affect, 5060
Negative affective priming, 1128
Negative priming, 2020, 4002
Negative testing effect, 2179
Negotiation, 2113
Network modeling, 1021
Network science, 4050
Networks, 215
Neural dynamics, 1200
Neural mechanisms, 4017
Neural networks, 5191
Neural plasticity, 2122
Neurodevelopmental conditions, 4224
Neuroimaging, 2201, 3056
Neuromyths, 4135
Neuropsychology, 5079
Neuroscience, 1155
Neutral memory, 4177
Nine dots problem, 2086
Nonhuman primate, 2010
Nonlinear dynamics, 3139
Non-native English speakers, 3138
Non-native phonetic learning, 3151
Non-native speech, 245
Nonprescription drug labels, 3118
Normative models, 5106
Nostalgia, 4195
Note taking, 1057
Novel learning, 2166
Number estimation, 4091
Number line estimation, 4087, 4091, 4093
Number representations, 191
Number-space associations, 4092
Numeracy, 255, 3057, 4086, 4095, 5112, 5234
Numeral classifiers and object categorization, 2124
Numerical cognition, 192, 193, 4088, 4092
Numerical distance effect, 3060
Numerical judgment, 3059
Numerosity, 2001

O

Object files, 300
Object imagery, 2219
Object location, 3248
Object perception, 5027
Object recognition, 3026
Object-location memory, 77
Objects, 163
Object's size, 4216
Observation inflation, 5171
Oculomotor, 1004, 5003
Older adults, 158, 244
Online educational content, 4148
Online lectures, 4242
Online research, 1236
Online searching, 3181
Online testing, 5079
Open science, 5244
Opportunity cost, 5102
Optic flow, 5020
Optimal alpha level, 31
Optimal viewing position, 1149, 1150
Optimizing research payoff, 30
Orienting, 2016
Orthographic forms, 4033
Orthographic knowledge, 1025
Orthographic neighbor, 1166
Orthographic processing, 2145
Other race effect, 3211, 5008
Output interference, 3234
Output monitoring, 3202
Outsmarting the test, 4244
Overdistribution, 197
Overspecification, 4042
Overt retrieval practice, 2174
Own face, 5001
Ownership, 1130

P

P300, 1111
P600, 5153
Pacemaker counter model, 1230
Pain and anxiety, 5180
Pair learning, 3172
Paired comparison, 5117
Parafoveal processing, 122, 124, 1027, 1151, 2156
Parallel forms, 5234
Parameter correlation, 1235
Parrot cognition, 253
Part of speech, 65
Partition dependence, 2079
Part-list cueing, 120
Parts, 3026
Part-Set Cue, 1222, 3215
Path integration, 165
Pattern separation, 2203
Pegword, 1060
Perceived aggressiveness in dogs, 1139
Perceived safety, 4240
Perceived self-location, 2218
Perception, 227, 1084, 1215, 3105, 5004, 5012, 5019, 5048
Perception and action, 2234, 4081
Perception of causality, 230
Perception of force, 230
Perception-action, 2243
Perceptual expertise, 112
Perceptual feedback, 4082
Perceptual fluency, 3193, 5015, 5203
Perceptual grouping, 234, 1201, 3025
Perceptual interference effect, 3195
Perceptual learning, 247, 3145
Perceptual organization, 5002
Perceptual priming, 5030
Perceptual processing, 3161
Perceptual separability, 116
Perceptual similarity, 3144
Perceptual span, 2163
Performance, 259, 2048
Perihand space, 4080
Peripersonal space, 1231, 4070, 4071
Peri-personal space, 3022
Person memory, 2105, 4212
Personality, 2080, 2099
Perspective shift, 4103
Perspective switching, 2222
Perspective taking, 3, 176, 4096, 4103
Persuasion, 3064
Phenomenology, 235, 3190, 4179, 4192
Phishing, 4228
Phonetic categorization, 317
Phonetic processing, 313
Phonetic specificity, 2007
Phonetics, 3132, 4041
Phonological awareness, 2161, 4033
Phonological encoding, 150, 3133
Phonological loop, 2068
Phonological neighbor, 2153
Phonological processing, 1159, 3114
Phonological short-term memory, 3129
Phonological units, 4029
Phonological working memory, 1220
Phonology, 1156, 2132, 3127
Phonotactic, 2134, 4043, 4044
Phonotactic frequency, 3142
Photographs, 4232, 4233
Photo-taking-impairment effect, 4238

Physical activity, 4136
Physical attractiveness, 5001
Piagetian overconservation, 253
Picture naming, 152, 3123
Picture processing, 3117
Pigeon, 2011
Pitch, 2076
Pitch accent, 1118, 1119
Place cells, 2218
Plasticity, 5148
Play, 5147
Plural nouns, 5159
Pointing quadrant, 4103
Police record, 213
Political decision making, 1168
Political ideology, 2003
Politics, 1174
Pop-out search, 5034
Positional regularity, 2159
Positive-negative asymmetry, 3068
Positivity effect, 158, 1126, 2053
Post error slowing, 4004
Post retrieval processes, 238
Postdictive bias, 9
Post-disaster cognition, 1202
Pragmatics, 11, 13
Precision, 221, 254
Predictability, 1029
Predictability monitoring, 5134
Predicting comprehension, 239
Prediction, 89, 3206, 4125, 5023, 5060
Prediction error, 3165, 5142
Predictive bias, 9
Predictive coding, 5015
Predictive modeling, 111, 1200, 4118
Predictive processing, 3150
Predict-observe-explain, 1046
Pre-feeding, 2004
Preference reversals, 5105
Prejudice, 3073
Preregistered studies, 295
Presentation modality, 3238
Presupposition, 1125
Pretesting, 1048, 1062, 1067, 2175, 4148
Primates, 2001
Prime awareness, 4002
Prime duration, 3126
Priming, 1112, 3028, 3029, 3036, 4046, 5164, 5185, 5241
Prior knowledge, 144, 3173, 5137
Prioritization, 1207
Proactive control, 4015
Proactive interference, 76, 1057, 4022, 4207
Probabilistic choice, 1096
Probabilistic reasoning, 2078
Probability, 129, 144
Probability distortion, 4083
Probability insensitivity, 147
Probability judgment, 8
Probability weighting function, 3060
Problem solving, 127, 129, 132, 174, 320, 2015, 2085, 2090, 2091, 2110, 3024, 4081, 4095, 4113, 5119, 5124, 5127
Procedural learning, 4110
Procedural memory, 1085
Procedure automatization, 4088
Process tracing, 1234
Processing, 1125
Processing fluency, 5103
Procrastination, 2006, 2116
Production, 275, 1197, 5246
Professional education, 2112
Pronunciation, 153
Proper names, 3221
Prosocial behavior, 3049
Prosodic phrasing, 2137
Prosody, 3147, 3152
Prospect theory, 145
Prospection, 60, 5108
Prospective memory, 302, 303, 304, 305, 306, 1010, 3199, 3200, 3201, 3202, 3203, 3204, 3205, 3207, 3210, 3211, 3212, 3213
Prospective task-set interference, 1211
Proximate unit, 3133
Psychedelics, 132
Psycholinguistics, 2120, 2128, 2133, 2139, 4046, 4053, 4056, 5155
Psychological constructionist, 3102
Psychological reality, 4073
Psychological skill, 2230
Psychology and forensic science, 23, 24
Psychology of belief, 1147
Psychometrics, 3047
Psychonomics journals, 5240
Psychophysiology, 1236, 3009
Punishment, 2101, 2107
Pupil dilation, 2193
Pupil size, 1006, 3031, 4059
Pupillometry, 1018, 1111, 1119, 1210, 3143, 3180, 5149

Q

Quantitative model, 197, 260
Quizzing, 1063

R

Race, 5195
Racial outgroups, 3092
Randomized controlled trial, 4224
Ranking information, 3052
Rating, 4228
Rational models, 2093
Rationality, 131, 3048
Raven's progressive matrices, 5128
Reaction time, 28, 211, 3060, 5021
Reactivity, 5202, 5207
Reading, 14, 62, 64, 91, 93, 122, 123, 124, 125, 319, 325, 326, 1026, 1027, 1029, 1031, 1038, 1040, 1041, 1042, 1151, 1154, 1160, 1161, 1167, 2045, 2148, 2155, 2156, 2163, 3115, 4041, 4048
Reading comprehension, 1021, 1024, 1030, 1044, 1070, 5159
Reading development, 1070, 1083, 1164
Reading disability, 1153
Reading goals, 3115
Reading network, 1153
Reading strategies, 3182
Reality monitoring, 5173
Real-life decision making, 3051
Reasoning, 127, 2089, 4113
Reasoning under uncertainty, 2085
Recall, 109, 119, 1076, 1142, 1186, 1189, 1191, 1197, 1198, 2169, 2246, 3167, 3221, 3230, 3231, 3235, 3238, 4193, 4211, 5092, 5194
Recall accuracy, 1194, 4082
Recall and recognition, 3183
Recall latency, 1194
Recall performance, 3197
Recognition, 1144, 2198, 2202, 2204, 3230, 3231, 5014, 5175, 5183, 5215, 5218, 5219, 5221, 5223, 5232
Recognition latency, 219
Recognition memory, 73, 74, 78, 118, 287, 289, 2074, 2184, 2186, 2188, 2189, 2190, 2196, 3156, 3169, 3195, 4030, 5094, 5214, 5216, 5220, 5224, 5226, 5230, 5231
Recognition-induced forgetting, 290, 5225
Recollection, 321, 1182, 2046, 5089, 5218, 5219
Recollection and familiarity, 2191
Red herrings, 2092
Redemption, 4176
Redundant target effect, 5034
Reference, 15, 63, 4049
Reference frames, 2207
Reference strategies, 4090
Referential communication, 4042
Reflective thinking, 2088
Refreshing, 54, 1217
Refutation, 3120
Regret, 5102
Regulation, 3095
Rehearsal, 1014, 1019, 4223
Reinforcement learning, 80, 279, 1104, 2005
Rejection of science, 214
Relational reasoning, 1135
Relative accuracy, 5208
Reliability, 3159
Religion, 1196, 4135
Remember/know, 3190

Reminding, 2246, 3168, 3173
Repeated choices, 146
Repeated retrieval practice, 2172
Repetition, 4125
Repetition priming, 275, 289, 2021, 3130, 4040
Replication, 21, 5235, 5241, 5242, 5243, 5245
Representation, 4068
Reproducibility, 196, 257, 5244, 5245
Research efficiency, 30
Research practices, 29
Resilience, 3057
Resource allocation, 2081, 3007
Resource depletion, 1162
Resource scheduling, 3016
Response bias, 2189, 5220
Response inhibition, 113, 1002, 2107
Response interference, 45
Response mode, 4012
Response selection, 2242, 4064, 5054
Response sequencing, 3204
Response time, 1102, 1233, 2071, 2233, 5029, 5230
Response-effect compatibility, 2242
Resting state, 224
Resting state EEG, 2066, 5148
Resting state functional connectivity, 4171
Restoration, 2012
Restudy decisions, 4134
Retention, 184, 1054, 5140
Retention-interval cue, 52
Retinotopic, 2155
Retrieval, 75, 268, 1066, 2027, 2164, 2195, 3234
Retrieval deficit, 3215
Retrieval dynamics, 3219
Retrieval latency, 267
Retrieval practice, 136, 265, 266, 1049, 1064, 1065, 2167, 2168, 2169, 2173, 2181, 2183, 3122, 3235, 4143, 4145, 4146, 4147, 4148
Retrieval strategy, 78
Retrieval-induced forgetting, 2168, 3216, 5225
Retrieval-modulated learning, 2183
Retrieved context model, 1199
Retroactive interference, 1141, 5084
Retrospective confidence, 5211
Retrospective evaluation, 1105, 4132
Retrospective semantic processing, 4054
Return-sweeps, 1041, 1042
Revelation effect, 106
Reward, 2, 142, 159, 1010, 2103, 2107, 2115, 3037, 3171, 4001, 4010
Reward learning, 96, 2040, 3172
Reward processing, 2109
Rhyming, 1155
Rhythm, 3154
Rhythmic perception, 3240
Risk, 286, 5103, 5235
Risk attitude, 1092
Risk factor comprehension, 3118
Risk perception, 1099, 3080
Risky choice, 81, 145, 155, 1103, 3054
Risky decision making, 1099, 1100
ROC analysis, 4168
Route learning, 4104, 4107
RpcN, 5043
RTs, 1239
Rule breaking, 5066
Rule-plus-exception categories, 59
Rules, 3090

S

Saccades, 2232, 5028
Salience, 2035
Sampling, 146
Sampling paradigm, 193
Sarcasm, 1121, 1122, 3116, 4053
Satisfaction of search (SOS), 2146
Satisficing, 131
Scale, 4091
Scale development, 5234
Scene processing, 2143, 2209
Scene representation, 163
Scenes, 3027
Schemas, 3091, 4186
Schematic knowledge, 2197
Schematic support, 5085
Schizotypy, 2098
Science communication, 214
Science learning, 1033
Scientific arguments, 225
Scientific consensus, 5110
Scientific explanation, 1124
Scientific testimony, 3056
Search, 5041
Second language, 125
Second language (L2) proficiency, 1077
Second language acquisition, 1085, 4124
Second language learning, 4124, 5148
Second language word recognition, 1075
Secondary analysis, 1021
Seductive allure, 5113
Seductive details, 1090, 4141
Segmentation, 5129, 5144
Selection history, 95, 2014
Selective attention, 240, 1009, 2037
Selective exposure, 2198
Selective influence, 116, 1233
Selective trust, 3075
Selective visual attention, 2044
Self, 18, 1130, 2194
Self awareness, 1127
Self-agency, 2002
Self-concept, 4082
Self-conscious emotion, 5233
Self-construal, 2102
Self-control, 210, 281
Self-explanation, 3122
Self-imagination, 4111
Self-monitoring, 149
Self-other matching, 4078
Self-positivity bias, 2206
Self-reference effect, 2206
Self-referential processing, 2206, 3114, 5209
Self-regulated learning, 3178, 4143, 5205
Self-regulated study, 5201
Self-regulation, 5198
Self-reported affect, 1099
Self-similarity, 2105
Self-testing, 2173
Semantic, 5055
Semantic cognition, 5151
Semantic competition, 5150
Semantic complexity, 5159
Semantic diversity, 5157
Semantic features, 1152
Semantic interference, 152
Semantic knowledge, 1025
Semantic memory, 117, 269, 1221, 1222, 5156
Semantic networks, 3163, 3183, 5158
Semantic norms, 4055
Semantic organization, 3079
Semantic priming, 1075, 1224, 2019, 2157, 4052, 4054, 5158, 5170
Semantic processes, 5161
Semantic richness, 5154
Semantic short-term memory, 3129
Semantics, 11, 65, 2126, 3027, 3104, 4046, 4055, 5145, 5149, 5152, 5160
Sense of self, 3074
Sensorimotor activation, 4075
Sensorimotor learning, 84
Sensory aging, 156
Sentence comprehension, 1069
Sentence processing, 62, 2135, 3103
Sentence production, 154
Sentence recognition, 3153
Sequence learning, 3224, 4117
Sequential dependencies, 2030
Sequential hypothesis testing, 30
Sequential lineups, 4157
Sequential representations, 5056
Sequential task, 2229
Sequential visual stimuli, 3093
Serial dependence, 1223
Serial learning, 2005, 4098
Serial order, 2075, 3220
Serial order memory, 50, 3216
Serial recall, 1219, 3220, 3237
Serial-order control, 5056
Sex differences, 166, 4100, 4106
Sex ratio, 248
Shape discrimination, 3246
Sharing, 4178

Shooting simulations, 113
Showups, 4164
Sign language, 2144
Signal detection, 222, 2004, 3066, 4153
Signal detection theory, 73, 288, 1238, 2190, 2196, 3124, 4168, 5231
Silver alert, 4156
Similarity, 56, 1208, 3062, 3081, 5047
Similarity judgments, 23
Similarity matrix, 2162
Simile, 1162
Simon effect, 307, 2017, 2210, 4003
Simulated driving, 2228
Simulation theory, 3098
Simulations, 4179
Simultaneous lineup, 27, 4157, 4165
Singing, 87, 2239
Situated metacognitive assessment, 3182
Situation model, 1038, 3100
Situational awareness, 4227
Size compatibility effect, 4075
Size congruity effect, 190
Skill, 3018
Skill acquisition, 84, 198, 260, 4109, 4119, 4121
Skill learning, 162
Sleep, 108, 118, 2090, 3201, 3229, 4191, 5169, 5175, 5185
Sleep and memory, 126
Sleep deprivation, 3214
Sleep-dependent consolidation, 5181
Sleep-dependent memory consolidation, 3151, 5124
Smartphone, 1013, 3207, 4237
Smile judgment, 1137
Social action, 2226
Social anxiety, 1138
Social attention, 5
Social brain network, 3111
Social categorization, 3075
Social circles, 7
Social cognition, 285, 2081, 2226, 3206
Social contagion, 226, 4158
Social evaluation, 285
Social information processing, 292
Social interaction, 5040
Social media, 3066
Social motivation, 3233
Social networks, 1089
Social preferences, 212
Social presence, 298
Social referencing, 1143
Social relationships, 1116
Social sampling, 7
Solution priming, 2015
Song perception, 3140
Sonority, 4057
Sorting, 3088
Sound symbolism, 2119, 2142, 4072
Source, 2204
Source guessing, 2192
Source memory, 177, 266, 2200, 3069, 3188, 4237, 5229
Source monitoring, 2197
Source-constrained recall, 3225
Southern English, 3128
Space, 17
Space perception, 261, 2245, 5013
Spaced retrieval practice, 1061
Space-valence metaphor, 4063
Spacing, 134, 136, 1054
Spatial, 2220, 4049, 4223
Spatial ability, 4104
Spatial attention, 5044
Spatial coding, 2025
Spatial cognition, 61, 162, 166, 2217, 2221, 4101, 4102, 4107, 5013
Spatial configurations, 4108
Spatial cueing, 2037
Spatial hearing, 115
Spatial imagery, 2212, 2219
Spatial indices, 63
Spatial learning, 5049
Spatial memory, 164, 164, 2062, 2218, 4100, 4105, 4106
Spatial representation, 4012, 4097
Spatial training, 2224
Spatial updating, 2216
Spatial visualization, 2211, 2224
Spatial working memory, 4102
Spatially continuous representations, 83
Speech, 316
Speech accommodation, 3138
Speech category learning, 4059
Speech error, 40, 150, 4039, 4043, 4044
Speech fluency, 153
Speech in noise, 3242
Speech intelligibility, 115
Speech memory, 3148
Speech perception, 85, 244, 245, 246, 247, 313, 317, 1229, 3143, 3145, 3147, 3151, 3157, 3158, 3159, 3160, 3162, 3249
Speech processing, 4059
Speech production, 12, 151, 313, 2076, 3129, 3132, 3144, 4034, 4037, 4041, 5082
Speech rate, 3155
Speech reception thresholds, 3153
Speech recognition, 4061
Speech segmentation, 3147, 3155
Speech synthesis, 3139
Speech-in-noise, 2008
Speech-perception-in-noise paradigm, 2120
Speed-accuracy tradeoff, 1239
Spelling, 1159
Spelling sound correspondence, 1157
Spelling-sound mapping, 4051
Spoken language comprehension, 4028
Spoken word recognition, 89, 316, 2158, 3141, 3142, 3150
Spontaneous cognition, 4182, 5076
Spontaneous retrieval, 3212
SSVEP, 5018
Startle, 2024
Startle response, 3241
State-trace analysis, 79, 82, 256, 5238
Statistical inference, 94, 128, 295
Statistical learning, 315, 326, 327, 1161, 2013, 4112, 5021, 5187, 5188, 5191
Statistical power, 5240
Statistical reasoning, 2085, 5115
Statistical reporting, 1240
Statistical summary representations, 3032
Statistics, 5237, 5239, 5243
STEM education, 2174
Stereotype bias, 5058
Stereotype cues, 4027
Stereotype threat, 156, 1171
Stereotypes, 4, 2192, 3075, 3188
Sternberg tasks, 287
Stimulus discrimination, 5116
Stimulus familiarity, 4219
Stimulus potential power, 2244
Stimulus size, 2244
Stimulus-response compatibility, 19, 2017, 2025, 2232
Stimulus-response mapping, 1015
Stop signal paradigm, 278
Stop signal task, 4077, 5061
Storage and processing, 4199
Storage/retrieval measurement, 76
Strategic monitoring, 304
Strategic processes, 5085,
Strategy, 1052, 2091, 3210, 4119, 5128
Strategy selection, 250, 4235
Strategy use, 5031
Stream of consciousness, 231
Strength theory, 1194
Stress, 266, 1170, 3112
Stroop, 90, 2024, 2151, 3005, 3014, 5050, 5055
Stroop interference, 4003, 5071
Stroop task, 1018, 2022, 2043
Structural priming, 3131, 4045
Structure building, 1062
Structure mapping theory, 2087
Study strategies, 4128
Subjective difficulty, 4008
Sub-lexical, 3160
Subsequent search misses, 2146, 5038
Substance abuse, 5236
Successive relearning, 1061
Suggestibility in preschoolers, 1181
Summary statistical representation, 5016
Support theory, 4183
Support vector machine, 2034
Suppression, 97, 98
Surprisal, 4045

Surveillance, 5037
Survey, 1081
Survival, 5194
Survival processing, 177, 3023
Sustained attention, 3010, 3017
Switching, 1205
Syllable-based languages, 3154
Syllabus review, 1065
Symbolic magnitude, 5193
Symbolic versus non-symbolic number, 191
Symmetry, 4222, 5131
Syntactic adaptation, 2135
Syntactic co-activation, 4032
Syntactic constructions, 5160
Syntactic format, 3136
Syntax, 315, 2136, 3137
Systems factorial technology, 229, 2059, 5042

T

Taboo interference, 3123
Taboo words, 3101
Tactile attention, 99
Tactile letter recognition, 2162
Tactile sensitivity, 2236
Talker familiarity, 311
Tangible user interfaces, 4101
Task characteristics, 259
Task difficulty, 5081
Task learning, 5122
Task organization, 2056
Task performance, 4120
Task preparation, 139
Task related cognitive control, 5122
Task representation, 4150
Task selection, 139
Task sets, 1015, 2023
Task Switching, 280, 1005, 4004, 4115, 5054, 5068, 5071
Task-set activation, 4020
Task-unrelated thought, 3039
TBRS, 1205
Technology, 4226, 4234, 4237, 4238
Temoral order judgments, 231
Tempo, 2069
Temporal attention, 4110
Temporal bisection, 2004
Temporal context, 3169, 5226
Temporal distance, 4196
Temporal grouping, 2075
Temporal memory, 5137
Temporal order, 2016, 3170, 4007
Temporal orientation, 1098
Temporal preparation, 3244
Temporal representation, 1230
Temporal structure of events, 179
Test expectancy, 5211
Test format, 2167
Testing, 269, 1054
Testing effect, 237, 267, 268, 1046, 1063, 2164, 2165, 2166, 2170, 2172, 2175, 2176, 2177, 2178, 2179, 2180, 3234, 3235, 4107, 4216, 5210
Testing effects in paired-associate learning, 270
Test-potentiated-learning, 270
Test-taking strategies, 4244
Text analysis, 3125
Text comprehension, 1032, 1033
Text processing, 2149, 3148
The DRM paradigm, 5173
The Hebb repetition effect, 223
The masked priming effect, 3126
Thematic relation, 3081
Theory of mind, 181, 1181, 4096, 5095
Think / No Think, 1190
Think-aloud, 3044
Thinking, 4083
Thought probes, 1011
Threat detection, 5136
Three-character kanji compounds, 2152
Thurstone's case V, 5117
Time, 3243, 4014
Time information, 5190
Time perception, 261, 1230, 1231, 2238, 5015
Time pressure, 284, 2193, 3046
Time-based resource-sharing, 1206
Timing, 245
Tip of the tongue, 3180, 4035, 5080
Tomosynthesis, 5038
Tonality, 85
Tonality-color synesthesia, 2077
Tone, 150
Tone language experience, 246
Tool use, 3022, 4071
Top-down control, 3002
Top-down effect, 2031, 3142
Top-down feedback, 5011
Top-down processes, 5025
Tracking, 3015
Traditional context, 5007
Training, 4200, 4236
Training attention, 4224
Trait anxiety, 3002
Transcranial magnetic stimulation, 46
Transcutaneous vagus nerve stimulation (tVNS), 1017
Transfer, 161, 1049, 2175, 2176, 3024, 3120, 4105, 4141, 4217
Transfer-appropriate processing, 4161
Transitive inference, 2005, 4098
Translation-ambiguity, 2133
Transposed letter effects, 1164
Transposed letter priming, 2150
Transposed radical effects, 2154
Trauma, 4174, 4188
Trial sequence effects, 4076
True/false tests, 2167, 2177
Trust, 1241, 4228
Truth, 323
Truth judgments, 106
Turn-taking, 13
Twitter, 3064
Type 1 diabetes, 5180
Typing, 318, 3124, 5050

U

Unanswerable questions, 178
Uncanny valley, 3031
Uncertainty, 3065, 3113
Unconscious processes, 3036, 3041
Underconfidence with practice, 3199
Unilateral spatial neglect, 2223
Untrained learning, 5122
Updating, 238, 1002, 3173, 4108
Usage frequency, 2149
Utilitarian accessibility, 5107
Utility, 2060, 4155, 5102

V

Valence, 2238, 4031
Valence of cue, 3191
Validation study, 196
Validity effect, 5024
Valuation, 2109
Value-directed encoding, 5075
Value-directed remembering, 2205
Value-driven attention, 2100
Variability, 1031, 1058
Variance discrimination, 3093
Variance estimates, 5239
Variance perception, 1226
Verbal fluency, 3163, 4032, 4038, 4116
Verbal humor, 1072
Verbal memory, 51, 1189
Verbal overshadowing, 4116
Videomediated communication, 4241
Viewing times, 5138
Vigilance, 2048, 3007
Vigilance decrement, 3007
Violent media, 3103
Virtual environments, 2243, 4243
Virtual reality, 2208, 2233, 2240, 4177, 4240, 5004, 5026, 5101
Virtual-hand illusion, 18
Visibility, 233
Vision, 2057, 4209, 5006, 5019
Vision-language interface, 2143
Visospatial working memory, 3017
Visual attention, 309, 1028, 1148, 4071, 5046
Visual attention/spatial cueing, 52
Visual awareness, 234
Visual context, 2128

Visual detection, 3022
Visual illusions, 3003
Visual imagination, 163
Visual long-term memory, 223, 290, 5014, 5225
Visual memory, 2199, 3237, 4170, 4232, 5002
Visual mental imagery, 235
Visual perception, 3106
Visual processing, 4080
Visual reasoning, 228
Visual recognition, 5011
Visual representation, 66
Visual salience, 1109, 5030
Visual search, 95, 185, 186, 187, 2063, 2064, 4065, 5029, 5030, 5031, 5032, 5035, 5036, 5037, 5038, 5039, 5042, 5045, 5047, 5048, 5049
Visual short-term/working memory, 52, 189, 222, 223, 309, 1204, 1208, 1218, 1221, 4207, 4211, 4216, 4219, 4220, 5035
Visual similarity, 1158
Visual space perception, 2208
Visual stability, 5028
Visual statistical learning, 45, 3172, 5190
Visual word recognition, 1149, 1157, 1148, 1165, 1166, 4050, 4051
Visual world paradigm, 1224, 3146, 4029
Visualization, 1051
Visual-spatial working memory, 188
Visuomotor rotation, 2235
Visuospatial, 4198
Visuospatial perspective taking, 2214, 2221
Visuo-spatial working memory, 53
Vividness, 3226
Vocabulary, 3125, 5187
Vocabulary learning, 4048
Vocal affect, 110
Voice onset time, 4246
Voluntary retrieval, 4172
Voluntary task switching, 139
VSWM, 4222

W

Warnings, 1101
Warping, 5004
Wayfinding, 4102
Weapon focus effect, 2026
Weather decision making, 3050
Weather forecast, 3065
Web-delivered assessment, 292
Website, 2173
Within-subject confidence intervals, 33
Word association, 2084
Word frequency, 1165, 2153, 5157
Word learning, 2138, 2160, 4125, 5161
Word length effect, 1028
Word perception, 2145
Word production, 4040
Word reading and recognition, 90, 92, 122, 1156, 1164, 3140
Word segmentation, 2013
Word skipping, 124
Word structure, 2123
Wording learning, 2140, 2141
Word-referent co-occurrence, 2138
Worked examples, 1033, 4093
Working memory, 48, 51, 54, 141, 185, 195, 221, 224, 225, 296, 297, 298, 300, 301, 1008, 1011, 1014, 1019, 1201, 1202, 1203, 1207, 1209, 1210, 1211, 1212, 1213, 1214, 1215, 1217, 1223, 2023, 2055, 2072, 2075, 2121, 3010, 3030, 3096, 3107, 3137, 3157, 4042, 4108, 4123, 4199, 4200, 4201, 4202, 4203, 4204, 4205, 4206, 4208, 4210, 4212, 4213, 4214, 4215, 4218, 4223, 5036, 5058, 5068, 5069, 5090, 5125, 5127, 5139
Working memory capacity, 53, 143, 3006, 3040, 5120, 5128
Working memory span, 2010
Working memory training, 4217
Working memory updating, 4022
Workload capacity, 2059, 5070
Writing, 1114, 3116, 3125
Written revisions, 4137
Wrongful convictions, 4151

X

XOR category structure, 3084

Y

Young and older adults, 4173

Z

Zoonosis, 3080

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