University of HUDDERSFIELD

WAYS OF VIEWING: A COGNITIVE AND NEUROSCIENTIFIC INVESTIGATION AND ANALYSIS OF THEATRE SPECTATORSHIP

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Acknowledgments

Mum & Dad

Thank you

For believing in everything I do

And every journey I take

For following me along the way

Even if it is 220 miles away

Your love, support and guidance

Makes everything seem possible

I love you both endless amounts

Pud.

Callum

You know I cherish you my love

Oh how I cherish you my love.

x x x

To my brother David, family and friends, thank you for always being wonderfully supportive.

Thank you to Eric Hetzler and Tim Moss for everything, you both made my journey at Huddersfield University possible.

Per audacia ad astra

Abstract

The intention of this investigation is to arrive at a greater understanding of spectatorship within the environment of the theatre. This thesis will use recent discoveries in neuroscience to unveil the processing of information in a spectator's brain; in particular the neural processing system for goal related actions. This thesis will use a theory of cognition to investigate how the mind of the spectator works in order to understand theatre and negotiate with the performance. By combining the fields of theatre, cognition and neuroscience, this thesis intends to generate more knowledge of the mental experience of the spectator and the mechanisms that enable spectatorship to occur.

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Introduction

This research investigation intends to arrive at an improved understanding of spectatorship by analysing the conscious and unconscious process of spectating. Through this thesis, I propose a cognitive and neuroscientific view of spectatorship. Using secondary sources from the world of science and theatre, I will create an interdisciplinary discussion from what we already know happens at the theatre, to explore the neural process and mechanism that enables spectatorship to occur. This thesis uses Fauconnier and Turner's theory of conceptual blending to discuss how spectatorship works in the mind; how it is that the audience can understand what is being presented to them and incorporate what is perceived into their own conceptual knowledge and understanding, ready to access as and when they need, so they can "run the blend". This notion of running the blend will be discussed further in the investigation to explain the process of how our human minds perceive and understand the play *The Woman in Black* (2015). This thesis draws upon the neuroscientific discovery of mirror neurons to establish the neural underpinnings of spectator's actions of perception. The neural mechanism enables spectators to experience and mirror the actions and emotions of the actors, allowing the spectator access to the brain of the actor, thus allowing access and understanding of the mind of the actor.

Initially, this thesis intends to contextualise how Western audiences encounter theatre, through their role, positioning and motives. This thesis will explore notions of – and - the neural underpinnings of emotion and consciousness to understand fundamental aspects of spectatorship. By consolidating what we already know about theatre spectatorship and creating a bilateral investigation from a cognitive and neuroscientific stance, we can move towards a clear understanding of spectatorship. I hope this thesis adds to the richness and

complexity of spectatorship and generates an improved insight into how spectators watch theatre and what actually happens during spectatorship.

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An overview of The Woman in Black

This thesis is using the London Fortune Theatre stage adaptation of *The Woman in Black* (2015) as a means to explore spectatorship. This production gives the following synopsis of the play:

> A lawyer obsessed with a curse that he believes has been cast over him and his family by the spectre of a Woman in Black, engages a sceptical young actor to help him tell his terrifying story and exorcise the fear that grips his soul. It all begins innocently enough, but then, as they reach further into his darkest memories, they find themselves caught up in a world of eerie marshes and moaning winds (The Woman in Black, 2015).

This synopsis of the play gives a clear overview of the plot, however, it does not give much information away, understandably, as this would spoil the show for new audiences. In order to create a coherent discussion and analysis, this thesis will provide a more in depth overview of the current production from 22nd July 2015.

Cast

Arthur Kipps – Julian Forsyth

The Actor – Antony Eden

Creative Team

Playwright - Stephen Mallatratt

Author - Susan Hill

Director - Robin Herford

The play begins with Arthur Kipps approaching The Actor with the intention of recounting a ghostly incident that happened to him when he was a young man. The motive for recounting the tale is so that Arthur Kipps will be free from The Woman in Black haunting him. Initially, Arthur Kipps intends to read the tale of the incident to his family and friends, The Actor however, coaxes him to make the story into a play and convinces him to partake in the performance.

It is agreed that Arthur Kipps will multi-role and take the part of several characters in the play within a play, and The Actor will take the part of the young Arthur Kipps. This allows the play within a play conceit to happen without any confusion for the audience, as the men can slip back into the role of their original character without any overlap.

The performance is set out into two worlds. The first world of the performance is the real time part of the play; the men can be identified in their first characters. In this world of the performance, the men can discuss and make reference to the second world of the play. The second world of the play is the rehearsals; they adopt their alternative characters to perform Arthur Kipps' story. The performance fluctuates between the real time world and rehearsal throughout the rest of the play.

To eradicate any confusion as result of the shift between the real time and rehearsal, this thesis will only refer to the men with their identity in the real time of the performance.

The performance is staged on a very basic set, and takes full advantage of the minimal props. The Actor and Arthur Kipps transform the props into many different objects with different purposes, e.g. a wicker basket into a desk, a bed, and a pony and trap. On occasions throughout the performance, there is no physical prop present, however, The Actor and Arthur Kipps use hand gestures and language to animate the imaginary and actual props to make clear how they exist and are being used.

There are several moments in the performance where The Woman in Black appears; The Actor assumes that Arthur Kipps has hired an actor to play the part of The Woman in Black. However, this is actually used as a conceit for The Actor to become cursed with the hauntings.

A description of the performance is as follows; The Actor is a solicitor who has been commissioned to attend the funeral of Mrs. Alice Drablow and visit Eel Marsh House, to gather her papers and settle any outstanding affairs. It becomes palpable to The Actor that Mrs Drablow was not a favourable woman. The Actor has a few encounters with local town folk who want nothing to do with him or his business with Mrs Drablow's affairs. Everyone refuses to accompany him to Eel Marsh House, except one local who knows the timing of the tides of the causeway. The Actor believes he has become cursed, as a woman in black begins to haunt him. The hauntings reach a crescendo and The Actor faints, Arthur Kipps rescues him and takes him home to safety. The Actor advances the time one year and describes walking in the park with his wife and child, and then watching them on a fair ground. The Actor sees The Woman in Black and almost simultaneously his child is thrown from the ride and dies instantly. The rehearsal then switches back to the real time of the performance; the

men congratulate each other on their performances. The Actor is particularly impressed that Arthur Kipps hired an actor to play The Woman in Black, Arthur Kipps and The Actor quiver as they realise the curse is still alive. The lights black out. The performance ends.

This thesis will analyse particular scenes and how they are created by the actors and experienced by the audience in more detail throughout the following chapters to facilitate the investigation into spectatorship.

Thought Experiment

Reader, I ask you please to suspend your disbelief and accompany this thesis on a journey, a thought experiment where the idea spectator exists. This thesis presents an ideal set of circumstances experienced through a model spectator; Elliot Shaw. Elliot is a virtual figure who exists in a virtual environment that this thesis will create. Elliot is a twenty-four year old male; he resides in a modern apartment in the Bermondsey area of London. Elliot recently graduated from University and works as a full time construction manager. Elliot regularly goes to gigs and attends the theatre every three to four months, his interests include, online gaming, sports and music. Elliot is particularly fond of thriller genre; he last saw *Let the Right One In* at The Apollo Theatre in London. Of course, this is all fiction made up entirely for the virtual world of this thesis. Elliot presents the notion of an idealised spectator; we have full access to his body and brain, every internal process and visceral response we can examine and analyse. There are limitations to this notion of the idealised spectator; numerous factors are set pre-performance for the spectator that affect how they interpret and experience the performance e.g. age, culture, knowledge. Each individual spectator's emotional responses will be different. Each spectator's experience is subjective. However, for the purposes of understanding how spectatorship works, Elliot enables this thesis to explore simultaneously the conscious and unconscious mind, and the cognitive processes that facilitate theatrical engagement, through his experience of *The Woman in Black* (2015).

Just off to the left of Covent Garden square and next to a buzzing chain cocktail bar, opposite the glaring neon lights of *Charlie and the Chocolate Factory*, The Fortune

Theatre, is the residing home of *The Woman in Black* (2015). It appears to be on the smaller side of its typical theatre land neighbours, but the intimacy of the small looking venue should add to the ambiance. “A truly nerve shredding experience”, exclaims the glossy billboard above the army of ushers, uniformed in plush red velvet waistcoats armored with shiny gold buttons. Two young men, most likely out of work performers, check tickets and welcome you into the theatre with a grin raised from ear to ear, that begins the eerie night of terror.

Down the stairs, into the basement, through the corridor on the left, the safe haven of the bar. The distinct aroma of red wine rises from different pockets of people. The poison of choice ordered, kindly decanted into a plastic cup, it is served by another eerie uniformed grin. At which point the excitement or nervousness becomes audible in the room, the latter most likely if the reviews are anything to go by. Plastic cups twisting and crunching under the strain of fidgety fingers, it must be coming up to show time. A path snakes through the guzzling crowd as the audience begins to break away and find their allocated seats. Out of the bar foyer, past the stairs on the right, emerge rows and rows of crimson. The stalls face on towards a gloomy mysterious stage, and before the imagination can run away with itself another uniform appears. Accompanied by glossy programs and multi-coloured packets of sweets, the girl asks, “Do you know where your seats are?” And with one eagle eyed sweep has already checked the ticket and planned the best route of entry that ensures minimal disturbances for the other spectators. With the marching orders given, eyes are averted to the floor and flick across the gaudy carpet inspecting each row, reciting the alphabet backwards until they land on row B. Row B seats 11 and 12; both aisle seats so fortunately there are no “excuse mes” or “thank yous”, although the seats further

down are empty so a disturbance is to be expected. Comfortably seated, curiosity and imagination can begin to play. The stage set appears fairly simple; old theatre walls enclosed with decrepit drapes, a protruding wooden panel and a sad looking door breaks through the walls and onto the stage. Stage left there is one wooden stool and chair, in the middle sits a very large closed wicker basket, downstage two metal mop bins. Imagination having run wild, drips and drabs of conversation begin to form a nonsensical narrative. The couple behind is in deep conversation about Daniel Radcliffe and the film version of *The Woman in Black* (2015)*;* they both hope the theatrical performance is just as good. The lights appear to slightly dim, the audience responds with silence, the show is about to begin.

Reader, you are in seat B11 and Elliot is in B12.

The Role of the Spectator

In order to understand spectatorship, we need to understand the role of the spectator in relation to the role of the theatre, in particular Western theatre. Initially, attending the theatre was seen as more of a social event; a place to be seen, rather than a place to watch plays and appreciate the skill of the actors and playwrights, the latter being more in line with current expectations of going to the theatre (McConachie in Zarrilli *et al*, 2010:243). In the 16th and 17th century, being seen at the theatre was a priority; it was a reflection of your social status. Audiences would go to the theatre to display themselves, it was a luxury, a fashion statement, and a chance to mingle with others and exert your power (Victoria and Albert Museum, N.D). As the theatre reflected the social status of the audience, spectators would sit in seats appropriate to their status; those of an elevated class could sit in galleries, or pay to sit on the stage whilst the performance took place (Victoria and Albert Museum, N.D). The theatre was not only a place for the elite; the lower classes could also attend and sit in cheap seats (Victoria and Albert Museum, N.D). The 18th century marked an attitude change towards the reception of the theatre, written material about the plays became more available for the public to engage with and so public admiration for the theatre and actors grew (McConachie in Zarrilli *et al*, 2010:243). In 1762, The Drury Lane Theatre in London banned spectators from sitting on stage alongside the performers; the theatre regained its control as an art form rather than a socialising event (McConachie in Zarrilli *et al*, 2010:243). This thesis will not give an exhaustive overview of Western theatre history, however this thesis agrees with Professor Emeritus Gary Jay Williams who makes the comment that, "Theatre is a transitory art that thrives in the immediacy of the cultural moment that performer and audience share, most especially, it seems, at

times of dynamic cultural change" (Williams in Zarrilli *et al*, 2010:252). The theatre represents and reflects society and culture. As a result of this dynamic, the role and positioning of the spectator has been manipulated within various genres of theatre. However, this thesis only looks to analyse theatre audiences for commercial theatre that is easily accessible by all and not a specific or niche audience.

Professor Bruce McConachie who writes about spectatorship with a cognitive approach states that, "There is no adequate word in English that encompasses all that an audience does on a regular basis at the theatre" (McConachie, 2008:3); how can the role of the spectator be defined when we do not know what each individual spectator is doing at any given moment. McConachie explains that terms often used to implicate audience members are rather loosely defined, terms such as "gazing", "spectating" and "watching" shed little information of the role of the audience member and what it is they actually do. The terms imply a visual perspective and little more, there is no reference to any cognitive processes taking place. Of course, for theatrical engagements to occur, the audience are not simply required to use their eyes to watch, but to see; not simply listen, but hear, the audience have an active role to play. There is an implicit contract that Elliot agreed to engage from the moment he purchased his ticket; he chose to attend the theatre to see *The Woman in Black* (2015), on a specific date and time that he chose, he even chose the seat from which he will watch the performance. Elliot made all these decisions because he actively wants to engage with the performance. However, this active engagement should not disrupt the play unless indicated by the performers, as Susan Bennett comments:

> Spectators are thus trained to be passive in their demonstrated behaviour during a theatrical performance, but to be active in their decoding of the sign systems made available. Performers rely on the active decoding, but passive

> behaviour of the audience so that they can unfold the planned on-stage activity (Bennett, 1997:206).

Theatrical engagement requires cognitive skill including, as McConachie summarises, "attention, memory, empathy, and cultural knowledge" (McConachie, 2008:2). How spectators engage with the concept of theatre is inseparable from how humans navigate the social world. Our human brains are structurally built the same and use the same processes in order to gain knowledge that then feeds their perception. The specificity and context of what we learn and know will be different from individual to individual, but the process of how we learn and create these perceptions are the same. These internalized patterns assist with the automaticity of our responses; our perceptions become how we see and guide the way in which we respond. The theatre is an environment where people go to adopt the role of the audience; they want to be a spectator of a particular show because it is relevant to them in some kind of cultural, social, or political way. Professor Joaquin Fuster of psychiatry and biobehavioral sciences postulates:

> Our capacity to choose between alternatives rests on the dynamic interaction of our brain with the world around us and within us. Whether our choices are guided by preference (freedom *to*) or aversion (freedom *from*), they are immersed in the continuous functional engagement of our nervous system with the internal and external environment (Fuster, 2013: 87).

Fuster emphasises the relationship between the self and the environment, how the environment that we live in affects us and how this consequently impacts the self and the way in which we then choose to interact with the world. The audience place themselves in the role of being a spectator because they have made the choice to actively have this encounter with the theatre and the performance. Ultimately the audience have the power and freedom to be selective with how they encounter and engage with the theatre. Despite adopting the role of the spectator and agreeing to the

implicit contract, once the theatrical engagement has ended the spectator vacates this role, and either allows the performance to affect them, or they leave their affected selves at the theatre.

There are different levels on which audiences can adopt the role of being a spectator; this depends on the style of theatre and the environment in which the performance is taking place. For example, immersive theatre requires audience participation in various forms; actors often interact and converse with spectators to provoke a response from them. The audience may be asked to play a part or accelerate the plot in one way or another. However, as this thesis looks to analyse *The Woman in Black* (2015), it will not give an expansive account of the varied roles spectators experience across different theatre genres.

The Woman in Black (2015) is a conventional realistic play that places the audience in a particular relationship with the production, as outlined above by Bennett – actively decoding but otherwise behaving passively in terms of other interaction with the performance. Elliot enters The Fortune Theatre and takes his seat and becomes a spectator. There is no requirement of him participating in the performance. The only necessary requirement is that he engages with the play and he allows his attention to be focused on the performance, carried away on the journey of the actor's journey through the narrative. To enter into the created temporary world and be receptive to what is offered to him. Now that Elliot has entered the world of the performance, this thesis can analyse the complexity of his role as a spectator, and investigate how this spectatorship occurs.

How and Why Do We Watch Theatre?

Audience members go to the theatre to gratify their personal needs, such as entertainment, information, and enjoyment. Elliot has chosen to watch *The Woman in Black* (2015), because he wants the performance to terrify him, he enjoys the feeling of being scared. Some of the audience may be watching the performance for the same reasons, others may want to see a particular actor perform, individual motives will vary across the entire audience. As the theatre represents and reflects society, going to the theatre is a social and cultural event. The audience have the power to choose what they see at the theatre, and therefore have the power to choose what they want to encounter and be informed of. Spectators position themselves in this way because they want to experience the sense of connectedness that the theatre offers. Spectators go to and engage with theatre because they want to be part of the living situation that manifests (Chaikin, 1972:1), we want the performance to have an effect on us, be it for entertainment, emotional awareness, or social and cultural awareness. We position ourselves as spectators because we want the actors to make this affect or experience happen. David Zinder describes this biological innate connectedness/relationship between the spectator and actor:

> An actor standing absolutely still in front of an audience, not moving a muscle, rendering an expression, nor uttering a sound, yet affecting the spectators to tears or laughter. On the face of it this seems impossible, more a contradiction of theatre than an affirmation. And yet, this "silent" moment is in many ways a very pure, very condensed form of the art. It is, in the language of theatre technique, a profound moment of psychophysical "connectedness," when self and other almost become one…everything that makes up an act of theatre is there: presence, form, […], enigma, and contact. (Zinder, 2009:pp.xi-xii)

Zinder illustrates the sense of presence that the theatre has, how the theatre has this quality where you can't quite put into words how you feel these emotions or impulses

but you know that the performance woke something inside your core and moved you. This encounter happens live in the theatre and occurs to each spectator individually and across the entire audience. Other forms similar to theatre such as television or the cinema cannot truly recreate this kind of encounter, because there is a lack of "the actor-spectator relationship of perceptual, direct, "live" communion" (Grotowski, 2002:19). It is through this live encounter that the spectator can cross a threshold and have this connectedness with the actor.

Anne Bogart describes the theatre as:

> a gym for the soul, the intellect, the imagination, and the emotions. I go to the theatre for a workout, to be active with my entire empathetic and perceptual system…at the end, I want to be glowing, exhausted, exhilarated, and exercised from the experience. I want to be awake and engaged.
> (Bogart: 2007:74)

Bogart encompasses the notion that spectatorship requires engagement of the brain, the mind and the senses, on our human cognitive abilities to perceive and make meaning. The theatre is this active environment where we go because we want to find something in ourselves. We want to be able to feel a sense of connectedness with the actors and the other spectators. Zinder and Bogart both allude to the intrinsic quality of the theatre and the effect it has on the spectator. This sense of pure connectedness which manifests through the liveness of the performance, is the essence of why we go to the theatre, it is at the core of spectatorship (Grotowski, 2002:19). Susan Bennett comments:

> It is, of course, true that live performance has an often uncanny ability to touch those very stories by and through which we understand ourselves. Indeed, part of what makes us a theatre audience is our willingness to engage with performances in ways that speak to the most intimate detail of our experience (Bennett, 1997:vii).

Bennett's belief is that cultural context enables the experience of the performance to take place. Bennett suggests that the connection between the theatrical event and the audience is the cultural significance between them. Therefore, the theatre and everything that happens during the performance is so relevant and personal to the identity of the audience that it makes spectatorship possible (Bennett, 1997:vii). Despite the audience being so crucial to theatre and performance, there is an inadequacy to the understanding of what the spectator actually does. Bennett comments:

> we lack any detailed picture of the theatre audience and, in particular, their role(s) in the production-reception relationship. The extensive criticism of reader-response theorists has not achieved a codification of reading practice, but it has made us more aware of the complexity of the process once considered 'natural'. Similarly the recent energies of theatre semiotics have not resulted in a codification of the elements of theatrical practice, but have established the multiplicity of signifying systems involved and the audience's role of decoding these systems in combination and simultaneously. Neither theories of reading nor theatre semiotics, however, goes far beyond the issues facing an apparently individual subjectivity (Bennett, 1997:86).

Although Bennett's *Theatre Audiences* was first published in 1997, the issue of a coherent decoding system for theatre spectatorship is still underdeveloped. As Bennett states, theories of reading and semiotics are lacking because although the theories highlight and analyse the many possible ways of interpreting text and signs, they do not examine the mental process involved. Fundamentally, the cognitive operations that assist with the way spectators think and the way spectators make perceptions is missing. Professor John Lutterbie writes, "Neuroscience is beginning to confirm, we are not segmented creatures with separate systems for thinking and feeling but one organism that is able to know the world concretely and abstractly" (Lutterbie in McConachie and Hart, 2006:156). Theatrical engagement is possible because of the active processes that occur in a spectators mind and brain. Therefore cognitive

abilities such as consciousness, emotion and perception need to be intertwined with theories of theatre spectatorship to cultivate a broader understanding of the complexity of spectatorship.

Emotion

Across the world men, women and children are divided for many reasons such as; language barriers, culture, society, age, prosperity and countless others, but despite all these differences each of us can be connected to each other through emotion (Damasio, 2000:35). Humans feel this sense of connectedness through emotion, because we can know it, feel it and see it, in others and ourselves. Damasio states, "emotions have become connected to the complex ideas, values, principles, and judgments that only humans can have" (Damasio, 2000:35), but what does emotion mean? Emotion is originally defined in The Oxford English Dictionary, as "an agitation of mind; an excited mental state" (OED, 2015), this 16th century definition has since been updated with a modern interpretation, explaining emotion as "any strong mental or instinctive feeling, as pleasure, grief, hope, fear, etc., deriving esp. from one's circumstances, mood, or relationship with others" (OED, 2015). This definition is accurate of course, but it doesn't elicit a true sense of all that emotion encompasses or explain the biological underpinnings e.g. how the body and brain manifest emotion. Theatre Scholar Peta Tait elaborates on this definition by suggesting that; "emotions include (emotional) feelings and bodily sensations in the present (momentary), which are linked to previously experienced (remembered) voluntary and involuntary patterns of responses and a cognitive system of interpreting these" (Tait in Hurly, 2010:19). This means that we have a kind of emotional history; feelings and emotion arise as a reaction, and the body and brain respond accordingly whether we want it to or not. Once an emotion reaches our conscious awareness, we feel the effects internally on our body and in our minds, however, we can try and mask the emotion so it does not appear externally to others (Damasio, 2000:48), but

"if the psychological and physiological context is right, an emotion will ensue" (Damasio, 2000:48). An involuntary emotional response, such as Elliot screaming in fear, in response to the stage door slamming shut, is difficult to mask because it occurred almost automatically, he can control it after the initial outburst by not continuing to scream, although he may still feel fearful privately in his mind. A voluntary response occurs when The Actor's child is killed, Elliot (our audience member) feels sad and upset internally at this thought, however, in this situation Elliot can control his bodily response not to become teary or cry. Elliot recognises that in the context of the theatre he can be open and receptive to his emotions, but because it is only a performance, he can mask the outward appearance of the emotion, so he doesn't reveal the emotion as he would perhaps under other circumstances. McConachie comments:

> emotions – generally understood by scientists as responsive brain-body systems directed towards people or objects – because emotions are the most relevant index of spectator enjoyment and meaning-making. Good performance situations provide a safe space in which actors and spectators can explore many of their emotional vulnerabilities and needs without embarrassment (McConachie in Shaughnessy, 2013:189).

This kind of emotional engagement that Elliot is experiencing and the feelings that manifest in response to the narrative is welcomed and encouraged at the theater, because the theatre is an efficacious environment, it is considered a place where spectators go because they want to have some kind of emotional encounter. (McConachie in Shaughnessy, 2013:189).

Professor Helen Nicholson illustrates how emotions exist in the theatre:

> Emotions are contagious, they act on the body. Like other infections, emotions are both public and private; they temporarily inhabit the intimate spaces of your body but they also multiply, sometimes wantonly, from one person to another. This means that the theatre is a very good place to spread emotions,

> as actors are intent on them passing on and audiences expect to be infected…Emotions are active and assertive, they demand attention and stir things up (Nicholson, 2013:20).

Nicholson's anthropomorphising of emotion transforms it into a kind of living entity similar to a cold or some other illness; suggesting that emotion takes a hold over the body and manifests itself through the body's interoceptive and exteroceptive awareness. The body and brain begin to experience an emotional state before it reaches our conscious awareness, the autonomic responses of our bodies which we have little or no control over have already begun; our heart begins to race, our temperature may increase or decrease, our eyes become dilated, blood pressure increases. We become aware of our feelings once the biological process has already started, and we have entered into that state and begin to experience a particular emotion. You may become aware that you are feeling breathless; you feel yourself perspire; your eyes have become watery because you are on the verge of crying. Feeling and emotion are separate entities. Damasio suggests that feeling is an internal experience of emotion, we feel the effects in our mind, and Emotion is the external representation. McConachie and Hart elaborate:

> Emotion is the embodied response to an emotionally competent stimulus, while feeling is the conscious awareness of the emotion. Thus, the emotion is a necessary but not sufficient condition for the feeling; that is, an emotion can exist without feeling, but a feeling cannot exist without an emotion (McConachie and Hart, 2006:225).

It is McConachie and Hart's view that we cannot know another persons' feelings and they cannot know ours without the outward public appearance of the emotion. We can detect and make perceptions about the emotions of others by their external representations, and similarly they can detect ours. Damasio concludes this by suggesting the ways in which different aspects of emotion exist, "*a state of emotion*, which can be triggered and executed non-consciously; *a state of feeling*, which can be

represented non-consciously; and a *state of feeling made conscious,* i.e., known to the organism having both emotion and feeling" (Damasio, 2000:37).

Recognising an Emotion

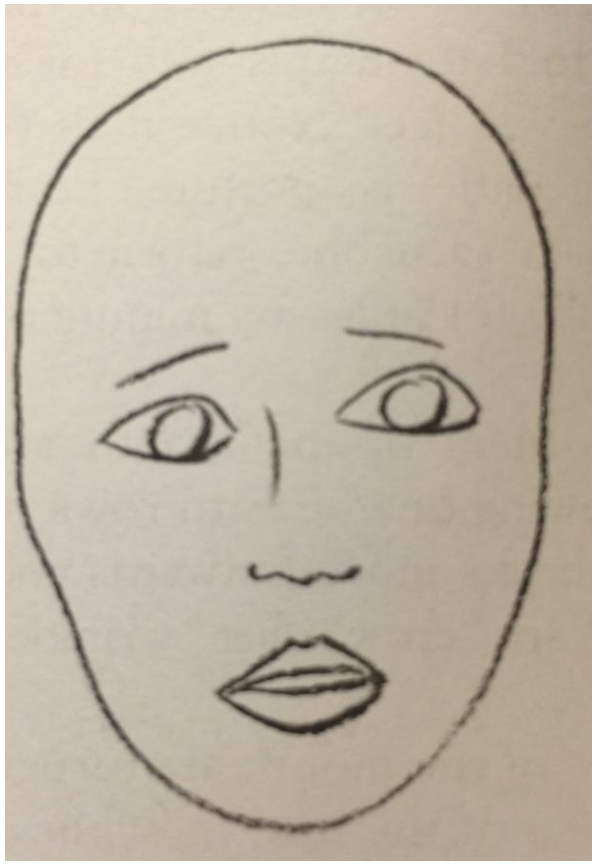
Primary emotions can be identified as; happiness, sadness, anger, fear, disgust and surprise (Kemp, 2012:169). There are also many secondary and social emotions, which stem from and follow on from the primary categories, e.g., delight, remorse, shame, embarrassment, anxiety, pride, to name but a few (Damasio, 2000:51). All primary and secondary emotions require a biological process for the emotional state to manifest. Damasio states:

> Emotions are complicated collections of chemical and neural responses, forming a pattern; all emotions have some kind of regulatory role to play, leading in one way or another to the creation of circumstances advantageous to the organism exhibiting the phenomenon…All emotions use the body as their theatre (internal milieu, visceral, vestibular and musculoskeletal systems)…The collection of these changes constitutes the substrate for the neural patterns which eventually become feelings of emotion (Damasio, 2000:51-52pp).

The audience can decipher the emotional states of the performers because emotions are identifiable through their distinct public appearance, the audience can observe the performers facial expressions, body language and can listen to how they use verbal language to communicate. The actor may genuinely feel the emotion that they are portraying, or the actor may be a highly skilled individual that can replicate the emotion well, or perhaps they can do neither of the aforementioned and are actually quite poor at simulating an emotion. However, actors working in the realms of naturalism or realism ultimately try to replicate the physical manifestations of particular emotions, so the audience can catch them and make perceptions about their

state. For example, the emotion of fear implicates the body's physical state by affecting the breathing rhythms; rapid irregular inhalation and exhalation; the heart rate increases, and the body begins to perspire (Kemp, 2012:16). Kemp portrays the facial expression for fear, stating, "the lips are parted and stretched laterally; the eyebrows are pulled together; the upper eyelids are raised; the lower eyelids tensed" (Kemp, 2012: 170).

Figure 1.



(Kemp, 2012:170)

Figure 1, Demonstrates the muscular arrangement for the emotion fear; the eyebrows, eyelids and the mouth arrangement are indicative of the muscles used (Kemp, 2012:170). As discussed previously.

There are of course many emotions experienced by Elliot and the audience as a whole throughout *The Woman in Black* (2015); however, the emotion of fear emerges regularly during the play. As Elliot watches *The Woman in Black* (2015), there are moments throughout the play where he experiences and feels genuine fear, although he knows that he is watching a performance and it is not real, the emotions that he encounters are real. The automatic responses of the brain mean that the brain does not decipher between what is a performance and what is not, the perceptual systems act automatically. Once this automatic response has manifested and reaches Elliot's conscious awareness, he can then evaluate and mediate his emotional response. Similar to Damasio's notion of the body experiencing the emotion before we are consciously aware, Joseph LeDoux comments that:

> The emotional meaning of a stimulus can begin to be appraised by the brain before the perceptual systems have fully processed the stimulus. It is, indeed, possible for your brain to know that something is good or bad before it knows exactly what it is (LeDoux, 2003:69).

The human brain processes fear through the amygdala structure, which is located in the frontal temporal lobe and is considered part of the limbic system. The amygdala works by constantly processing possible threats from facial expressions; the structure detects patterns in exteroceptive stimuli and passes this information to the central nucleus (Whalen, 2014). The central nucleus will inform the rest of the brain that there is a possible danger or threat and enables the body's relevant reflex and response systems to become active, so it can deal with the external if necessary (Whalen, 2014). If the central nucleus recognises and understands that the stimulus is of no threat, it does not inform the rest of the brain (Whalen, 2014). Dr Paul Whalen has focused his research on investigating the anatomy of the amygdala and the role that the amygdala plays in emotion; he states that:

> Facial expressions mediate a critical portion of our nonverbal communication. From the expressions of others we can glean information about their internal emotional state, their intentions, and/or their reaction to contextual events in our immediate environment…Since a fearful face contains an immense amount of configurable information (e.g., raised brows, wide eyes, slightly open mouth, etc.), it is likely that the amygdala does not compute all this information in such a short time frame. Indeed, the presentation of fearful eye whites using backward masking has been shown to be sufficient to produce amygdala activation (Whalen, 2013:78-79pp).

Backwards masking is a way to test something without it being subjectively reported by the patient, e.g., a test patient is wired to an fMRI machine so their brain activity can be recorded, they are then asked to watch a video and then report what they saw (Whalen, 2014). Whalen used positive faces as a mask to hide the fear faces, so that the fear face was not consciously reportable. This means that Whalen could discover what the patient thought they saw, and what the amygdala actually processed. From this Whalen concluded that the amygdala could detect fear, without us being able to report that we saw a fear face.

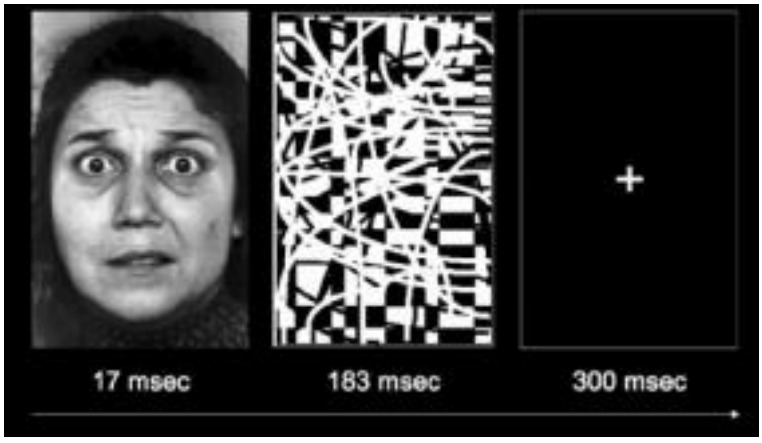
Figure 2.

(Kim *et al*, 2010:364)

Figure 2, demonstrates the amygdala trials using "face-masked fearful trials" (Kim *et al,* 2010:364). The female face shown for 17 milliseconds represents the fearful face, so this is shown to the patient very quickly (Kim *et al,* 2010). The male face shown for 183 milliseconds is the neutral face used to mask the fear face that was shown previously. The third clip shown is blank; this is presented to the patient for 300 milliseconds (Kim *et al,* 2010). This trial uses a neutral human face to mask the human fear face. The patient's brain activity was recorded using fMRI scans to show the activity of the amygdala. The patients were assessed after the trial took place, to examine what they thought they saw, they were asked to describe the faces (Kim *et al,* 2010). The trial concluded that the human neutral face successfully masked the fear face in the patient's subjective awareness (Kim *et al,* 2010). The fMRI data showed activation in the amygdala whilst the fear face was presented, and then whilst the neutral face was shown the activity in the amygdala decreased (Kim *et al,* 2010).

Whalen further tested the amygdala response by creating patterns using contours and meta-contrasting that represent a neutral state, to test how good the amygdala is at detecting fear without the context of human face.

Figure 3.



(Kim *et al,* 2010:364)

Figure 3 demonstrates the "pattern-masked fearful trials" (Kim *et al*, 2010:364). The trials used the same format as the previous trial; however, the second presented clip uses a contour pattern as a neutral stimulant as opposed to the human neutral face. Similar to the previous trial, the patient did not report the fear face of the woman. The fMRI data showed amygdala activity in response to the woman's facial expression. When the contour pattern representing neutral was presented, the data showed a decreased amount of activity (Kim *et al*, 2010). This means that the amygdala can detected fear signals whether masked by neutral faces or a pattern, and that the patient is not subjectively aware of the fearful faces (Kim *et al*, 2010).

This demonstrates how the neural underpinnings of emotion are detected prior to us being aware, and that our bodies can control the commands for emotion to ensue; none of the patients entered into a conscious fearful emotional state. From this research Whalen demonstrates that there are mechanisms in our brain that detect possible emotional triggers without us even being subjectively aware (Whalen, 2014).

Whilst watching the play, the amygdala structure in Elliot's brain is constantly processing all the information available. An old haggard witchy woman has suddenly appeared upstage and leers at The Actor, consequently The Actor yells and points towards her, Arthur Kipps screams "No" and leaps towards The Actor to protect him. Elliot's shoulders jump upwards into his neck and his body jolts backwards into his seat because he was taken aback by the sudden appearance of the old woman. The amygdala couldn't predict this action because it was a surprise, but responds immediately by sending a signal to the central nucleus, and in this instance a fear response was triggered in Elliot, as a way of rapidly protecting him from any possible

danger. Elliot observed both Arthur Kipps and The Actor react to the old woman by expressing the muscular configuration of fear on their faces and took preventative action in response to the old woman; Arthur Kipps leaps to protect The Actor. Elliot's amygdala system detects the appearance of the old woman and processes this information as a possible threat. However, Elliot's amygdala system also detected that others responded to the old woman with fear, so the amygdala system uses this sensory input to guide his response as a means to deal with the threat. Whalen comments that "facial expressions of emotion have predicted important events for us in the past, and we can use this information about previous associated outcomes to respond appropriately to expressions we encounter subsequently" (Whalen, 2013:78:79pp). The amygdala works for the performance exactly the same as it would outside of the theatre. There is no difference in the processing of the information at the neural basis of the emotion. However, at a conscious level the feeling of fear that Elliot feels is only a fleeting emotion because he is aware that he is at the theatre and watching a performance, and he doesn't need to respond as he would under different circumstances e.g. a figure suddenly appearing down a dark alley way on his way home.

At the theatre, spectators can respond individually and also as an integrated audience, and they will experience the same or a similar array of emotions to different extents (McConachie, 2013:68). When the old woman made her sudden appearance on stage, the audience elicited an emotional response as a group, half of the spectators in the auditorium shrieked simultaneously as an immediate response. As a result of this the audience became engulfed in low-leveled subdued laughter. Joyous laughter is expressed through a smiling mouth; the corners are stretched far and wide, the body is

very relaxed, the head is tilted upwards and the eyes are squinted. The laughter of the audience at this moment was of a nervous disposition. Rather than exhibiting a joyous laughter expression, the audience is laughing through their fear faces, so the laugh is strained and releases the feeling of alarm and embarrassment. The initial emotion of fear seeped through the spectators' perceptual systems and manifested to an audible noise, this then infected the rest of the audience, and this then resulted in a new contagious emotional state of nervous laughter. Elliot realises he is also laughing nervously.

Consciousness

Whilst Elliot sits in the audience waiting for the show to begin, he flicks through the glossy programme accompanying the play. Having gazed over the pictures of the actors and previews of the performance, he scrunches and tightens the programme into a tube like shape and taps it on his knee in a rhythmic pattern. Elliot becomes aware that is he fidgeting because he feels apprehensive about the show's scary reputation, and he knows he scares quite easily. Elliot places the programme on the floor and focuses on the stage whilst listening to the surrounding conversations. Elliot begins to listen attentively to a conversation between a man and a woman behind him. Their discussion reflects on the film adaptation of *The Woman in Black* (2015) by James Watkins, their chatter highlights the performance of Daniel Radcliffe, who starred in the film. The woman concludes the conversation with her hope that the play is just as good as the film. Elliot picks up that they are both fond of the adaptation; Elliot has not seen the film but hopes the play exceeds their expectations. Echoes of *Harry Potter* fill the auditorium, Elliot releases a little chuckle and his mouth transforms into a grin, he nods along at the recollection of his favourite book. A group of gaggling girls interrupt this thought as they seat themselves in the row adjacent to his across the aisle. Elliot envisions that they'll scream with terror at some point throughout the play, as will he most likely.

In a matter of minutes Elliot has fluctuated between being aware of his own body state; concerned himself with the attitude and desires of others in his surroundings; reflected on his own thoughts; and made predictions about the future emotional states and actions of others and himself. Elliot is aware of his private and personal feelings; he can also think retrospectively about things and make future predictions. At the

same time he can infer the feelings of others and use this knowledge to make future predictions of action and behaviour on this basis. Elliot, however, does not have access to the private and personal feelings of others, and others cannot access his. This ability is defined as consciousness. The concept of consciousness has become regarded as embodied; the brain and body works together as one rather than as separate entities, and how this whole body interfaces with the external world. Bernard Baars explains embodied consciousness:

> The contents of consciousness include the immediate perceptual world; inner speech and visual imagery; the fleeting present and its fading traces in immediate memory; bodily feelings like pleasure, pain, and excitement; surges of feeling; autobiographical memories as they are recalled; clear and immediate intentions, expectations, and actions; explicit beliefs about oneself and the world; and concepts that are abstract but focal (Baars, 2001 cited in MeCutcheon *et al*, 2013:3).

Antonio Damasio furthers this:

> Consciousness is, in effect, the key to a life examined, for better and for worse, our beginner's permit into knowing all about the hunger, the thirst, the sex, the tears, the laughter, the kicks, the punches, the flow of images we call thought, the feelings, the words, the stories, the beliefs, the music, the poetry, the happiness and the ecstasy. At its simplest and most basic level, consciousness lets us recognize an irresistible urge to stay alive and develop a concern for the self. At its most complex and elaborate level, consciousness helps us develop a concern for other selves and improve the art of life. (Damasio, 2000:5).

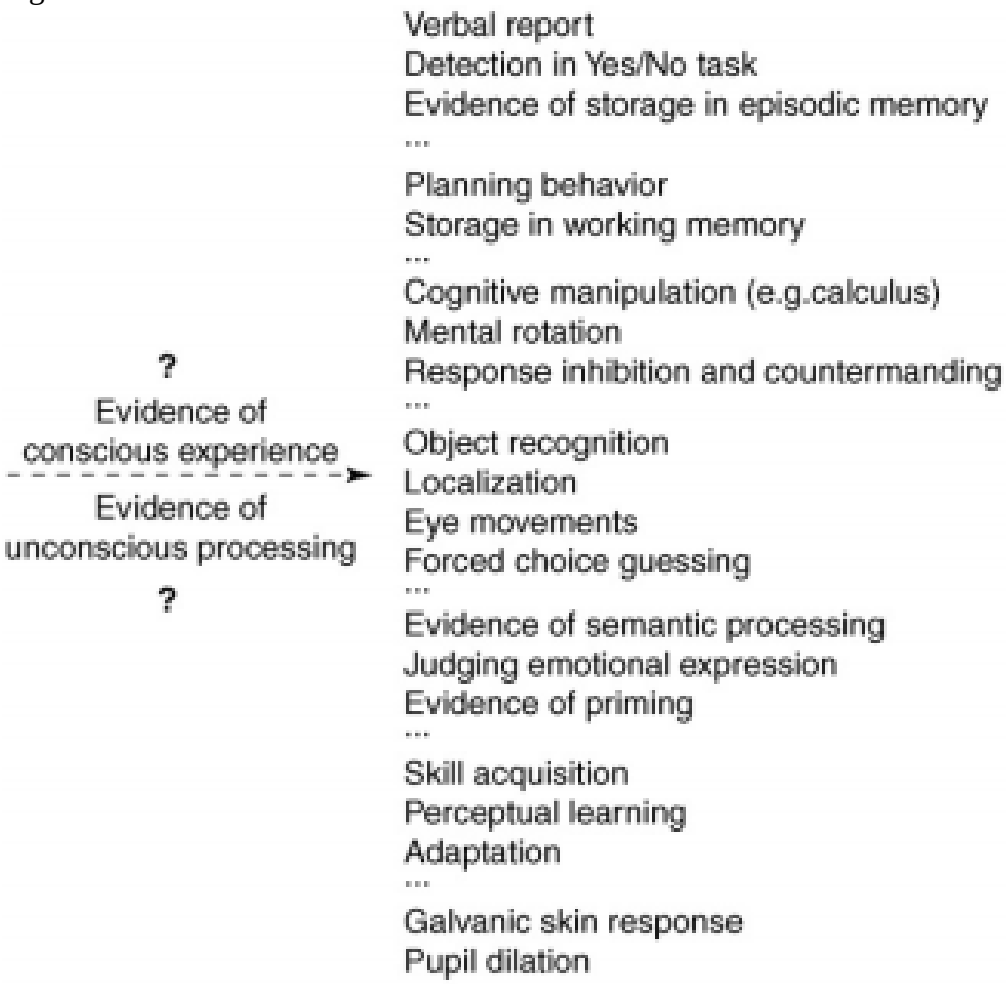
Damasio suggests that consciousness enables us to learn and gain knowledge about our surroundings and ourselves; we can identify between the self and others and understand that they are separate entities (Damasio, 2000). Many studies highlight that due to the nature of consciousness there must be various states of consciousness, this has been suggested because of the many forms of subjective experience and subjective feelings; including subconscious feelings that we are not aware of (McCutcheon, 2013). Damasio conceptualises consciousness into two brackets, core consciousness and extended consciousness. Damasio defined the former as primary

and simple, relating only to the individual; core consciousness provides one with knowledge about the self in the moment, the here and now (McConachie and Hart, 2006). Core consciousness is exhibited through Elliot's "instinctual movement and voluntary responses" (Lutterbie in McConachie and Hart, 2006:158). For example, if Elliot were to scream and jolt backwards in fear because of the performance, he responds with an immediate impulse that has not been filtered and controlled and does not require much conscious awareness. However, Elliot is aware of his own body and how he feels. The latter involves more complex notions, developing the sense of self into forming an identity. Extended consciousness can alternate between different modes of time, the "lived past and of the anticipated future" (Damasio cited in McConachie and Hart, 2006:158), as well as the present. It is more advanced than core consciousness, and has been linked to functions such as language and long-term memory; extended consciousness allows human creativity to flourish (Damasio, 2005). Extended consciousness is exhibited through Elliott's ability to go to the theatre and enjoy the thriller genre; he understands that what he is watching is not real and so he enjoys the fear feelings that manifest, rather than entering a full on fearful emotional state he enters a kind of theatrical fearfulness. Elliot is also aware that other's experience and feelings of the performance of *The Woman in Black* (2015) will differ from his, but they will be able to engage in conversation and discuss their subjective views.

Conscious experience is our awareness of something we have perceived; prior to this awareness, unconscious processes occur in order for us to be able to report evidence of consciousness (Lamme, 2006). In figure 4, Victor A.F. Lamme has composed a list detailing evidence of unconscious processing in response to a visual stimulus, and

also evidence of the conscious experience. Lamme has set up a comparison between the neural perceptions of a stimulus, this is when our signal receptors first detects an input, and how this then reaches our awareness and we can actually report a percept (Lamme, 2006).

Figure 4.

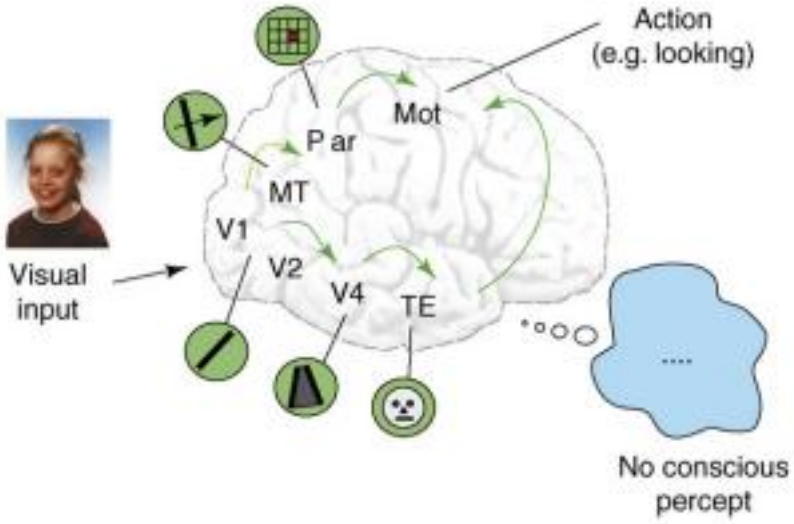


(Lamme, 2006:497).

In Figure 4, the top half of the list suggests factors, which are considered as evidence for our conscious awareness of a stimulus. The lower half of the list, from the dotted line and arrow, depicts a comprehensive suggestion of processes that occur during the processing of a visual stimulus, prior to knowledge of the stimulus reaching our consciousness (Lamme, 2006). Lamme depicts the process of a visual stimulus being accepted at a neural level and then at an experiential level, he says:

> When a new image hits the retina, it is processed through successive levels of visual cortex, by means of feedforward connections, working at an astonishing speed. Each level takes only 10ms of processing, so that in about 100-150ms the whole brain 'knows' about the new image before our eyes, and potential motor responses are prepared. From the very first action potentials that are fired, neurons exhibit complex tuning properties such as selectivity for motion, depth, colour or shape, and even respond selectively to faces. Thus, the *feedforward sweep* enables a rapid extraction of complex and meaningful features from the visual scene, and lays down potential motor responses to act on the incoming information (Lamme, 2006:495-497pp).

Figure 5.

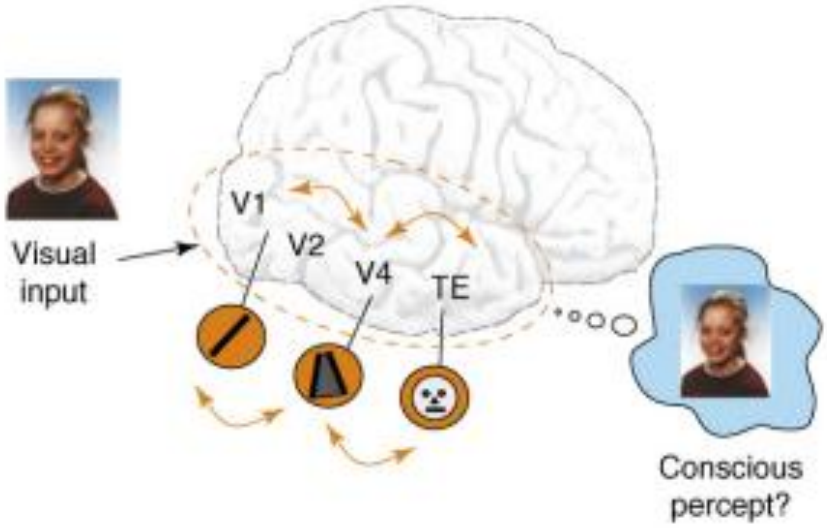


(Lamme, 2006:497).

Figure 5 presents a visual diagram of the feedforward sweep, as described in the previous paragraph by Lamme. Feedforward sweep is a process where information about the visual input is passed around the brain to evoke possible responses (Lamme, 2006). Feedforward sweep is entirely an unconscious process, Elliot would not be aware of the information being extracted by the visual input, and would therefore not consciously respond (Lamme, 2006).

The next stages of the process facilitate the visual stimulus to reach Elliot's conscious. Firstly, recurrent processing breaks down all the visual components of the stimulus and sends this information to areas of the brain that deal with visual sensory perceptions (Lamme, 2006). Secondly, the information is then passed around further areas of the brain, for example the frontoparietal network, which brings the stimulus to Elliot's attention, the stimulus becomes reportable (Lamme, 2006).

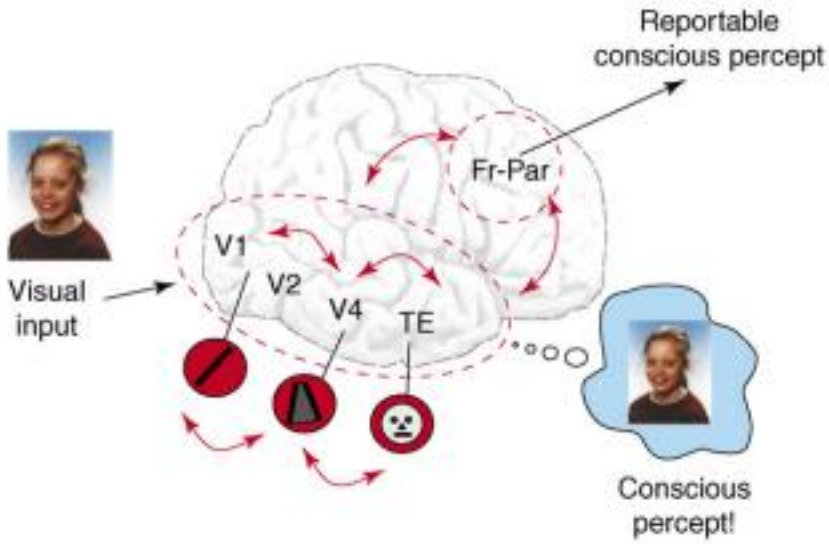
Figure 6.



(Lamme, 2006:497).

Figure 6, demonstrates the visual components of the stimulus being passed around the visual areas, Lamme describes this as the "Localized recurrent processing" (Lamme, 2006:497).

Figure 7.



(Lamme, 2006:497).

Figure 7, demonstrates the recurrent processing, expanding the communication of the visual stimulus to other areas, and from this a conscious perception is formed (Lamme, 2006).

Lamme provides a partial explanation for how a visual stimulus reaches our consciousness; Lamme's view is that recurrent processing is the key ingredient that enables conscious experience (Lamme, 2006). Lamme's explanation of consciousness can be examined through Elliot's conscious awareness of the emotional state of fear, which he frequently enters into through the theatrical event. Evidence of the unconscious processing of fear can be demonstrated through the amygdala system. The Actor is in a fearful emotion state as a response to seeing a ghostly figure. Elliot's amygdala detects and processes the eye whites of The Actor; his eyes are enlarged showing an increased amount of eye whites. Elliot's amygdala detects that another, who is like me, has responded to a stimulus with a fearful face, therefore I should

respond with fear? This process is entirely unconscious to Elliot. The amygdala carries the localized recurrent processing of the visual input, evaluating the eye whites and passes this information of the fear face to other areas of the brain, to work out what the perceived is and what response is needed. Through this cognitive process Elliot enters into a conscious state of fear. The brain uses the initial eye white input to elicit a response in Elliot. The neural pattern of fear manifests through Elliot's own facial expressions; his eyes also become enlarged similar to The Actors, this enables him a wide sight of vision to detect any possible threats of danger. Elliot physically jerks his body backwards into his seat as though he were moving out of dangers way. Moreover, Elliot is aware of the fearfulness he feels as a result of the recurrent processing of the amygdala.

There are many theories surrounding the phenomenon that is consciousness. Neuroscience has located no specific area of the brain that enables conscious thought to occur. However, neuroscientists are currently moving more towards the idea that consciousness occurs through communication between networks of areas in the brain. This means that the neural underpinnings of consciousness rely on other cognitive abilities in order to define the phenomenon. In the theatre, consciousness is seen as an innate physic quality that allows spectators to engage with the self and others. Consciousness allows Elliot to place himself in the role of the spectator, enables him to encounter the theatre and think abstractly about the performance.

Conceptual Blending

In a previous chapter titled "Thought Experiment", this thesis discussed a conversation overheard by Elliot prior to the start of the play. The conversation took place between a male and female spectator; the discussion revolved around the actor Daniel Radcliffe. The spectators recalled the film adaptation of *The Woman in Black* (2015) and considered Daniel Radcliffe's performance in the blockbuster. They discussed the Hollywood film in relation to the West End stage adaptation that had yet to commence, they both conferred that they would like the theatre actors to outdo Daniel Radcliffe's skilful performance. The conversation progressed into Daniel Radcliffe's performance as Harry Potter in the Harry Potter film series. In this discussion the spectators are using counterpart connections of Daniel Radcliffe e.g. role and matching them to separate inputs e.g. different films, to create a blend of information. From this emerges a concept of Daniel Radcliffe involving all of the inputs (Fauconnier and Turner, 2002:46-47pp). This process is called conceptual blending, but it also commonly referred to as conceptual integration. Simply put, conceptual blending connects different concepts of knowledge by finding a shared element, and then maps the shared element to each separate input in order to create an emergent structure that integrates them into one blend. Conceptual blending is an internal cognitive process, and through this ubiquitous mechanism manifests conscious conceptual meaning. In Fauconnier and Turner's, *The Way We Think*, the theory conceptual blending is presented as fundamental across a spectrum, from the most basic human everyday meaning making through to our most imaginative creations, Fauconnier and Turner assert:

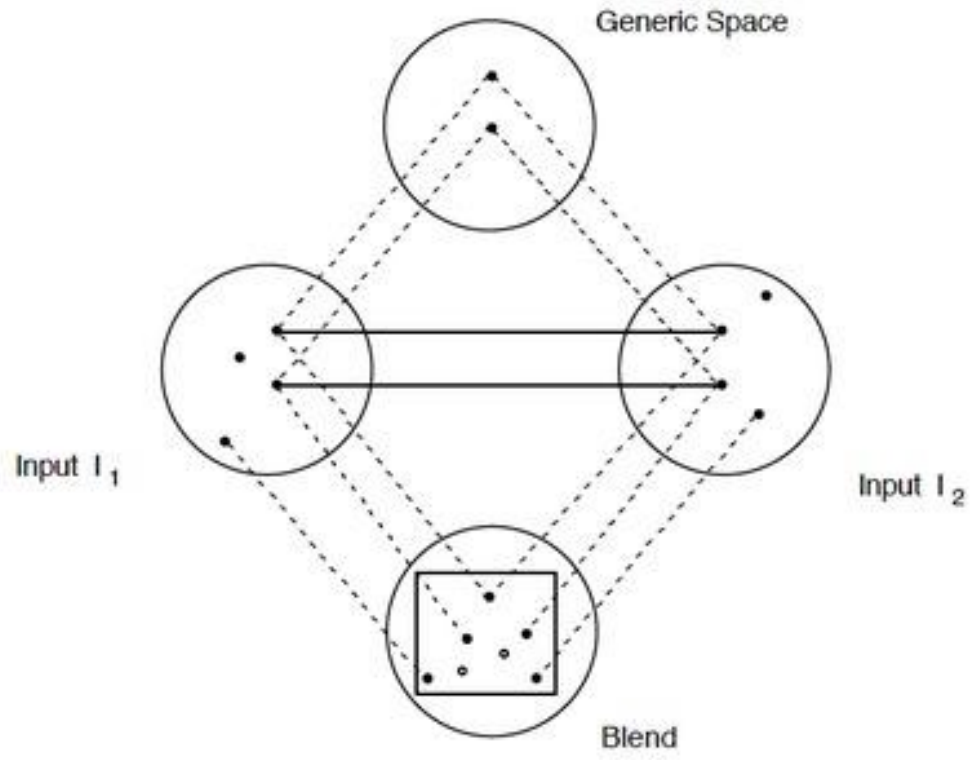
> Conceptual blending operates largely behind the scenes. We are not consciously aware of its hidden complexities, any more than we are consciously aware of the complexities of perception involved in, for example, seeing a blue cup. Almost invisible to consciousness, conceptual blending choreographs vast networks of conceptual meaning, yielding cognitive products that, at the conscious level, appear simple. The way we think is not the way we think we think. Everyday thought seems straightforward, but even our simplest thinking is astonishingly complex (Fauconnier and Turner, 2002:V).

Crucial for the human mind to make meaning, Fauconnier and Turner posit that within our knowledge structure we have mental spaces, which are:

> small conceptual packets structured as we think and talk, for purposes of local understanding and action…Mental spaces are very partial…They are interconnected, and can be modified as thought and discourse unfold. (…) [They] can be used generally to model dynamic mappings in thought and language (Fauconnier and Turner, 2002:40).

We incorporate selective information that is common amongst the inputs to create a new blend that binds all the information we need, so it is readily accessible. The knowledge counterparts could be "connections between frames and roles in frames, connections of identity or transformation or representation, analogical connections, metaphoric connections, and, more generally, "vital relations" mappings" (Fauconnier and Turner, 2002:46-47pp). Fauconnier and Turner have formulated a basic diagram to illustrate the connections in the process in the way we think.

Figure 8.



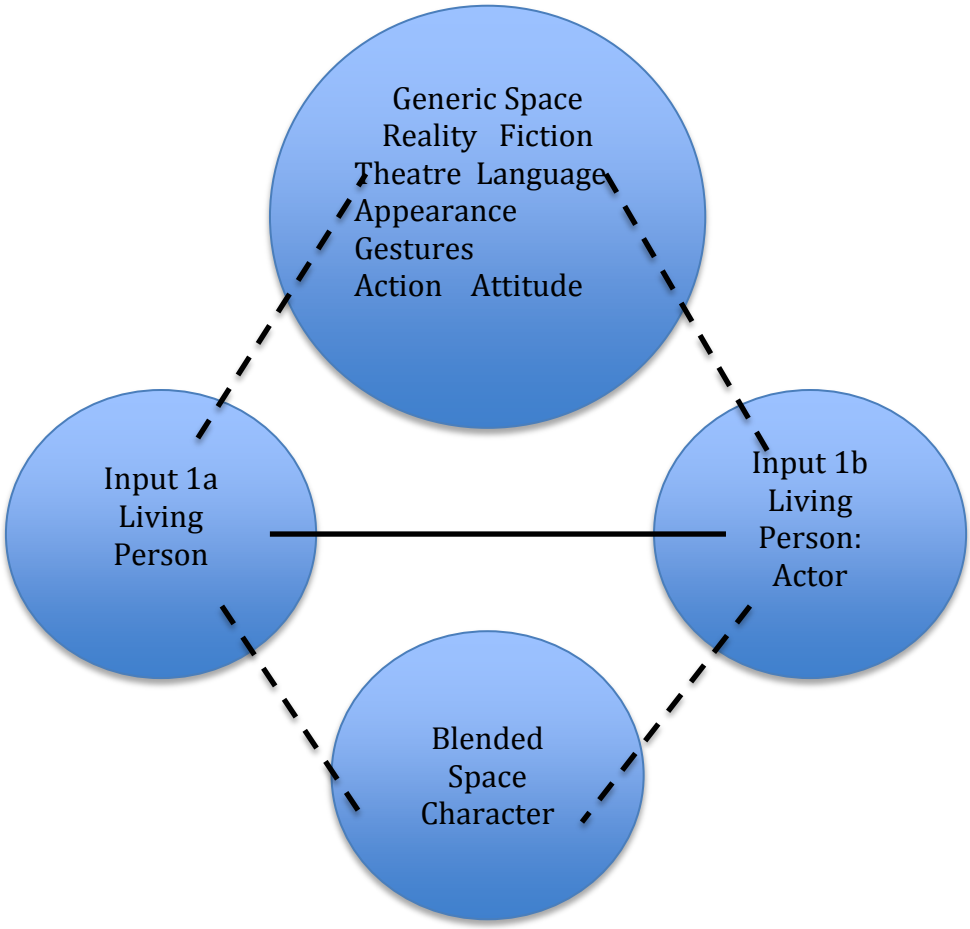
(Fauconnier and Turner, 2002:46)

In figure 8, there are four circles, which represent different mental spaces; two circles represent the initial inputs. There is one generic mental space where commonalities are found between the two inputs. Fauconnier and Turner use the lines in the diagram to show possible conceptual links, the unbroken lines between the two inputs are knowledge counterpart connections that have been matched e.g., identity (Fauconnier and Turner, 2002:46-48pp). The dotted lines demonstrate conceptual projections mapped from different aspects of the inputs; the projections are selected to expand the structure of the already existing inputs to create a new conceptual blend (Fauconnier and Turner, 2002:46-48pp).

For a theatre audience, an immediate conceptual blend is that of the actor-character scenario, when a spectator goes to the theatre they are aware that they are watching a performance; actors play the characters on stage. Elliot is aware that Arthur Kipps and The Actor are both characters played by actors and that beyond the theatre; the actors have separate identities as Julian Forsyth and Antony Eden. This knowledge is the product of a blend; Elliot unconsciously uses the input of one framework of knowledge, the first being the character on stage with specific traits, dialect and costume. Elliot perceives Arthur Kipps as an old man from London, and middle class. Elliot then maps this to the second input, the actor playing the character has a separate identity from this particular role and as soon as they step off stage they will resume their habitual identity, which is unknown to Elliot. The mapping of the inputs creates a new blend; Elliot becomes consciously aware that the actor exists as two separate identities and simultaneously as one. Fauconnier and Turner state:

> Dramatic performances are deliberate blends of a living person with an identity. They give us a living person in one input and a different person, an actor in another. The person on stage is a blend of these two. The character portrayed may be entirely fictional, but there is still a space, a fictional one, in which that person is alive. In the blend, the person sounds and moves like the actor and is where the actor is, but the actor in her performance tries to accept projections from the character portrayed, and so modifies her language, appearance, dress, attitudes, and gestures. For the spectator, the perceived living, moving, and speaking body is a supreme material anchor. […] In principle, actors are linked to characters by virtue of performing in the real world actions that share physical properties with actions performed by the characters in the represented world. […] While we perceive a single scene, we are simultaneously aware of the actor moving and talking on stage in front of an audience, and of the corresponding character moving and talking within the represented story world (Fauconnier and Turner, 2002: 266).

Figure 9.



(Fauconnier and Turner, 2002:266-267pp)

Figure 9, demonstrates actor character conceptual blend using Fauconnier and Turners diagram.

In *The Woman in Black* (2015), Arthur Kipps actually assumes the identity of many roles throughout the performance. With each character that Arthur Kipps plays, he adopts various accents such as cockney and Yorkshire; he modifies his costume using scarves, coats and hats, and adjusts his hairstyle. Arthur Kipps makes each character visibly and audibly distinct from each other, as to make them clearly identifiable. This means that there are more layers of blends for Elliot to understand. Julian Forsyth is an actor who plays the character; Arthur Kipps; Arthur Kipps plays the character Mr Samuel Daily; Arthur Kipps also plays the character Mr Horatio Jerome; Arthur

Kipps also plays the character Keckwick. There are many blends in this sequence for Elliot to comprehend, Elliot has used the input of each separate character to create a blend that works and exists for him, so he can call upon that blend without hesitation when Arthur Kipps seamlessly switches between each of these characters and suddenly appears on stage as a different character from when he exited the stage. These conceptual blends are constructed through the framework of the performance, and once the performance has ended the temporary representational structure that had been blended to perceive the inputs emerges as its own structure (Grady, Oakley and Coulson, 1999). The blend that emerges is then readily available for Elliot to access when he needs to, so each time that he discusses this performance he will have the relevant conceptual knowledge to run the blend. Of course the specific blend information related to each theatre show will vary but the concept of creating and running the blend remains the same. Learned blends are articulated in the unconscious mind, Fauconnier and Turner postulate:

> It might seem strange that the systematicity and intricacy of some of our most basic and common mental abilities could go unrecognized for so long […] it may be part of the evolutionary adaptiveness of these mechanisms that they should be invisible to consciousness, just as backstage labor involved in putting on a play works best if it is unnoticed. Whatever the reason, we ignore these common operations in everyday life […] Even after training, the mind seems to have only feeble abilities to represent to itself consciously what the unconscious mind does easily (Fauconnier and Turner, 2002:18).

Fauconnier and Turner are referring to the "many different aspects of human life" (Fauconnier and Turner, 2002:18) where conceptual blending manifests perception. The theatre can almost be seen as ontologically different, because the theatre is an environment where blends are made to happen by the actors, directors and playwrights, and the spectators are positioned to encounter the blends. Rhonda Blair states that:

> Blending is a fundamental part of the actor's and director's manipulation of language and imagery in order to engage the material on which they're working in as fully felt and specific a way as possible. Living and playing "in the blend" is at the root of originality and creativity (Blair, 2009:94)

Moreover, Fauconnier and Turner ascertain that conceptual blending is how we operate and function in the world, not just in the theatre. Fauconnier and Turner state that once "we construe the physical, mental and social worlds we live in by the virtue of the integrations we achieve through biology and culture. There is no other way for us to apprehend the world" (Fauconnier and Turner, 2008:390). Fauconnier and Turner describing this as "living in the blend" (Fauconnier and Turner, 2008:390); once we have blended something and have integrated it into our knowledge, it will be virtually impossible to not see the blend. For example, as you read from this thesis, you can see the symbols on the page as coordinated words from the English language, from which you construct sentences and in turn enable me to communicate to you. As adults we have mastered this ability to run the blend without struggle but for a pre-school infant these symbols would have no meaning or seeable function, but the plasticity of the child's brain means that in their developmental years they too will integrate our complex coordinated cultural blends, so they too will be able to "live in the blend" (Fauconnier and Turner, 2008:389-396pp). A child will build the essential tools to "live in the blend" through imitation and mimicry, parents repeat words for their children to mimic to encourage the use of language. This activity enables the child to communicate and learn words without knowing their useful and proper meaning. As the child develops the brain is mapping and developing a coherent network that is necessary for the child to understand the rules and structure of our culture and language (Fauconnier and Turner, 208:389-396pp).

As Blair previously stated, directors and actors manipulate the audience with the intention to evoke particular emotions and memories and lead the response of the audience. Generally the audience will have a synchronic understanding of the performance, and yet each spectator has the freedom and possibility to choose between an infinite amount of memories and emotional responses. Fuster uses this brilliantly simple phrase "cells that fire together wire together" (Fuster, 2009:15); this means that any piece of knowledge or memory that we retain is intertwined with "sensory, motor, or emotional events experienced at, or nearly at the same time" (Fuster, 2009:15). Fuster goes on to say "as a result of that temporal coincidence or near coincidence, those events are associated with one or another by the strengthening of the contacts (synapses) between the cell assemblies or nets that represent them" (Fuster, 2009:15). Each spectator has isomorphic common knowledge but there is variance in each spectator's individual neuronal combinations (Fuster, 2009:15), the spectator uses input 1a, the living person, as a vessel to project aspects of themselves or concepts personal to them. These projections will then meet with the actors and directors created concept in the generic mental space to create a blended character that exists privately for each spectator, and across the audience for the performance.

Professor Bruce McConachie gives insight to the dynamic of conceptual blending and suggests how spectators multitask between numerous observations and place their attention in many different aspects of the performance at any possible time. McConachie writes:

> While watching *Hamlet,* spectators are implicitly invited to consider the skills of the actors playing the protagonist and the excellence of Shakespeare's poetic verse, in addition to blending both together to create a specific version of skillful actor/Shakespearean Hamlet. This means that spectators can move

> among at least three modes of attention while listening to the 'To be or not to be' soliloquy (McConachie, 2013: 53).

McConachie furthers the spectator's ability to multitask by suggesting that spectating "involves conscious shifts in attention, empathy, emotions, narrative, theatrical conventions, memory, and cultural networks" (McConachie, 2013: 54). McConachie suggests eight different oscillations within a two-minute time frame. These include:

> mentally step back from the immediate situation on stage to compare this particular actor's Hamlet with Kenneth Branagh's performance in the same scene […] take a moment to cross your legs […] wonder at the shift in lightning that allowed the actor playing the ghost to appear suddenly on stage without anyone seeing his entrance […] try to refocus your attention onto the stage after a spectator sitting behind you suddenly sneezes" (McConachie, 2013: 54).

McConachie demonstrates that the spectator integrates many different shifts whilst being an audience. Elliot undergoes his own oscillations throughout the entire performance, partly of his own accord and partly due to other spectators. At the beginning of the performance, Elliot is rather interested in the costume of The Actor, observing that he has a watch on his left wrist; Elliot ponders whether it actually works. As The Actors sleeves are half rolled up, Elliot can see that he has veiny hands and arms, Elliot contemplates that The Actor has a good physique and must work out. Elliot also contemplates how performing in *The Woman in Black* (2015) must be a good consistent job for an actor. Elliot focuses his attention back to the performance just as Arthur Kipps has agreed to perform his story. Fifteen minutes into the performance a family of late comers arrive, Elliot hears them shuffle down the aisle towards him, realising there are empty seats to his left, he awkwardly clutches his knees into his chest so the theatre chair slightly tilts and the tardy family can pass him. The spectator in seat B11, next to Elliot, sighs loudly and scowls as they

scramble past. Once everyone is settled, Elliot's attention is occasionally jolted by his fellow screaming spectators, although he rather enjoys the extra scare. Each spectator's experience of the performance will vary, and so each spectator will have manifested individual blends personal to him or her throughout the performance, depending on their experience of the theatre. Fauconnier and Turner state that "What the real binding allows a real brain to do is apply the general schema behind the logical formula to particular things and individuals to keep track of when they count as the same and when they count as different (Fauconnier and Turner, 2002:12). Moreover, conceptual blending is a model of how the mind works and how humans construct meaning from the world around them.

In Western theatre, the audience are propelled to "live in the blend", a spectator is not a passive voyeur but rather they have an active role within the experience of the performance. The audience are present; as Grotowski postulates theatre cannot exist without an audience "It cannot exist without the actor-spectator relationship of perceptual, direct, "live" communion. […] At least one spectator is needed to make it a performance" (Grotowski, 2002:19-32). This sole communion is the basic element that must exist for theatre; all other elements are superfluous (Grotowski, 2002:19). Grotowski continues, "Since our theatre consists only of actors and audience, we make special demands on both parties. Even though we cannot educate the audience - not systematically, at least - we can educate the actor" (Grotowski, 2002:33). The actors are vessels for the spectator to perceive, imagine, empathize, engage with and respond to; conceptual blending is manifested, in this form through the actors, and enables the spectator to be imaginatively open and receptive with themselves and to the world of the performance, to everything that is offered to them. The actors

themselves have to conceptually blend and create their character so it works for the performance. This character would have been manifested by selecting and combining different pockets of knowledge and imagined projections to build a version of the character, that the audience can engage with and can further the initial blend presented to them in the performance. Elliot has the possibility to imagine and create infinite amounts of blends whilst watching Arthur Kipps and The Actor in *The Woman in Black* (2015), as do the other spectators, conceptual blending does not provide definite perceptions, rather as Cook comments:

> The network of spaces prompted in a given situation is more powerful as a process in a flux, a series of variables, than simply a final blend. Almost by design, a complete description of the spaces within a network built by a blend is impossible, since there are an infinite number of possible associated spaces. The value of applying blending theory to a text or performance does not lie in its taxonomic abilities, but rather in how it maps the likely spaces and uncovers connections not immediately apparent though maintaining power even in dormancy (Cook, 2007:584).

Conceptual blending confirms that Elliot and the other spectators have an active role to play and become part of the living situation of the performance (Chaikin, 1972:1). Elliot gives nuances of himself to the characters on stage, and these nuances that emerge and manifest are the real crux of spectatorship. The audience take on a huge role in the performance by accepting, projecting and creating blends because this is how the performance comes alive. If Elliot could not accept and understand the simple blend of the actor character scenario, he would not be able to comprehend anything further in the performance, and would therefore not be able to adopt the role of the spectator. Conceptual blending facilitates the unconscious and invisible process of constructing meaning.

Mirror Neurons

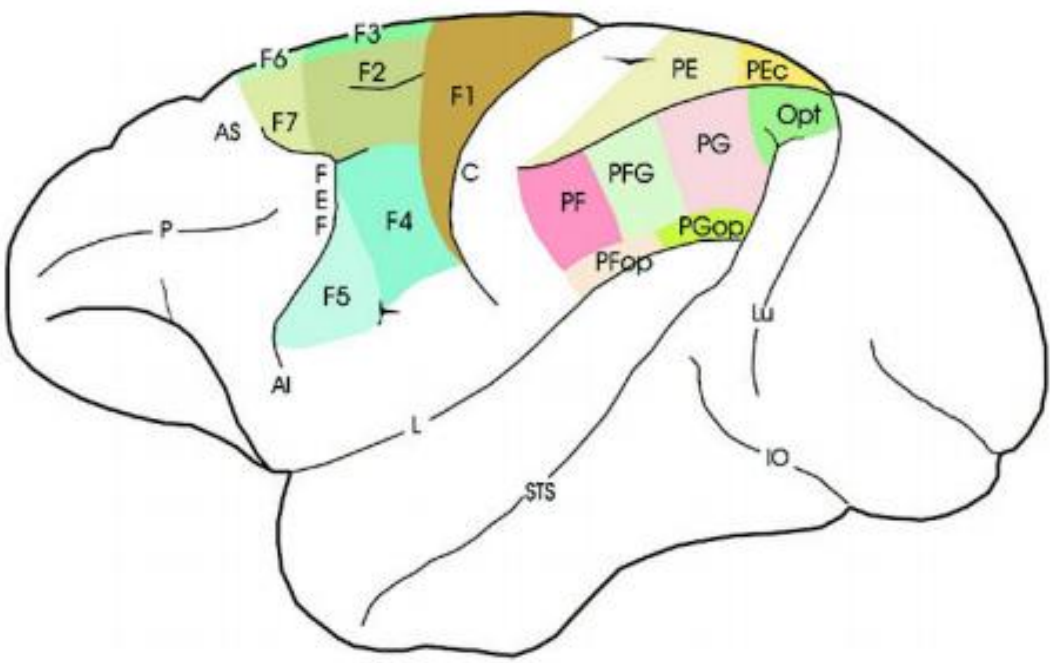
As Elliot, our idealised spectator sits in the audience watching Robin Herford's; *The Woman in Black* (2015), there are several internal mechanisms and processes operating simultaneously that enable this spectatorship to occur. As the auditorium lights dim and the stage lights come to life, Elliot fixes his eyes on Arthur Kipps who has just entered stage right. Elliot observes Arthur Kipps place his overcoat and briefcase upon the basket, as he makes his way towards the centre of the stage, Elliot notices that Arthur Kipps has kept a large book tucked under his left arm. Elliot observes as Arthur Kipps opens the manuscript and adjusts his positioning as if to get comfy and begins to read; "It was nine thirty on Christmas eve…" the rest of the spiel is inaudible to Elliot as Arthur Kipps mumbles through the lines. Whilst straining to hear Arthur Kipps, Elliot dissects the affordances he offers; cognitive scientist James Gibson coined the term affordance, as a way of describing objects with action potentials (Shaughnessy, 2013). Elliot observes Arthur Kipps' costume is fashioned in a formal style in shades of grey, black and white. Both of Arthur Kipps hands are firmly grasping the manuscript from which he is reading. Elliot is observing each and every distal movement; he is absorbing all the affordances presented to him to create a potentiality of action for the objects and the actor (McConachie, 2013:14).

The moment that Elliot observes Arthur Kipps grasping the book with his hands, a network in Elliot's brain becomes active and begins to respond to this specific hand action. Action understanding is a gateway to understanding others, so as Elliot watches the actions of the performers, he begins to understand their motives and intentions. Action understanding is made possible by mirror neurons; a new visuomotor neuron discovered and described by neuroscientists over the last few

decades. Effectively mirror neurons are thought to be part of the neural mechanism of understanding the action and behaviours of others.

Mirror neurons were initially discovered in the ventral premotor cortex of the Macaque monkey. The anterior sector is partly made up of two areas F4 and F5; mirror neurons are located in the F5 area of the Macaque's brain (Gallese, 1998). Presented in the diagram, figure 10, is the lateral view of the Macaque brain. This side view of the brain highlights the anatomical location of areas F4 and F5 (Gallese *et al*, 1998).

Figure 10.



(Rizzolatti *et al*, 2004)

In figure 10, the areas labelled with beginning with 'F' are the frontal motor areas and the areas labelled beginning with 'P' or 'O', are the posterior parietal areas (Rizzolatti and Craighero, 2004). This region makes up the cortical mirror neuron area in the Macaque (Rizzolatti and Craighero, 2004).

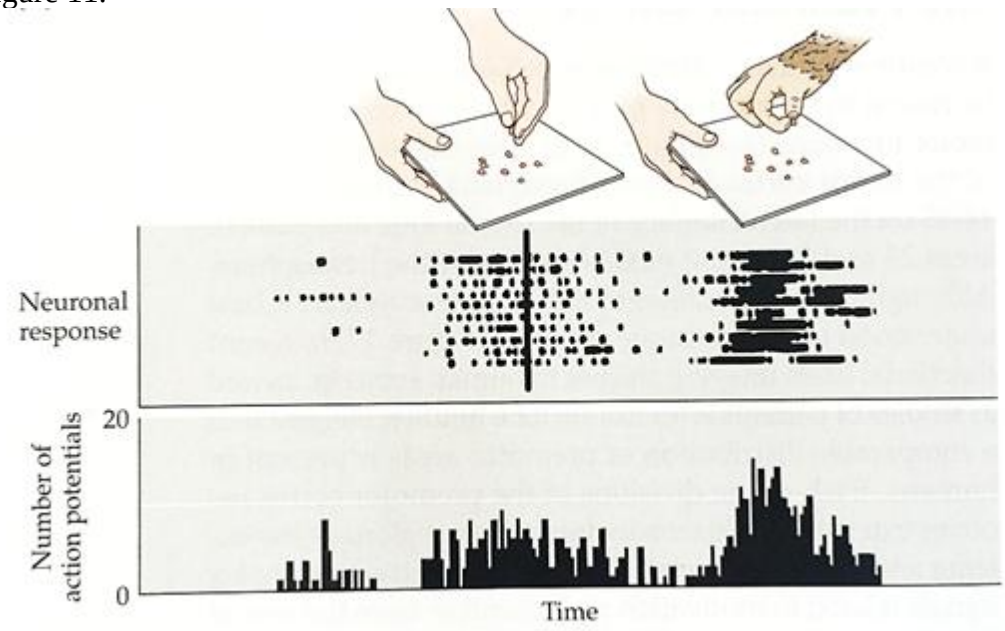
There are several hypotheses surrounding the function meaning of area F4, a proposed theory by Luciano Fadiga suggests, "The visual discharge of F4 neurons reflects a 'potential action' directed towards a particular spatial location" (Fadiga *et al*, 2000:171). This means any visual stimulus presented to the Macaque is regarded as a 'potential action', and the F4 neuron geographically maps the position of the stimulus for any potential movement relating to the head or arms (Fadiga *et al*, 2000:171). The neurons in area F5 became of significance because the neurons became active not only when the Macaque watched another monkey perform an act, such as grasping food but also when the Macaque itself grasped the food. Experiments identified that the same neural activity occurred when the Macaque carried out the action and also when the Macaque observed the action being carried out. Vittorio Gallese, a leading neuroscientist whose research predominantly investigates mirror neurons and simulation theory, asserts that the mirror neuron system has the ability to "form a cortical system matching observation and execution of goal-related motor actions" (Gallese and Goldman, 1998:493). Gallese identifies that the mirror neuron network facilitates an observation and execution system, whereby the Macaques neural network becomes active and begins to fire when they are observing a goal related action, such as tearing or grasping. The diagram labelled Figure 10 demonstrates that the mirror neurons located in area F5 work as part of a wider neural visuomotor network in the Macaque; it goes without saying that the neurons are not working alone, the mirror neurons are like a cog in a machine that is the brain. However, neuroscientists have become excited about this particular set of neurons, because it could lead new ways of thinking about social cognition in primates and in humans. It is important to consider this new information for theatre,

because it will provide playwrights, directors and actors with a greater understanding of how spectatorship actually works at a neurological level.

Mirror neuron trials in the Macaque

On the subsequent pages, there are three figures labelled '11', '12', and '13', these diagrams depict the mirror neuron experiments carried out with the Macaque. Each of the diagrams follow the same pattern. The diagrams firstly present an image, which demonstrates the visual action carried out in the experiment, in order to evoke the mirror neuron potentials in the Macaque (Gallese and Goldman, 1998 and Fadiga *et al,* 2000 and Purves *et al,* 2012 and Rizzolatti and Craighero, 2004). Food is used throughout all of the trials as the prop to provoke the response potentials of mirror neurons. Below the image, the middle section, are raster plots that illustrate the neural response (Gallese and Goldman, 1998 and Fadiga *et al,* 2000 and Purves *et al,* 2012 and Rizzolatti and Craighero, 2004). Each row signifies one trial and each raster marked is evidence for the mirror neurons firing in response to the action, both observed and executed (Gallese and Goldman, 1998 and Fadiga *et al,* 2000 and Purves *et al,* 2012 and Rizzolatti and Craighero, 2004). The third section consists of a peristimulus histogram, which visualises the amount of neurons being discharged, the spikes are indicative of the amount of neurons firing. This means the higher the spike, the greater the amount of mirror neurons being discharged in relation to the neural response presented in the middle section. You will note on diagrams labelled 'A' and 'B' on the histogram, there is a vertical line; this line signifies the precise moment the experimenter made physical contact with the food (Gallese and Goldman, 1998 and Fadiga *et al,* 2000 and Purves *et al,* 2012 and Rizzolatti and Craighero, 2004).

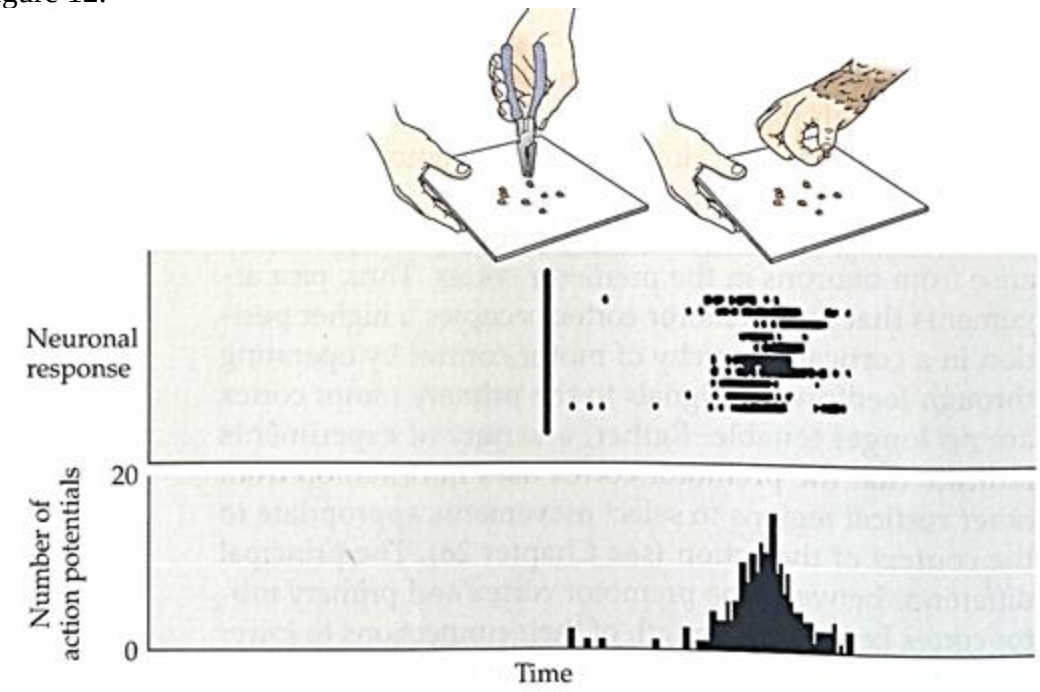
Figure 11.



(Purves *et al*, 2012*)*

Figure 11 demonstrates the experimenter grasping a food item; the experimenter uses one hand to hold the tray on which the food sits, and another hand to actually grasp the food. The experimenter then moves the food towards the Macaque; the Macaque then grasps the food. The spikes on the histogram show an increase of neuron activity when the experimenter begins the action to grasp the food and when the food is actually grasped (Gallese and Goldman, 1998 and Fadiga *et al,* 2000 and Purves *et al,* 2012). There is a significant reduction of neurons being discharged when the experimenter moves the food towards the Macaque, and an extreme increase when the Macaque grasped the food (Gallese and Goldman, 1998 and Fadiga et *al*, 2000 and Purves *et al*, 2012).

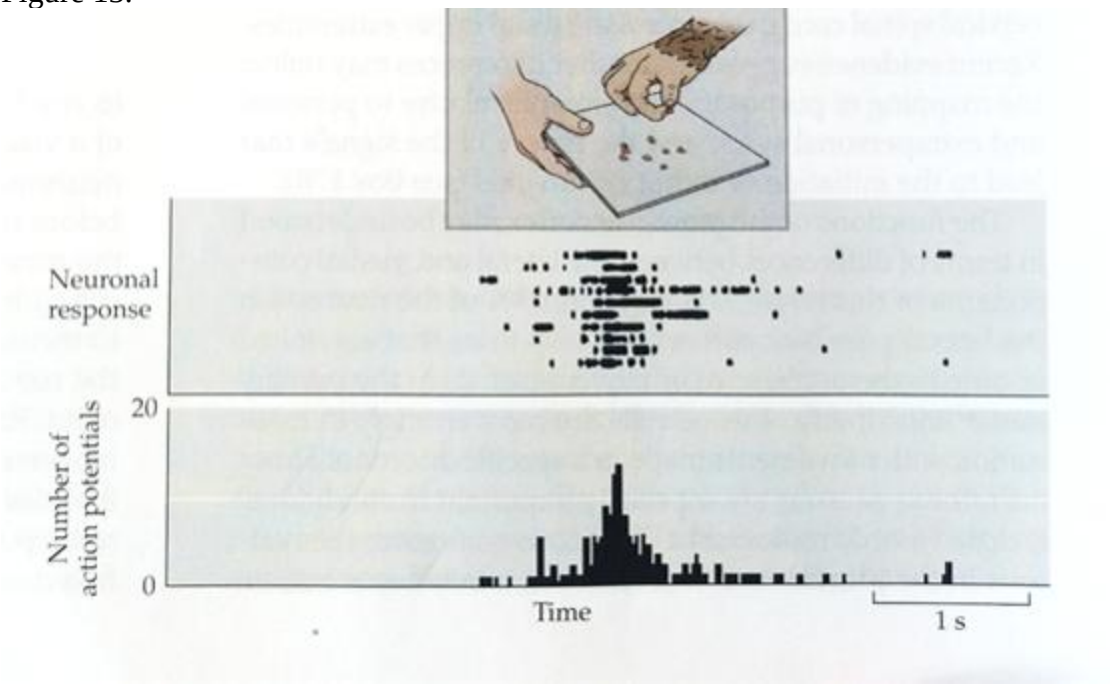
Figure 12.



(Purves *et al*, 2012*)*

Figure 12 shows the experimenter initiating contact with the food using pliers as a grasping mechanism. The experimenter then moves the food towards the Macaque and as in the previous trial the Macaque then grasps the food. The histogram clearly indicates that the mirror neurons did not fire when the pliers were used to grasp the food or when the experimenter moved the food towards the Macaque (Gallese and Goldman, 1998 and Fadiga *et al,* 2000 and Purves *et al,* 2012). The only mirror neuron activity occurred when the Macaque grasped the food (Gallese and Goldman, 1998 and Fadiga et *al*, 2000 and Purves *et al*, 2012).

Figure 13.



(Purves *et al*, 2012*)*

In Figure 13 the trial conditions have been slightly adjusted, the trial took place in darkness. The purpose of this condition change is to compare the trial to the two previous trials to examine whether the light or darkness affects the mirror neuron activity (Gallese and Goldman, 1998 and Fadiga *et al*, 2000 and Purves *et al*, 2012). This trial consisted only of the Macaque grasping the food; there was no observation element by the Macaque as in the former trials. The histogram records the mirror neuron activity as firing when the Macaque begins to reach for the food, the firing spikes at a peak when the Macaque has made contact with the food and actually grasped the food, and the discharge begins to decrease as the action ends (Gallese and Goldman, 1998 and Fadiga et *al*, 2000 and Purves *et al*, 2012).

The trials elicited mirror neuron activity by creating various observation and execution tasks for the Macaque, the activity of the mirror neurons recorded in the

histogram for each separate trial reinforces Gallese's notion that mirror neurons have the potential to form a cortical matching system. This is evident through the consistent pattern that emerges in the Macaques neural activity. The mirror neurons do not fire for spontaneous reasons or when other apparatus are used, the neurons have to be stimulated by hand actions and only fire when observing the action and carrying the action out (Gallese and Goldman, 1998 and Fadiga *et al,* 2000 and Purves *et al,* 2012). The results of this experiment demonstrate that mirror neurons can identify goal-related action; and that the same neurons fire in response to goal related action for the self and other, the brain does not distinguish between the two (Gallese and Goldman, 1998 and Fadiga et *al,* 2000). The neural network that becomes active and fires in response to the observation, is the same network that fires when the observer actually carries the action out himself or herself. Moreover, Gallese establishes that the mirror neuron system can detect goal related action and without necessarily acting the action out, the brain manifests the action as though it were actually carried out by the Macaque (Gallese and Goldman, 1998)

Gallese furthers the necessary requirement of a goal to activate mirror neurons in the Macaque, by explaining, "The activity of F5 neurons is correlated with specific hand and mouth motor acts and not with the execution of individual movements like contractions of individual muscle groups" (Gallese and Goldman, 1998:493). Gallese identifies that mirror neurons can distinguish motor acts from simple movement; the F5 neurons identify a purpose to the move, a goal. Gallese reiterates that it is necessary to understand the difference between movement and a goal related action:

> The distinction is very important since it allows one to interpret the role of the motor system not just in terms of dynamic variables of movement (like joint torques, etc.), but rather as a possible candidate for the instantiation of mental states such as purpose or intention (Gallese and Goldman, 1998:493).

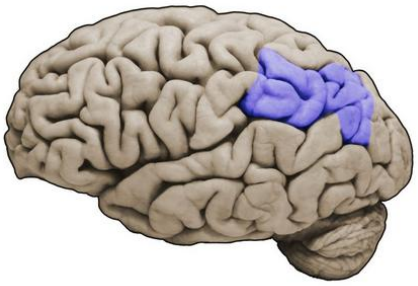
The visual action of this goal, as carried out in trials by the neuroscientists, included the use of a prop, the prop in this instance was food. The trials recorded the visual and motor responses of the Macaque when it observed the experimenter grasp the food, when the food was untouched, when the Macaque itself grasped the food, and when the Macaque watched another monkey grasp the food (Gallese and Goldman, 1998). The trials concluded that the neurons fired only when the food was actively being grasped or in the process of, the mirror neurons did not fire and remained silent when there was no action taking place (Gallese and Goldman, 1998), therefore the use of a prop is necessary in the activation of the neurons for the Macaque.

Through the Macaque trials, mirror neurons emerged as a distinguished system that not only responds to precise distal movements but also enables action understanding within social interactions (Pellegrino, 1992). The Macaque has the potential, with the presence of a prop, to predict the goal related action. In commonplace life for the Macaque, the mirror neuron system would exist and function through various daily tasks or actions such as; climbing a tree with the intention to reach the top or to reach out and grab some berries from a branch to eat. The neurons would also be stimulated and become active when watching their conspecifics carry out similar actions. The mirror neuron system is a part of social cognition that enables action and intention understanding, which underpins the ability of social communication (Gallese, 2007).

Mirror neuron system in humans

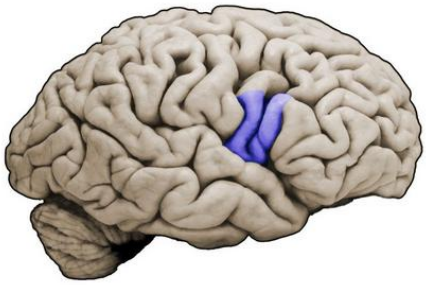
From the initial anatomical discoveries and studies of mirror neurons in the Macaque, empirical data has suggested a similar observation and execution matching system in humans. The mirror neuron system in humans spans across the brain, and interacts across different areas. Mirror neurons are "formed by a cortical network composed of the rostal part of the inferior parietal lobule and by the caudal sector (*pars opercularis)* of the inferior frontal gyrus (IFG), plus the adjacent part of the premotor cortex" (Gallese, 2004:397).

Figure 14.



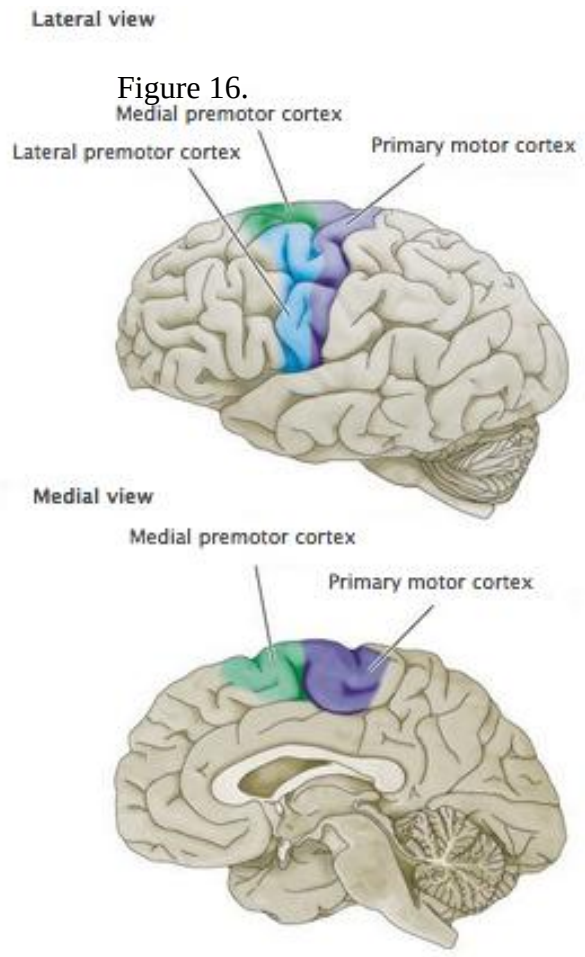
(Williams *et al, 2013*)

Figure 15.



(Williams *et al, 2013*)

Figure 16.



(Williams *et al, 2013*)

Figure 14 presents a side view of the left side of the human brain (Williams *et al*, 2013) of the inferior parietal lobule (Gallese, 2004:397). This area of the brain is thought to be involved in spatial perception (Williams *et al*, 2013). Figure 15 shows a side view of the human brain presenting the "(*pars opercularis)* of the inferior frontal gyrus (IFG)" (Gallese, 2004:397). Figure 16 shows a side and middle view of the premotor cortex in the human (Williams *et al*, 2013). The premotor cortex is involved in helping in the controlling and planning of movements (Williams *et al*, 2013). Through this network of areas in the brain, spans the mirror neuron system.

Gallese *et al*, note that the human mirror system is a mature system in comparison to the Macaque; with research showing that the human mirror system "codes both the goal of an observed action and the way in which the observed action is performed" (Gallese, 2004). Intransitive and mimed actions are sufficient enough to activate the mirror neurons; this means that when the human action/observation matching system becomes active and begins to discharge neurons, there doesn't need to be a prop as with the Macaque. The human mirror system can intuit plans or movement intention without the physical object being present (Gallese, 2004). Philosopher Pierre Jacob and neuroscientist Marc Jeannerod postulate that:

> [T]he perception of biological motion automatically triggers, in the observer, the formation of a motor plan to perform the observed movement…Thus, motor imagery lies at the interface between planning the movements and the observation of others' movements. Arguably, in humans, the capacity for motor imagery may have unique adaptive value, since the observation of others' bodily movements is a crucial source for the learning of skilled gestures by imitation (Jacob and Jeannerod, 2003, cited in McConachie 2007:564).

Jacob and Jeannerod suggest that the mimetic aspect of how our brain operates, underscores social cognition because imitation bridges a self to other gap, and facilitates action understanding of others.

The Woman in Black (2015) begins with The Actor trying to convince Arthur Kipps that his story needs to be performed and not merely read out. The Actor introduces Arthur Kipps to the illusionary world of theatre by demonstrating new technology that is at their dispense. Elliot observes the actor click his fingers, and this action signals a cue for recorded sound, which echoes through the theatre, and Arthur Kipps is amazed at how real the recording sounds. The Actor then furthers his argument for a performance by gesturing with flat open hands towards the basket, Elliot observes The Actor grab the basket with both hands and pulls it forwards presenting it to Arthur Kipps; The Actor proclaims "A pony and trap". Elliot's mirror neurons begin to fire in response to the hand gestures directed towards the wicker basket, and again as The Actor uses a grabbing hand action to move the prop. Arthur Kipps laughs in disbelief; he sees only a wicker basket, The Actor retorts that it is possible to create a pony and trap with "Our imagination and our audiences imagination". Elliot observes as The Actor proceeds to seat himself on the basket, he then springs his core upwards to create a momentum that helps him to generate a rhythmic bounce; his legs swing back and forth and this simulates a movement as if the actor were travelling. The Actor, with his right hand clenches it into a fist and raises his hand slowly up high and then sharply back down whipping and cutting through the air. The Actor's left hand remains low to his core, with its own kind of rhythm and controlled movement and shaped as though it were grasping something. Elliott's mirror neurons become active and detect The Actor's whipping action with his right hand and The Actor's left hand

grasping invisible reins, the mirror neurons fire in response and simulate the action. Elliot sees the physical manifestation of the horse and trap come alive and yet there is only a basket and the actor on stage. Jumping forward in the play, the physical manifestation of the horse and trap is reprised several times with both The Actor and Arthur Kipps. At each reprise the movements are very evocative of the shape, timing, rhythm and traveling aspects of the horse and trap, this also adds new layers of imagery. Both men create a visual image of the horse and trap travelling over a bump; in unison the men lurch their torsos upwards, their hands follow the movement in the same positions, they hold the pose for a slight pause and to create a sense of gravity pulling them back downwards, they crash down on towards the seat. In a later scene, Arthur Kipps adds language to the pony and trap imagery by yelling; "geeeeeerup" and simulates a kicking motion that then initiates the horse and trap to once again take form. The final physical image created shows Arthur Kipps lurch his body and arms forward, his hands are in the grasping position, he clenches them tighter and yanks his hands and arms inwards and upwards towards his chest, his body leans back and slowly makes small jolts forwards, the men's legs kick forward and flop back down as the horse and trap comes to a stop. Again, Elliot's mirror neurons become excited by the action of The Actor and Arthur Kipps and the neurons begin to fire, Gallese *et al* comment that under these types of conditions, observing a range of hand and arm actions elicits excitement in the same muscles in the observer as the executer used in the movement (Gallese and Goldman, 1998:495). This means, "Every time we are looking at someone performing an action, the same motor circuits that are recruited when we ourselves perform that action are concurrently activated" (Gallese and Goldman, 1998:495). Elliot's body has become stimulated with excited mirror neuron activity as a direct result of observing The Actor and Arthur Kipps create the pony

and trap and the consequential movement that occurs. Elliot can not only see the transformation of the wicker basket into a pony and trap, he can feel it within himself, and he can feel The Actor's whipping action in his own body, he can feel the judder of the trap in his own torso.

In the play The Actor describes the ability to believe the reality of the pony and trap as our ability to imagine. We can imagine things by using the affordances available to us and combine the initial image with potential projections that may have previously happened or are yet to occur. We can simulate these scenarios in our conscious mind, in our action, and language. As the audience begin to understand what is happening on stage, they accept the physical manifestation of the pony and trap through their mirror neuron systems. Once this has been processed and the information reaches the spectators conscious awareness, they can then incorporate this repertoire of action into their personal minds, and they can expand and develop the original ideas with whatever else they can imagine. As Jacob and Jeannerod ascertain, motor imagery in humans enables us to gain knowledge, for Elliot, it means that he has the ability to understand more creative imagery that is used later in *The Woman in Black* (2015).

The Woman in Black (2015) presents a striking piece of imagery by Arthur Kipps and The Actor through the creation of Spider the dog. The physical manifestation of Spider exists only through Arthur Kipps and The Actors precise and distinct movements and interactions with the dog. Arthur Kipps introduces Spider to The Actor and the audience by calling for her to come to him, Elliot observes both men affix their eyes to the floor by Arthur Kipps feet. The Actor bends down to meet Spiders height and opens the palm of his left hand into a relaxed curve; he then

strokes Spider from the top of her neck and across her back riding over the contours of her spine. Elliot is aware that there is not a real dog on stage and yet through the actions of Arthur Kipps and The Actor, Elliot can see the silhouette of the dog on stage as clear as he can see both performers, as an audience we form an emotional attachment to Spider through movement. Damasio postulates:

> You can find the basic configurations of emotion in simple organisms, even in unicellular organisms, and you will find yourself attributing emotions such as happiness or fear or anger to very small creatures who, in all likelihood, have no feeling of such emotions in the sense that you and I do, creatures which are too simple to have a brain, or, having one, too rudimentary to have a mind. You make those attributions purely on the basis of the movements of the organism, the speed of each act, the number of acts per unit of time, the style of movements, and so on. You can do the same thing with a simple chip moving about on a computer screen. Some jagged fast movements will appear "angry", harmonious but explosive jumps will look "joyous," recoiling motions will look "fearful". A video that depicts several geometric shapes moving about at different rates and holding varied relationships reliably elicits attributions of emotional state from normal adults and even children. The reason why you can anthropomorphize the chip or an animal so effectively is simple: emotion, as the word indicates, is about movement, about externalized behaviour, about certain orchestrations of reactions to a given cause, within a given environment (Damasio, 2000:70).

Elliot's mirror neurons began firing when The Actor started to stroke Spider, because the stroking action simulates the action of how one may interact with an animal, in this case it simulates the idea of stoking a dog, which generally people make emotional bonds with. Observing Arthur Kipps and The Actor behave with affection towards Spider, induces an emotional response from Elliot, and so a representation of Spider has formed for Elliot. The Actor continues to interact with Spider by bending his stance and begins to direct his lines toward the space that Spider occupies, and it becomes clear that he is talking to her. Elliot then observes The Actor whistle and snap his right arm upwards and click his fingers in order to gain Spiders attention so she can follow him. At this moment, the mirror neurons in Elliot's brain become active and distinguish this clicking action as a way to draw attention to oneself, Elliot

immediately focuses onto The Actor because the action has sharpened his own awareness. Elliot knows that The Actor has been successful in his ploy for Spider to follow him as The Actors eyes swoop from across the stage to his feet, which is indicative of Spider travelling. The clicking action not only drew the attention of the audience, it also brought the physicality of the dog alive for the audience to see. The Actor then strokes Spider again in the same fashion as before, which confirms to Elliot that Spider has followed him. Elliot's mirror neurons begin to fire in response to the positioning of The Actors hand and the stroking action that follows; Elliot's brain receives this visual sensory input and uses it to understand what is going on. In a later scene set in Mrs Drablow's house, The Actor decides to play with Spider; he calls out her name, whistles and taps his thighs with both hands to beckon her over. The Actor uses the same swooping technique to represent Spider travelling. Elliot then observes The Actor mimicking the mannerisms of a dog; he droops his head into his neck, pokes his tongue out of his mouth, he starts panting and then he begins to run around chasing after Spider. Elliot understands that The Actor has created a physicalisation of Spider, because he has made a believable realistic animation of her. The Actor was able to do this because he uses very simple and particular movements as a repertoire for his interactions with Spider, so the audience can easily identify with what he is doing. When actions such as these occur, Elliot's mirror neurons become active and his brain begins to function as though it were he stroking and interacting with the dog. McConachie writes:

> When they pay attention to intentional human action (in a performance or anywhere else), spectators unconsciously mirror the actions of social others and use this cognitive information directly to understand their intentions and emotions. Although audiences must also interpret spoken language and engage in other mental operations when they watch actors performing, interactional simulation seems to be primary (McConachie, 2007:565).

Elliot understands the physicalisation of the dog on stage, but if he were asked how he knew this, he would say that he understood because he heard Arthur Kipps introduce the dog and also because he saw the performers act it out. If this question were put to the entire audience in the auditorium, their responses would most likely be very similar. This response is undoubtedly accurate; Elliot used his signal receptors; eyes and ears, to gain knowledge from the external world. However, knowing this only demonstrates the beginning and end of the process, there is no explanation of the unconscious process that feeds our consciousness and makes us aware of what something is; how we know what we know and how we incorporate it into our knowledge.

Explaining what we know or what we think we know, is part of our conscious awareness, we can't explain something that is below this conscious level because we do not have access to the internal milieu of our brain or body. Having all this information would overwhelm our normal functioning, our brain tells us what we need to know, when we need to know. Evolution has primed human beings in this way to assist with our automaticity; the mirror neuron system is exemplary of this. McConachie comments that:

> It is the *spectators* who mirror the motor actions of those they watch on stage; cognitive imitation is a crucial part of spectatorship. Presumably, playwrights, actors, and others also engage their visuomotor representations when they write a script and put together a production, but this is a separate process, removed from the moment-to-moment interaction that occurs between actors and audiences in performance. Mirror neurons do not invalidate Aristotelian mimesis, but if we are interested in audience response from a scientific point of view, the mode of imitation triggered by these neurons (and their consequences) should be part of our explanation (McConachie, 2007:565)

Of course mirror neurons are not exclusive to spectatorship, Elliot's mirror neuron system, operates in exactly the same way for everyday life occurrences as it does for

the theatre. Cook notes that, "Mirror neurons themselves do not discriminate between an act performed and a witness act" (Cook, 2009:590). The theatre is a contrived environment where the audience are positioned to have encounters with the actors and are made to engage with their entire range of cognitive abilities. As the aforementioned scientists ascertain, this neurological system makes it possible for spectatorship to occur because it is the basic fundamental component of how we understand others. The human mirror neuron system demonstrates the ability to not only understand action in social situations, but that the neurons can also predict future action and have the potential to attribute emotional states (Pellegrino, 1992).

Cook states that, "Action understanding, intention, emotional attunement, and communication are clearly pivotal in theatre, since without them there is no fear, pity, conflict, dramatic irony, subtext or even story" (Cook, 2007:50). This enables the audience to get the conceit of the performance being a play within a play. This conceits sets up the convention that the performance can break the fourth wall of the play. Elliot and the audience understand and accept that Arthur Kipps can break the fourth wall and speak directly to the audience, because this convention was set out at the beginning of the play. So whenever the fourth wall is broken, the audience continue to understand that the performance is still taking place.

When the performers switch between levels of the play and speak to the audience, the audience understand that this communication is still part of the actual performance and no response is required by them. Elliot observes as Arthur Kipps turns away from The Actor, who is standing centre stage, and walks towards the front left of the stage; Arthur Kipps positions his torso facing the audience and begins to speak, "Imagine

this stage an island, this aisle a causeway". Although Arthur Kipps and The Actor are on stage together and have engaged in conversation throughout the play, Elliot understands that this remark is not part of their dialogue with each other. Elliot has observed how Arthur Kipps body language has transformed; his attention/gaze/gestures/lines are all directed towards the audience rather than The Actor. Arthur Kipps is speaking to the audience with the intention of guiding their imaginations to allow the next scene to manifest. When Arthur Kipps speaks his lines he uses hand gestures to emphasis the narrative; he demonstrates the aisle as the causeway by bringing both this hands out in front of him palms facing down, spreads his fingers wide and then slowly pushes his right hand forward and outwards, simultaneously bringing his left hand backwards. Elliot's mirror neurons become stimulated by these hand actions. In response, Elliot's brain is constructing the new theatre setting and accepts that the stage in front of him has become Mrs Drablow's isolated house.

Arthur Kipps discourse with the audience leaves The Actor in a different zone of the play within a play and it allows Arthur Kipps to then narrate the scene and accelerate the play without the need for commonsensical details. And so Elliot watches as Arthur Kipps narrates the action of The Actor and The Actor continues to act in the play within the play, they both perform simultaneously as if it were spontaneous rather than in response to each other. It is similar to a sign language interpreter on television, they are presented together in the same format and are relevant to each other, but audiences understand that the interpreter is separate from the television programme. In this particular scene it enables Elliot to listen to Arthur Kipps narrate and to observe the actions of The Actor, Elliot focuses his eyes and attention on The

Actor because all any additional information he needs to understand what is happening is being articulated to him. The scene progresses in a very theatrical manner with the use of action, narrative, smoke and lighting, creating one of the plays heightened moments that supports the plays renowned thrilling catharsis. Elliot observes The Actor is currently being subjected to the supernatural happenings that occur in Arthur Kipps Story. Elliot watches as The Actor becomes frantic, he proceeds to run around the stage searching for the mysterious figure, opening doors and searching in all the rooms, he begins to yell and shout. As the scene begins to reach a climax, Elliot notices the lights begin to focus onto the protruding wooden frame on stage and light up the door, he looks back to The Actor, who has become entranced by the door. Elliot observes as The Actor bends his left knee and brings it upwards engaging the hip, his torso leans forward, both hands clenched into a fist as his arms raise and lock at his elbows his arms swing back and forth as each leg powers up and down, he races to the door. The Actors right hand releases his fist and opens to grasp the oval brass doorknob, his left hand opens flat and wide as he slams it against the doors wooden panel. Elliot observes The Actors muscular body tense and release repeatedly as he exerts more and more power to try and open the door. The Actor releases his right hand from the doorknob and slams both hands flat against the door, he then slides both hands down the door as he slithers towards the floor, his hands then regain a fist clenching action as his whole body slumps to the floor. The lights black out for intermission. When Elliot observes The Actor run towards the door and try and open it, his mirror neurons are firing because they have detected an external stimulus with a goal. The mirror neurons are firing because they are predicting that The Actor is going to open the door, so in a matter of milliseconds Elliot's brain has already registered The Actors intentions. However, the door does

not open so the prediction of action is not quite right because the goal hasn't been achieved. The mirror neurons projected goal has failed to manifest, Elliot expected the door to open when The Actor twisted the doorknob because this is a probable and most likely action as a result of the previous action. The fact that it did not open creates a dilemma for Elliot's mirror neurons, as they have to figure out the next action. The Actor continues in his efforts to open the door and makes great use of his hands, which triggers the mirror neurons again. In this short sequence, Elliot's mirror neurons are manipulated by the performance to receive continuous signals of input, because what you expect and think will happen does not. Elliot's mirror neurons continue to spike each time The Actor slams his hands on the wood, and tries to force the door open. The director and The Actor have successfully created a theatrical sequence that directly stimulates the mirror neurons of the spectators, although this neural activation was probably unintentional. This sequence throws the audience, and the director knows that because the goal was never completed, it keeps the audience on their toes, they have to make more predictions about what they think will happen. The audience will begin to contemplate what is going to happen next, will The Actor manage to open the door? What is on the other side of the door? What happens now as a result of the door not opening?

Whilst all this is happening, the mirror neurons detect the way in which the action was carried out, so Elliot attributes corresponding emotions such as fear and anger. The predictions of future action and possible emotional states are sparked by the action of The Actor and are then supported by Elliot's ability to read the mind of others. Gallese *et al* define this mind-reading ability as "the activity of representing specific mental states of others, for example, their perceptions, goals, beliefs,

expectations, and the like" (Gallese and Goldman, 1998:495). McConachie furthers this by also including emotion in our attempts to understand the minds of others (McConachie in Shaughnessy, 2013). Elliot can read the mind of The Actor because he can make inferences about his emotional state. Damasio clarifies:

> We can feel our emotions consistently and we know we feel them. The fabric of our minds and of our behaviour is woven around continuous cycles of emotion followed by feelings that become known and beget new emotions, a running polyphony that underscores and punctuates specific thoughts in our minds and actions in our behaviour (Damasio: 2000:43).

The physical display of erratic behaviour by The Actor, lead Elliot to believe that he is in a fearful emotional state, the fast bursts of movement in an abnormal manner makes Elliot feel The Actor's distress. A simulation theory of empathy has been suggested as a result of the direct access to the minds of others that mirror neurons enable. McConachie writes:

> Through mirror network processing of the muscles in another's face and body, humans are able [to] pick up some information about the other's emotions and intentions, information that unconsciously informs empathetic response. By approximating other's intentions through our mirror networks, we can fine-tune our own responses and intentions towards them (McConachie, 2011: 37).

Elliot can empathise with The Actor because his own mirror neuron system responds to the actions of The Actor by firing in the same way. Elliot's brain processes the information as though it were him carrying out these actions and so this makes it possible for him to not only access the mind of The Actor, but Elliot can enter into his emotional state. Damasio comments that, "We do not need to be conscious of the inducer of an emotion and often are not, and we cannot control emotions wilfully. You may find yourself in a sad or happy state, and you may be at a loss as to why you are in that particular state now" (Damasio, 2000:47). Elliot can see the emotion in The Actor, and he can feel it himself. Elliot becomes hyper aware, his wide eyes dart around the stage looking for possible clues, his breathing becomes rapid, his heart rate

increases, his internal milieu has transformed into a state of fear because he has been induced by the emotional behaviour of The Actor. Elliot feels as though it were him trying to penetrate the door because his mirror neurons initiated a neural process that informed the rest of his body that this is what he is doing, this is the situation, respond in this way. Of course Elliot does not actually get up and try to open the door, nor does Elliot run away in fear as a response, because when these feelings reach his conscious awareness, he has control over his external actions. Fuster comments:

> The choosing and evaluating by the cortex goes on all the time even in the absence of any need for decision. Many of the choices take place subliminally – that is, unconsciously – at low levels of cortical activity. […] Many of our decisions come out of our gut feeling, based on a broader and sometimes more reliable database than the one we have in conscious awareness. […] Choices go on in our brain all the time whether we are aware of them or not. (Fuster, 2013: pp97-98).

Elliot's brain uses the activity of his mirror neurons to gain information from external sensory information to manifest a coherent "execution/observation matching system" (Gallese and Goldman, 1998:493). It is a system that creates a biologically lead response in Elliot; his body simulates that of The Actor. The response that is created in Elliot is then filtered to gain knowledge and information about the external stimulus. From these perceptions it has been suggested that Elliot can read the mind of The Actor because he can infer what The Actors goal is, what his intentions are and the emotional state of his mind (Gallese and Goldman, 1998). This entire process happens below Elliot's conscious awareness; he has no idea of the activity occurring inside his brain whilst watching *The Woman in Black* (2015), he is not aware at all that his mirror neuron system becomes stimulated and excited at the action of The Actor and Arthur Kipps. Elliot's engagement with the theatre is made possible

because of the nature of the mirror neuron system. Prior to the discovery of mirror neurons Bruce Wilshire presupposed:

> bodies biologically human learn to become human persons by learning to do what persons around them are already doing. The learning body mimetically incorporates the model; it comes to represent the model and be authorized by it… The actor models modelling, enacts enactment, and reveals it. I think it plausible to hypothesize that since behaviour and identity were laid down bodily, mimetically, and together – in the theatre, for example (Wilshire cited in Cook, 2007:588).

Cook supports Wilshire's assertions, "Indeed, incorporating the model *does* happen: our brains mirror neurons system […] links the actions and intentions of others with our own perceptions and actions" (Cook, 2007:588). Elliot's mirror neuron system informs him that The Actor whipping his hand and arm through the air is not doing so in a random and unintentional manner, but is doing so because he is using this action to represent him using a whip against a horse to make the horse go faster. Elliot's mirror neuron system facilitate the manifestation of Spider the dog, because the system detects the interactions of Arthur Kipps and The Actors and compares it to how one would interact with an animal. The mirror neuron system also codes the way in which the men interact with Spider, notably the affection directed towards the animal; they embody stereotypical actions of a dog and mimic the behaviour. Elliot understands that this mimicry is carried out in playful manner because his mirror neuron system detects how the action was carried out. Elliot's mirror neuron system can catch the emotions of others, Elliot feels the fear of The Actor as he tries desperately to open the mysterious door, and makes future predictions from direct observations.

The discovery of the F5 neuron in the Macaque enabled scientists identify a part of the brain that becomes excited in response to the observation of others using a prop to carry out an action, and when the Macaque carried the action out themselves. This observation and execution matching system in the Macaque enabled neuroscientists to discover a similar mechanism in the human neural system; mirror neurons, Gallese *et al* postulate:

> The human brain is endowed with structures that are active both during the first- and third-person experience of actions and emotions. When we witness someone else's action, we activate a network of parietal and premotor areas that is also active when we perform similar actions. When we witness the disgusted facial expressions of someone else, we activate that part of our insula that is also active when we experience disgust. Thus, the understanding of basic aspects of social cognition depends on activation of neural structures normally involved in our own personally experienced actions or emotions. By means of this activation, a bridge is created between others and ourselves (Gallese *et al*, 2004:401).

The Actor and Arthur Kipps directly simulate Elliot's biological experience; their performance stimulates Elliot's mirror neurons, guiding his neural response, shaping his experience and perception of the performance. Elliot's brain is behaving in certain ways, making him feel and experience actions and emotional states because he has direct access to the minds of the performers. The mirror neurons in Elliot's brain create an internal representation for him, of what it feels like to be The Actor or Arthur Kipps, in the situations that manifest on stage. Elliot can truly "get" the performance because his brain is replicating the experience for him, he doesn't need to think about the mind of the characters because he is actually experiencing what is happening in their minds. Elliot can imagine the pony and trap because he can feel the movement of the trap in his own body; his muscles elicit excitement as a direct stimulation from The Actors. As The Actor lifts his arm up and strikes it through the

air creating a whipping action, this evokes in Elliot what it feels like to carry out this whipping action. Elliot not only observes the action but his brain actively registers the action as though he were physically carrying it out. Mirror neurons do not only facilitate understanding of action and emotion, they have the potential to create a full experiential theatre inside of the spectator, as if they were the ones performing (Gallese *et al*, 2004).

Thesis conclusion

This thesis arrives at no definite answer; I cannot provide a complete theory on spectatorship because there is still so much we do not know about the brain and the ubiquitous neural mechanisms that enable us to even think about what a spectator does when they watch theatre. However, I hope this research investigation has added to an improved understanding of spectatorship. I have used conceptual blending theory to illuminate the way a spectator's mind works. The theatre environment positions the spectator to encounter blends that the actors and directors have created, the spectator uses these blends as a starting point, from which they integrate and apply their own blends to and find commonalities between them. It is through this integrated networking system that spectators perceive meaning and create an understanding. Conceptual blending allows Elliot to primarily blend the actor to the character, and then further allows Elliot to blend the character that is on stage and project a version of the character that exists for him. Elliot will create a blend that works for him, he uses an array of internal knowledge and external information as tools to build and project the world around him. In the theatre, Elliot makes blends as a spectator as an effective and fluid way to make meaning from what is being presented to him, so he can respond to the performance with full integrity (Blair, 2009:94).

I have used evolutionary neuroscience in an attempt to create an understanding of how a spectator perceives, how a spectator watches theatre, what actually happens in a spectators brain watching a performance. I have tried to identify the neural mechanism in our human brain that assists us when watching theatre. From current information we have about mirror neurons, the basic knowledge is that the neurons

fire in response to an observed other. Elliot's brain essentially copies the neural activity of The Actor and Arthur Kipps. Through this activation of the mirror neuron system, Elliot's brain and body creates an embodiment and experience of what The Actor and Arthur Kipps are doing and feeling. The physical action of The Actor stimulates Elliot's own muscles, so he can feel an evocation of the tension and struggle that The Actor feels when he tries to force open the door. Elliot feels the emotions in the situations on stage because he is subjectively experiencing the minds of the performers because his own mind is running in a parallel state. This entire process occurs below Elliot's level of conscious awareness but feeds into Elliot's conscious experience of the theatre, guiding his responses and imagination. Mirror neurons have been put forward as a fundamental mechanism for social cognition because the neurons allow us to directly understand others in social situations, connecting a gap between the first and third person experiences (Gallese *et al*, 2004:396). Using current neuroscientific information and hypothesises, this thesis proposes that mirror neurons underscore spectatorship, because they create a basic and fundamental connection between the actor and the spectator. Hart states:

> behind every actor's use of his or her body is a body of *knowledge*, and that out of that knowledge emerges a focused intentionality that participates along with the body in creating a performance. It may sound simplistic to say so, but surely such intentionality emerges from – or at least mediated by – the actor's *brain* (Hart in McConachie and Hart, 2006:33).

If the performance is premised on the basis of the actor's body and brain, surely spectatorship is based on the intentionality of the spectator's body and brain.

The Actor and Arthur Kipps bring the performance to a dramatic end, freezing their entire bodies. The lights black out. The auditorium lights come up. The stage is empty. Julian Forsyth and Antony Eden walk on and take centre stage and to a round

of applause they take a bow. Elliot claps audaciously; relieved the terrifying experience is over but feels disenchanted that the time has come where he has to leave the world of the performance. Elliot looks around the auditorium to evaluate the fear factor of the performance, he observes a few wide-eyed jittery spectators. The spectator sitting next to him on the left looks rather uneasy. The army of ushers appear, lining up against the walls, guiding the audience along to the exit of the theatre. Elliot walks out into the dark summer evening, just as the rest of the theatre land audiences break away from their chosen show, he has to negotiate the traffic of people pouring out of *Charlie And The Chocolate Factory.* Allowing a herd of hyper children and a seemingly fatigued father to cross in front of him, Elliot contemplates that the crowd of people are a mix of chocolate wonderland wanderers and distraught individuals. He hopes nothing happens to the children.

Bibliography

Agnew, Z.K., Bhakoo, K.K. & Puri, B.K. (2007) *The Human Mirror System: A Motor Resonance Theory of Mind-Reading.* Brain Research Reviews. 54 (2) pp. 286-293. [online] Available at: Science Direct doi:10.1016/j.brainresrev.2007.04.003 [Accessed 3rd July 2015].

Benedetti, J. (1982) *Stanislavski: An Introduction (Performance Books)*. New York: Theatre Arts Books, 1982.

Bennett, S. (1997) *Theatre Audiences: A Theory of Production and Reception*. 2nd edn. London: Taylor & Francis.

Blair, R. (2009) *Cognitive Neuroscience and Acting: Imagination, Conceptual Blending, and Empathy*. TDR: The Drama Review. 53 (4) pp. 92-103. [online] Available at: Project Muse http://muse.jhu.edu/login?auth=0&type=summary&url=/journals/the_drama_review/v053/53.4.blair.html
[Accessed 4 November 2014].

Cameron, O.G. (2001) *Visceral Sensory Neuroscience: Interoception.* GB: Oxford University Press.

Chaikin, J. (1972) *The Presence of the Actor.* New York: TCG Books.

Chatterjee, A. & Coslett, H.B. (2014) *The Roots of Cognitive Neuroscience: Behavioural Neurology and Neuropsychology*. New York: Oxford University Press.

Cohen, M. C. (2014) *Midfrontal Theta: Causes and Consequences.* [Seminar to Institute of Cognitive Neuroscience] 24 November.

Cook, A. (2006) *Staging Nothing: "Hamlet" and Cognitive Science.* Substance. 35 (2) pp. 83-99. [online] Available at: Summon http://www.jstor.org.libaccess.hud.ac.uk/stable/4152885 [Accessed 4th may 2015].

Cook, A. (2007) *The Method and Potential of a Cognitive Scientific Approach to Theatre.* Theatre Journal. 59 (4) pp. 579-594. [online] Available at: Project Muse: https://projectnarrative.osu.edu/sites/projectnarrative.osu.edu/files/Cook-Theatre-Journal.pdf [Accessed 4th may 2015].

Damasio, A. R. (2000) *The Feeling of What Happens: Body and Emotion in the Making of Consciousness.* New York: Hartcourt Brace.

Duffy, P.B. (2014) *The Blended Space Between Third and First Person Learning: Drama, Cognition and Transfer*. Research in Drama Education: The Journal of Applied Theatre and Performance.19 (1) pp. 89-97. [online] Available at: Summon 10.1080/13569783.2013.872428 [Accessed 5th March 2015].

Ellis, R.D. & Newton, N., (2005). *Consciousness & Emotion. Agency, conscious choice, and selective perception.* Amsterdam: John Benjamins Publishing Company.

Fadiga, L., Fogassi, L., Gallese, V. & Rizzolatti, G. (2000) *Visuomotor Neurons: Ambiguity of the Discharge or 'Motor' Perception*. International Journal of Psychophysiology. 35 (2) pp. 165-177. [online] Available at: Summon doi:10.1016/S0167-8760(99)00051-3 [Accessed 4th February 2015].

Fauconnier, G. and Turner, M. (2003) *The Way We Think: Conceptual Blending and the Mind's Hidden Complexities*. United States: Basic Books.

Feinberg, T.E. & Keenan, J.P. (2005). *The Lost Self: Pathologies of the Brain and Identity*. GB: Oxford University Press.

Fotopoulou, K. (2014) *The Metallization of Interoception: Social, Predictive Signals of Salience.* [Seminar to Institute of Cognitive Neuroscience] 17 November.

Fortier, M. (2002) *Theatre/Theory: An Introduction.* 2nd edn. London: Routledge.

Freeman, E. (2015) *Individual Differences in Multisensory Integration and Timing.* [Seminar to Institute of Cognitive Neuroscience] 19 January.

Fuster, J., 2013. *The Neuroscience of Freedom and Creativity: Our Predictive Brain*, United Kingdom: Cambridge University Press.

Gallese, V. & Goldman, A. (1998) *Mirror Neurons and The Simulation Theory of Mind-Reading*. TRENDS in Cognitive Sciences. 2 (12) pp. 493-501 [online] Available at: Science Direct doi:10.1016/S1364-6613(98)01262-5
[Accessed 4th November 2014].

Gallese, V. & Keysers, C. & Rizzolatti, G. (2004) *A Unifying View on the Basis of Social Cognition.* TRENDS in Cognitive sciences. 8 (9) pp. 396-403. [online] Available at: Science Direct www.sciencedirect.com/science/article/pii/S1364661304001846 [Accessed 3rd January 2015].

Gallese, V. (2007) *Before and Below 'Theory of Mind': Embodied Simulation and The Neural Correlates of Social Cognition.* Philosophical Transactions of the Royal Society B. 362 (1480) pp. 659-669. [online] Available at: Summon DOI: 10.1098/rstb.2006.2002 [Accessed 12th February 2015].

Gilbert, S. (2015) *Outsourcing Cognitive Control to the External Environment: The Role of Metacognition.* [Seminar to Institute of Cognitive Neuroscience] 9 February.

Grady, J. E. Oakley, T. Coulson, S. (1999) *Blending and Metaphor* [online] Available at: http://cogweb.ucla.edu/CogSci/Grady_99.html [Accessed 19th May 2015].

Grossenbacher, P.G. (2001). *Finding Consciousness in the Brain: A Neurocognitive Approach.* Amsterdam: John Benjamins Publishing Company.

Grotowski, J. (2002) *Towards a Poor Theatre.* New York: Routledge.

Hurley, P. E. (2010) *Theatre & Feeling*. Houndmills, Basingstoke, Hampshire: Palgrave Macmillan.

Kim, M. J., Loucks, R. A., Neta, M., Davis, F. C., Oler, J. A., Mazzulla, E. C., & Whalen, P. J. (2010) *Behind the Mask: The Influence of Mask-Type on Amygdala Response to Fearful Faces*. Social Cognitive and Affective Neuroscience 5(4) pp. 363–368. [online] Available at: http://doi.org/10.1093/scan/nsq014 [Accessed 2nd August].

Kemp, R. (2012) *Embodied Acting: What Neuroscience Tells Us About Performance.* London: Routledge.

Keysers, C. & Gazzola, V. (2007) *Intergration Simulation and Theory of Mind: From Self to Social Cognition.* TRENDS in Cognitive sciences. 11 (5) pp. 194-196. [online] Available at: Science Direct doi:10.1016/j.tics.2007.02.002 [Accessed 3rd January 2015].

Lamme, A.F. (2003) *Why Visual Attention and Awareness are Different.* TRENDS in Cognitive Sciences. 7 (1) pp. 12-18. [online] Available at: Science Direct doi:10.1016/S1364-6613(02)00013-X [Accessed 1st January 2015].

Lamme, A.F. (2006) *Towards a True Neural Stance on Consciousness.* TRENDS in Cognitive Sciences. 10 (11) pp. 494-501. [online] Available at: Science Direct doi:10.1016/j.tics.2006.09.001 [Accessed 1st January 2015].

Marshall, L., Oida, Y. and OIDA, M. (2007) *An Actor's Tricks (Methuen Drama)*. LONDON: METHUEN DRAMA.

McConachie, B. (2007) *Falsifiable Theories for Theatre and Performance Studies*. Theatre Journal. 59 (4) pp. 553-577. [online] Available at: Summon http://www.jstor.org.libaccess.hud.ac.uk/stable/25070111 [Accessed 6th January 2015].

McConachie, B. (2010) *The Actor, Image and Action: Acting and Cognitive Neuroscience (review)*. TDR: The Drama Review. 54 (2) pp. 183-184 [Online] Available at: *http://muse.jhu.edu.libaccess.hud.ac.uk/journals/the_drama_review/v054/54.2.mcconachie.html* [Accessed: 27th January 2015].

McConachie, B. & Hart, E. F. (eds.) (2010) *Performance and Cognition: Theatre Studies and the Cognitive Turn*. London: Routledge.

McConachie, B. (2011) *Engaging Audiences: a Cognitive Approach to Spectating in the Theatre*. 1st edn. Basingstoke: Palgrave Macmillan.

McConachie, B. (2011) *An Evolutionary Perspective on Play, Performance, and Ritual.* TDR: The Drama Review. 55 (4) pp. 33-48. [online] Accessed at: http://www.mitpressjournals.org/doi/abs/10.1162/DRAM_a_00120#.VOMHlbCsWRs [Accessed: 23rd October 2014].

McConachie, B. (2013) *Theatre & Mind*. United Kingdom: Palgrave Macmillan.

McCutcheon, J. R. and Sellers-Young, B. (eds.) (2013) *Embodied Consciousness: Performance Technologies*. 1st edn. Houndmills, Basingstoke, Hampsihire: Palgrave Macmillan.

Meltzoff, A.N. (2005) *Imitation and Other Minds: The "Like Me" Hypothesis.* Perspectives on Imitation: From Neuroscience to Social Science. 2 pp. 55-77 [Online] Available at: http://web.cs.swarthmore.edu/~meeden/DevelopmentalRobotics/05Meltzoff_Like_Me_Hypth.pdf [Accessed: 3rd October 2014].

Meyer-Dinkgrafe, D. (1997). *Barba's concepts of the pre-expressive and the third organ of the body of the theatre and theories of consciousness.* Contemporary Theatre Review. 7(1), pp. 35-47. [online] Available at: Summon 10.1080/10486809708568443 [Accessed 14th November 2014].

Molenberghs, P. Cunnington, R. Mattingley, J. B. (2009) *Is the Mirror Neuron System Involved in Imitation? A Short Review and Meta-analysis.* Neuroscience and Biobehavioural Reviews. 33 (7) pp. 975-980. [online] Available at: Science Direct doi:10.1016/j.neubiorev.2009.03.010 [Accessed 1 January 2015].

Nicholson, H. (2013) *Emotion.* Contemporary Theatre Review. 23 (1) pp. 20-22. [online] Available at: Summon 10.1080/10486801.2013.765106 [Accessed 1st July 2015].

Noland, C. (2009). *Agency and Embodiment: Performing Gestures/Producing Culture*. Harvard University Press.

Ochsner, K.N. & Kosslyn, S.M. (2014) *The Oxford Handbook of Cognitive Neuroscience.* Oxford: Oxford University Press.

Oida, Y. Marshall, L. (2007) *An Actor's Tricks.* London: Methuen Drama.

Okasha, S. & Binmore, K. (2012) *Evolution and Rationality: Decisions, Co-Operation and Strategic Behaviour*. Cambridge: Cambridge University Press.

Pashler, H. (2012) *Encyclopaedia of the Mind*. USA: Sage Publications, Inc.

di Pellegrino, G., Fadiga, L., Fogassi, L., Gallese, V. & Rizzolatti, G. (1992) *Understanding Motor Events: a Neurophysiological Study*. *Experimental Brain Research.* 91 (1) pp. 176-180. [online] Available at: Summon 10.1007/BF00230027 [Accessed 4th February 2015].

Purves, D., Augustine, G. J., Fitzpatrick, D., Hall, W. C., LaMantia, A., White, L. E. eds. (2012) *Neuroscience.* 5th edn. USA: Sinauer Associates, Inc.

Politser, P.E. (2008) *Neuroeconomics: a Guide to the New Science of Making Choices.* New York: Oxford Press University.

Riley, S.R. (2004). *Embodied Perceptual Practices: Towards an Embrained and Embodied Model of Mind for Use in Actor Training and Rehearsal.* Theatre Topics. 14 (2) pp. 445-471. [online] Available at: Summon http://www.jstor.org.libaccess.hud.ac.uk/stable/25069533 [Accessed 14th November 2015].

Rizzolatti, G. Craighero, L. (2004) *The Mirror-Neuron System.* Annual Review of Neuroscience. 3 pp.169-192. [online] Available at: DOI: 10.1146/annurev.neuro.27.070203.144230 [Accessed 10th December 2014].

Ruthrof, H. (2011) *From Kant's Monogram to Conceptual Blending.* Philosophy Today. 55 (2) pp. 111-126. [online] Available at: Summon http://search.proquest.com.libaccess.hud.ac.uk/docview/873824109?accountid=11526 [Accessed 3rd May 2015].

Shaughnessy, N. (2013) *Affective Performance and Cognitive Science: Body, Brain and Being.* London: Bloomsbury Methuen Drama.

Stanislavski, C. (1989) *An Actor Prepares*. 1st edn. United Kingdom: Theatre Arts Book.

Sterzer, P. & Kleinschmidt, A. (2010) *Anterior Insula Activations in Perceptual Paradigms: Often Observed but Barely Understood*. Brain structure & function, vol. 214, no. 5-6, pp. 611-622. [online] Available at: Summon doi:10.1007/s00429-010-0252-2 [Accessed 20th November].

The Woman in Black by Stephen Mallatratt. (2015) Directed by Robin Herford. The Fortune Theatre: London. [22nd July 2015]

The Woman in Black. (2015) *The Show*. [online] Available at: http://thewomaninblack.com/the-show. [Accessed 01 August 15].

Tsakiris, M. (2014) *The Plasticity of The Self: From Body-Ownership to Social Cognition.* [Seminar to Institute of Cognitive Neuroscience] 27 October.

Uddin, L.Q. & Iacoboni, M. & Lange, C. & Keenan, J.P. (2007) *The Self and Social Cognition: The Role of Cortical Midline Structures and Mirror Neurons.* TRENDS in Cognitive sciences. 11 (4) pp. 153-157. [online] Available at: Science Direct doi:10.1016/j.tics.2007.01.001 [Accessed 1st January 2015].

Victoria and Albert Museum. (N.D). *Theatre Histories*. [online] Available at: http://www.vam.ac.uk/page/t/theatre-history/ [Accessed 1st August 15].

Vignemont, F.D. & Singer, T. (2006) *The Empathic Brain: How, When and Why?* TRENDS in Cognitive Sciences. 10 (10) pp. 435-441. [online] Available at: Science Direct doi:10.1016/j.tics.2006.08.008 [Accessed 2nd January 2015]/

Vogeley, K., Bussfeld, P., Newen, A., Herrmann, S., Happé, F., Falkai, P., Maier, W., Shah, N.J., Fink, G.R. & Zilles, K. (2001) *Mind Reading: Neural Mechanisms of*

Theory of Mind and Self-Perspective. Neuroimage. 14 (1) pp. 170-181. [online] Avaliable at: Summon doi:10.1006/nimg.2001.0789 [Accessed 4th May 2015]/

Zarrilli, P., McConachie, B., Sorgenfrei, C. F. and Williams, G. J. (2006) *Intro Theatre Histories*. United Kingdom: Routledge.

Zarrilli, P.B. (2004) *Toward a Phenomenological Model of the Actor's Embodied Modes of Experience*. Theatre Journal. 56 (4) pp. 653-666. [online] Available at: Summon http://www.jstor.org.libaccess.hud.ac.uk/stable/25069533 [Accessed 14th November 2014].

Zarrilli, P.B. (2012) *Psychophysical at Work.* Taylor and Francis.

Zinder, D. (2009) *Body Voice Imagination.* Abingdon, NY: Routledge.

Whalen, P.J., Raila, H., Bennett, R. (2013) *Neuroscience and Facial Expressions of Emotion: The Role of Amygdala–Prefrontal Interactions.* Emotion Review. 5 (1) pp.78-83. [online] Available at: DOI: 10.1177/1754073912457231 [Accessed 10th November].

Whalen, P.J. (2014) *Neural Responses to the Multiple Meanings of Fear.* . [Seminar to Institute of Cognitive Neuroscience] 3 November.

Williams, G. J., McConachie, B. A., Sorgenfrei, C. F. and Zarrilli, P. B., Sorgenfrei, C.F. (2010) *Theatre Histories: An Introduction.* 2nd edn. New York: Routledge.

Williams, S.M., White, L. E., Mace, A. C. (2013) *Sylvius 4 Online* [online] Available at: http://sylvius.sinauer.com/ [Accessed 13th August].

White, G. (2013) *Audience Participation in Theatre: Aesthetics of the Invitation*. GB: Palgrave Macmillan M.U.A.