Cognitive Bias in Line-Up Identifications:

The Impact of Administrator Knowledge

Abstract

Prior knowledge of the likely or expected outcome of a forensic investigation has been shown to produce biases in results obtained, reducing objectivity within the forensic sciences. The wide prevalence of such cognitive biases has long been recognised by social psychologists, but its significance is only now gaining appreciation within forensic science communities. It is therefore timely to draw attention to the power of cognitive biases found in a study of the influence of administrator expectations on photographic identifications. Data are presented to show that when a line-up administrator knows the identity and position of a target within a line-up that target is more than twice as likely to be selected compared with when the administrator is kept 'blind'. These findings, taken together with related studies, support the recommendation that all forensic analyses are made 'double-blind'- a method that has proven to be effective at reducing such effects within the social science literature.

Keywords: Cognitive bias; forensic decision making; experimental design; interpretation; experimenter effects

1. Introduction

Whilst the potential for biases and subjectivity effects in forensic science disciplines has been discussed for a number of years [1, 2, 3] only recently has the question of the true objectivity of forensic practices come to the fore [4], largely as a result of the National Academy of Science (NAS) report on Strengthening Forensic Science in the United States [4]. A number of empirical studies have begun to emerge which, between them, demonstrate the range of impacts that practitioners can have on the reliability and consequent validity of evidential evaluations [4, 6]. More specifically, these works have demonstrated that extraneous knowledge of the details of a case can influence the interpretation of evidence pertaining to that case by forensic practitioners [3, 4, 7].

The current paper presents data on administrator influences on eyewitness identification decisions in order to demonstrate the value of blind testing as a means of combating 'cognitive bias' effects [8] produced by practitioner knowledge. Findings emphasise the need for careful consideration of the wide range of factors that may compromise the objectivity at the very heart of the forensic and investigative sciences, and of the ways in which their influence can be controlled or removed.

1. Cognitive Bias

The generality of biasing and subjectivity effects across science-based disciplines has long been observed [9]. Many forms of cognitive bias, relevant and pertinent to a wide and

varied range of experimental contexts, have been observed and discussed within the literature [10].

Social psychologists have made much reference to a particular form of bias, known as the 'Experimenter Expectancy Effect' [11], whereby participant responses or experimental outcomes are influenced by the expectations, desires or beliefs of the experimenter and the subjective biases that these create [12].

As Rosenthal [13] observes, some expectation of the likely results of an experiment or test is virtually a constant in science. Indeed, research is generally conducted with the specific intention of examining and evaluating hypotheses or expectations about the nature of different phenomena or effects.

It is proposed that hypotheses held by the investigator can lead them to unintentionally alter either their behavior towards research participants or their approach towards conducting an experiment/analysis in such a way as to increase the likelihood of obtaining results that confirm their hypotheses or expectations [11]. Rosenthal and Rosnow [14], for example, illustrate how an experimenter's outcome expectations or hopes can become significant determinants of the nature and quality of the data obtained by causing subtle but systematic differences in (a) the treatment of subjects, (b) the selection of cases, (c) observation of data, (d) the recording of data, and (e) systematic errors in the analysis of data.

The power of experimenter expectancy effects has been demonstrated by a large body of research - in studies of human and animal learning, personality and ability, reaction time and psychophysical judgments, person perception, and many other different phenomena. Time and time again it has been shown that experimenters obtain results in line with their

hypotheses or expectations, far more often than could be expected if the null hypothesis were true [13].

Evidence of the universality of this effect, presented by empirical studies numbering in the thousands (as summarised by Rosenthal [13]), is not only unequivocal [15] but is of substantial practical import for a range of science-based disciplines [13].

2. The Pertinence of Cognitive Bias to the Forensic and Investigative Sciences

Experimenter expectancy effects have notable connotations for many branches of the forensic and investigative sciences. For example; there has recently been detailed discussion of likely sources and consequences of biases and subjectivity in the interpretation of investigative evidence [3, 4, 5, 16]. Krane et al. [3] observe that practitioners will often have been exposed to information about a criminal case and/or potential suspect(s) before commencing any form of forensic analysis, creating the opportunity for confirmatory or expectancy biases to occur regardless of the best intentions of the analyst. Indeed, Dror and Hampikian [4] present direct evidence to show that the interpretation of complex DNA mixtures can be biased by a practitioner's knowledge of the extraneous circumstances of the criminal case.

Moreover, the fact that, as Koerner [16] discusses, many forensic techniques (such as the analysis of indentations, finger matching, or fiber comparison) rely upon subjective interpretation, often with no standardized scientific protocol in place, make cognitive bias effects particularly pertinent within the forensic science arena. Indeed, the 2009 NAS report goes into considerable detail on the ways in which cognitive biases may manifest throughout many forensic science disciplines [5].

Valentine et al. [15] discuss in detail how cognitive biases and the expectancy effects they generate, may have pervasive impacts at many stages of the criminal justice process, from police stopping and searching someone 'acting suspiciously' to the parole board assessing the sincerity of a convict's pleas.

One area in which they have been noted to be particularly pertinent is in the administration of investigative line-ups.

3. Cognitive Bias in Investigative Line-Up Administration

1.2.1. The Importance of Eyewitness Identifications within the Criminal Justice System

Eyewitness identifications are used widely throughout the criminal justice system, and constitute one of the most prevalent forms of evidence used throughout investigative and prosecutorial proceedings. To give some idea of the prevalence of their use;

- Eyewitness identifications were found by Phillips and Brown [17] to play a role in around 90% of arrests made at ten police stations across England and Wales (and was the main source of evidence relied upon in sexual offences and offences involving the use of violence against the person the eyewitness testimony of the victim).
- A survey of those involved in Crown Court trials conducted by Zander and Henderson [18] showed that in 25% of contested cases eyewitness identification evidence formed an important element of the prosecution case.
- In 1999, eyewitness identifications directly led to 75,000 prosecutions in the United States [19].

However, there is growing recognition that eyewitnesses are prone to error, and that investigative identifications are immensely sensitive to external influences and biasing effects [20, 21]. Analyses of known cases of wrongful imprisonment have repeatedly shown mistaken eyewitness identification to be a major factor in miscarriages of justice [22].

For example; Huff et al. [23] found that nearly 60% of five hundred proven cases of wrongful conviction involved eyewitness identification errors. Wells et al. [20] analysed forty cases in which convicted individuals were exonerated by DNA evidence, showing that over 90% of these involved eyewitness misidentification. The 'Innocence Project' [24] keeps a running tally of all cases in the U.S. where individuals wrongfully convicted of offences are later exonerated by DNA. At the time of writing, their count was at almost 300; more 75% of these cases involved eyewitness misidentification.

It is likely that the total numbers of wrongful convictions far exceed the estimates provided by such research, given both the widespread use of eyewitness testimony and the limited number of cases in which DNA evidence is available for post-conviction testing (evidence suitable for DNA testing is estimated to be available in, at most, 10% of cases and, even when available, may have been comprised) [24].

Unsurprisingly, given the range of problems that eyewitness errors and misidentifications cause for the criminal justice system, a notable body of research has emerged over the past few decades exploring the factors that impact upon eyewitness accuracy and which may influence the reliability and validity of investigative identification evidence. These fall into two main categories [25];

- Estimator variables; those factors which cannot be controlled by the criminal justice system (for example, the conditions under which the person to be identified was witnessed, or the characteristics or attributions of the witness themselves which may impact upon their identification accuracy).

- System variables; those factors that the criminal justice system can, and should, control for. These relate to how a witness's memory is retrieved and recorded, for example; the way in which line-up procedures are administered.

Of particular relevance to a discussion of impacts of cognitive biases and subjectivity within the forensic and investigative sciences, then, is the question of whether those persons who administer the line-ups from which eyewitnesses identifications are made influence the accuracy and validity of such evidence; if so, then in what ways, and to what extent?

1.2.2. Cognitive Bias and its Relevance to Eyewitness IDs

Given that, within the investigative domain, line-ups are typically administered by individuals involved in the case (frequently investigating officers), with a detailed knowledge of the contextual background to the identification [21], then there is certainly the potential for subjective biases to manifest and impact upon the identifications made [20,21, 26-28]. Indeed, both the 'cognitive bias' effects discussed by Dror and his colleague and the full gamut of experimenter expectancy effects identified within the social psychology literature are perhaps even more pertinent here.

'Informed' administrators, with knowledge of the identity and location of the target within the line-up, may provide cues for witnesses that will increase the likelihood that they will select the target suspect [26], either purposefully or inadvertently communicating to the witness which line-up member is the suspect [28], in line with the administrator's personal hypotheses [20].

Phillips et al. [27] give examples of a range of different types of cues that may be emitted, consisting of both verbal and non-verbal behaviours: In terms of verbal cues; statements like "what about this picture over here?" or "have a careful look at number…", they argue, may direct the focus towards a particular line-up member. Or, by asking a witness to 'take another look and make sure he's the one", an investigator, they propose, may encourage a witness to reconsider (or even reject) their identification decision. Thus, as Clark et al. [26] observe, statements made by the lineup administrator which may seem on their literal surface to be cautionary, helpful, or encouraging, may in fact influence the witness's decision to make rather than not make an identification, and may impact upon the witness's choice as to whom to identify. Nonverbal cues that Phillips et al. [27] identify include various facial gestures (e.g., smiling, frowning, or rolling the eyes) and body movements (e.g., nodding of the head, shaking the head back and forth, folding the arms, or leaning toward or even away from the witness).

The possibility of such 'administrator effects' on eyewitness identifications has obvious and significant implications for their investigative utility and reliability. It is therefore surprising that, despite wide recognition of these effects as a matter of grave concern from both investigative and prosecution standpoints [20, 21], only a handful of empirical studies have explored bias effects on identification accuracy and the conditions under which they are generated [28].

Further, the few attempts that have been made to clarify the nature and extent of administrator influence on line-up identifications have tended to confuse rather than resolve issues by failing to disentangle and isolate such effects from the many factors and processes shown within the extensive literature on memory processes to impact upon identification

decisions [20]. The experimental methods employed have combined various administrative procedures with different levels of stake-holder commitment (e.g. different degrees of administrator-participant contact or varying levels of motivation towards a particular outcome). As a result, levels of administrator influence reported have tended to vary greatly from study to study, with some works reporting very strong bias effects and others reporting none at all. There is therefore, as Schachter et al. [29] discuss, an urgent need for disaggregated studies of administrator bias effects in order to reliably determine their impact on eyewitness identifications.

4. Objectives of the Present Study

- To establish the degree of influence that administrator knowledge has on photographic line-up identification accuracy using a novel experimental paradigm that removes confounding aggregation effects.
- To evaluate the importance value of using double-blind experimental procedures as a safe-guard against administrator cognitive bias effects on identifications made from photographic line-ups.
- To address the need for, and value of, the adoption of double-blind methodologies as standard practice across the investigative and forensic sciences.

Materials and Method

2.1. An Experimental Paradigm for Examining Administrator Bias Effects

Whilst, as Dror [8] observes, the issue of bias and other cognitive influences is of a sensitive nature and presents complex experimental challenges, it is possible to disentangle

fundamental administrator effects from other factors and processes governing eyewitness identification decisions using a carefully controlled experimental paradigm.

Firstly, selection decisions should be kept as simple and pure as possible. Previous studies have typically relied upon a mock-crime paradigm or abstract identification task as the basis for selection decisions. When respondents are drawing from memory in such a way their susceptibility to potential biases will be heavily influenced by the quality and distinctness of that memory. It is therefore possible that administrator influence has been confounded in previous studies by variations in memory processes and the forms of malleability that memory has. An alternative form of selection decision is therefore desirable; one in which the respondent has no memory to use as a basis for making their selection, but in which they believe a reasonable decision is possible and not necessarily random.

Asking people, who have had no contact with the investigation, to pick the likely culprit of the well-known Lockerbie bombing from the actual line-up used in the investigation constitutes such a straightforward decision. Here the possibility that respondents will perceive target selection as arbitrary will be avoided (given that that case is well known, and respondents are therefore likely to have a clear knowledge of the contextual background for the selection that they are making), as will the likelihood of random selection (as the respondent knows that a reasonable judgment is possible – they know that someone was convicted of the bombing). However, the respondent, in this instance, will not be drawing on their own specific memory of an event or target. They are making a relative judgment of likely culpability; a judgment which is, in effect (although not in appearance), arbitrary and therefore more likely to be subject to administrator influence than those that depend upon the quality of the witnesses own memory.

Secondly, experimental conditions should exert minimal pressure on respondents, and no potential motivational influences, such as incentives or rewards (e.g. for a correct

response) should be introduced. Only by limiting stakeholder commitment and reducing experimental demands, with minimal contact between administrator and participants and little vested interest on the part of the administrator, can the basic influence of simple administrator knowledge on eyewitness identification decisions be established.

Finally, in order to reliably determine the nature and degree of bias exerted by administrators it is important to employ a simple and consistent methodological protocol. As such, the present study used target-present line-ups and a simultaneous presentation method (see Greathouse and Kovera [28] for a discussion of the impacts of different forms of line-up construction and presentation method).

2.2. Materials

The actual police photographic line-up administered to a key witness in the investigation into the Lockerbie bombing was used as the stimulus for the identification. This consisted of twelve photographs (one target and eleven foils). The key suspect in the investigation, Abdelbaset Al-Megrahi (who was later convicted of the bombing), featured within this particular line-up in position number 8. The study was carried out before the public debate of Al-Megrahi's appeal and being let out of prison on compassionate grounds.

2.3. Method

Six experimenters each recruited two line-up administrators. They were instructed to inform one of their administrators as to the location and position of the target (Al=Megrahi) within the line-up (administrator 'informed' condition) but not the other (administrator 'blind' condition). Each administrator then asked twenty naïve participants (Total N = 240) if they could identify the person convicted of the Lockerbie bombing from the photographic line-up.

The identifications made by the participants were subsequently compared across the two administrator conditions.

3. Results

The frequencies and percentages of target selection for each of the two conditions are presented below in Table 1

Table 1 about here

The target photo (Al Megrahi) was significantly more likely to be selected when the administrator knew which it was and where it was located in the line-up than when they were kept blind ($p < 0.001$). The target was selected more than twice as often in the 'administrator informed' condition than in the 'administrator blind' condition.

4. Discussion

4.1. The Impact of Administrator Knowledge on Eyewitness Identifications: Evidence for Cognitive Bias Effects?

The fact that the target was selected by participants significantly more frequently when the line-up administration knew the identity and location of the target photograph is argued to be illustrative of a strong biasing effect of administrator knowledge on identifications, in line with the propositions made in section 1.2.2.

Findings show that keeping an administrator 'blind' can prevent the occurrence of such biases; indeed, when the administrator did not know which of the photographs in the line-up was Al Megrahi the target was selected only slightly more often than would be expected on the basis of chance (1 in 12, or 8.33%; the target had a selection rate of 10.83%).

Whilst the present study provides some insight as to the extent to which administrator knowledge may introduce subjective biases into eyewitness identifications, no consideration was given to the many factors and processes that have been suggested within the literature to mediate such effects.

For example, certain contextual experimental characteristics, such as line-up composition (e.g. target-present vs. target absent) or line-up presentation method (e.g. simultaneous vs. sequential exposure), may serve to strengthen or weaken susceptibility to, and resultant degree of, influence [27, 28]. Now that the possibility of a fundamental administrator knowledge effect has been established, further research employing more complex versions of this research paradigm that take into account these various factors are certainly warranted.

Motivation and pressure are also likely to have a strong impact upon the nature and degree of influence that administrators have over eyewitness identification decisions. To reiterate; the effect observed here was a fundamental form of bias distinct from any identification-specific effects of witnesses' actual memories or the police investigation context. It was generated using a relatively neutral experimental paradigm that is not likely to have exerted much external/contextual pressure on either administrators or participants.

Within a real-life investigation, where results have real and potentially huge consequences, the observed effects are perhaps likely to be even stronger. Officers who have invested time and effort in finding a suspect, who are convinced that the suspect is guilty, and who may feel threatened by evidence that their work has led to an erroneous conclusion, might be expected to be more likely to act in ways that may encourage a witness towards a particular outcome, for example; by indicating, through either intentional or inadvertent means, who the suspected line-up member is and who they hope the witness will identify [30]. Moreover, the combination of witness desire to please police, expectation that the police

have arrested the guilty party, and desire to feel safe or to have the guilty party punished are an ideal combination for priming witnesses to choose someone from a line-up [30].

It is therefore suggested that research consider in more detail the potential biasing effects of administrator subjectivity within more realistic and ecologically valid settings, in order to gain a greater understanding of the extent to which it may play a role guiding eyewitnesses towards particular identification selections.

It would also be fruitful for research to explore in more detail the ways in which administrator knowledge manifests in particular vocal behavioural cues, in order to determine the mechanisms through which these cognitive bias effects emerge. This would offer direction for the revision of line-up administration procedures currently in place, enabling recommendations to be made as to how ensure that they are objective, reliable and valid.

4.2: Protecting Against Cognitive Bias: Double-Blind Testing

4.2.1. The Value of Double-Blind Procedures

As Risinger et al. [1] discuss; the simplest, most powerful, and most potentially useful procedure to protect against the distorting effects of unstated assumptions, collateral information, and improper expectations or motivations is blind testing.

There are two forms of blind testing; in a single blind test some (but not all) of the participants are kept unaware of certain information that might lead to biases, either conscious or subconscious (e.g. in the case of line-up identifications the witness *or* the administrator would be kept 'blind' as to the context within which the identification was being made). In double-blind testing all participants (both those being tested and the researcher themselves) are kept blind (e.g. in the case of line up identifications *neither* the witness or the administrator would have any information on the circumstances surrounding

the line-up). Double-blind methods thus provide the most protection against subjective bias influences.

Double-blind methodologies can be easily and effectively implemented in any situation where cognitive biases might possibly influence the validity and reliability of results obtained [20]. They constitute an important research tool for many different research-based disciplines (including, but by no means limited to; psychology and the social sciences, the natural and biological sciences, chemistry and the physical sciences, individual surveying and market research). Indeed, the extensive literature on the prevalence of subjective bias effects in experimental settings have led to an almost universal uptake in some disciplines, such as in medical and pharmaceutical research. In drug-testing, for example, double-blind testing is considered essential [30].

4.2.2. Double-Blind Procedures as a Safe-Guard Against Administrator Effects

As has been discussed throughout this article, eyewitness identifications and the line-up procedures through which they are obtained, are likely to be highly sensitive to administrator bias effects [20, 21, 27-30].

The results provided in section 3 show just how much of an influence administrator knowledge can have on eyewitness identification decisions, even in a neutral experimental context with little at stake. They add to the constantly growing body of research demonstrating the power of administrator expectancy effects in a range of experimental settings using a variety of manipulations [28, 31].

Many have argued vociferously for the universal uptake of double-blind procedures in administering investigative line-ups in order to ameliorate influences subjected on witnesses that may compromise the integrity of identifications made [20, 21, 32-35).

However, despite such campaigns the criminal justice process has yet to wholly embrace the use of double-blind methods. Investigators provide many reasons as to why they are reluctant to adopt such procedures [21, 30, 36, 37], however, as Wells et al. [21] discuss in some detail, these concerns have little merit and can be easily overcome.

Thus whilst some police and law enforcement jurisdictions now use double blind procedures, many (indeed most) do not [22]. In the U.S., where there is no mandatory requirement for double-blind testing it has only been implemented in a handful of jurisdictions: the State of New Jersey; the State of North Carolina; Boston, Massachusetts; Northampton, Massachusetts; Madison, Wisconsin; Hennepin, Minnesota; Ramsey County, Minnesota; and Virginia Beach, Virginia. The state of Wisconsin has promulgated the method as voluntary [24].

In terms of the current situation in the U.K.; the present version of Code D of the Police and Criminal Evidence Act (1984), which came into force in 2008, makes the major provision that persons administrating line-up procedures should not be involved in the investigation of the cases to which those identifications pertain. Although the code of practice does not have statutory force, trial judges who have the discretion to exclude or allow eyewitness identification evidence may employ the code as a means of assessing the likely reliability of a witness's ID. Police forces will consequently often have systems in place to demonstrate compliance with the code and to protect themselves from losing vital evidence from investigations [15].

In summary, then; the fact that there is no mandatory requirement, to our knowledge anywhere in the world, for police and law enforcement agencies to use a double-blind administration procedure when conducting investigative line-ups, coupled with a reluctance

to use such methods which has led to a lack of universal uptake, mean that subjective bias and related administrator effects, and the problems that they pose for the reliability of investigative identification, continue to resonate throughout the system.

4.2.3. The Need For Universal Uptake of Double-Blind Procedures Across the Forensic Sciences

It is has always been that forensic techniques are scientifically and methodologically sound and reliable, and they are often seen as being beyond reproach [24]. The general consensus is that forensically-tested evidence is more objective and more trustworthy than, for example; an eyewitness identification [16].

However, there is a growing realization within the criminal justice domain that many forensic methods and applications lack the rigors of 'real' science [5] and that, as such, they may not be as objective or as reliable as they are generally held to be. Attention is being drawn to the fact that many forensic testing methods are applied with little or no scientific validation, with assessments of their robustness or reliability being inadequate or, more often than not, non-existent [24].

This has the potential to cause serious problems for the forensic sciences, providing considerable ammunition for defence challenges (fuelled by the growing number of miscarriages of justice where inadequacies in the forensic analysis of evidence were shown to have played a key role in securing a faulty conviction).

The benefits of the use of double-blind methods, widely appreciated within the social science literature as the most effective means of reducing biasing subjectivity and expectancy effects, appears to have largely bypassed the forensic science domain. This is not necessarily

the fault of the practitioners; indeed, Sheldrake [38] shows how few of the so-called 'hard sciences' employ double-blind procedures as standard. Moreover, he demonstrates that the values of such methods are rarely taught in science-based disciplines [38]. However, it is clear that things need change if the objectivity at the very heart of the discipline is to be preserved [4].

The mounting body of evidence that cognitive and subjective biases are likely to resonate throughout the forensic and investigative sciences [2, 3, 4, 5] means that practitioners cannot stay 'blind' to the value of blind testing for much longer. For, as Krane et al. [3] observe; the full potential and value of forensic testing will only be realised if cognitive bias and related expectancy and subjectivity effects are minimised throughout the process.

This recommendation is supported by recent US legislation. On the 12th July 2012, just as this article was reaching completion, a bill was filed in both houses of the U.S. congress mandating scientific standards for forensic sciences. The bills are designed to address the wide ranging deficiencies in scientific validation and the lack of oversight of forensic sciences that were highlighted in the 2009 NAS report.

One of the key recommendations made within the report (chapter 6, recommendation 5) is that standard operating procedures be implemented to minimize, to the greatest extent possible, potential bias and sources of human error in forensic practice. These were to include, where feasible, blind-testing.

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