

GREEN SCREEN: THE ACTOR'S CHALLENGE

Nicolaas JACOBS & Marth MUNRO & Chris BROODRYK

University of Pretoria

Abstract

Introduction

The design options in the contemporary computerised era, lead to the digitised manipulation of proposed reality. Green screen is a technique used within film/television and permits compositing and manipulation of the proposed reality. This allows the filmmaker and the virtual designers to substitute the green screen area with whatever designed 'environment' the filmmaker desires. The challenges this pose to actors in being congruent with and thus creating (photo)realism in the designed world of the green screen is yet to be delineated and circumvented. When this technique is implemented it substantially limits the range of stimuli which the actor receives to feed his belief in the proposed circumstances and his behaviour. Such stimuli are crucial within the acting moment. Therefore within the green screen environment the actor has to imagine and experience that which will supplant the green screen and not the green screen itself – the end manipulated designed world. Within the field of acting, the principles and strategies of Stanislavsky's System – specifically his notion of the magic if - can assist the actor to successfully portray a character within an imagined environment. Acting reflects human behaviour and implements the body/mind paradigm to navigate the acting moment. Recent discoveries within the field of cognitive neuroscience have increased the understanding of human function and behaviour and substantiated Stanislavsky's notion of the magic if. However these discoveries have not been implemented within the green screen environment. Based on existing cognitive neuroscientific knowledge regarding acting, the magic if, imagery and the body/mind paradigm, we hypothesise that a strategy can be developed which will assist the actor in circumventing the challenges of green screen acting and promote verisimilitude within the designed world.

Method:

This paper is based on a qualitative approach and includes knowledge from books, articles, and internet sources. These sources include behind-scene-footage of films incorporating green screen. This type of research into the notion of magic if, substantiated by cognitive neuroscience with regards to the challenges posed by the green screen environment, assists in the theoretical development of acting explorations and an acting strategy to successfully navigate the green screen environment. In essence the demands of the green screen environment, the strategies of the magic if as an acting theory and practice, and the search for scientific validity through cognitive neuroscience of the magic if were triangulated

Results:

The cognitive neuroscientific investigation into the magic if and all its pertinent components allowed for the development of science-substantiated acting explorations which possibly enhance the actor's skills which he needs to utilise when working with green screen, as well as a science-based acting strategy which the actor can implement when faced with the green screen.

Conclusion:

Cognitive neuroscience provided the validity of the magic if approach, and then strongly suggested ways of expanding and using this strategy in acting for green screen. This forms a scientific basis for further empirical research in this domain.

Introduction

The contemporary computerised era permits the designer to digitally manipulate reality. Specifically within film and television the filmmaker incorporates this manipulation to place the actor within various environments and situations that are made possible through the use of advanced computer technology. This designed environment requires congruent character interaction. Green screen¹ technology, facilitates digital manipulation, yet limits or eliminates the external stimuli needed by the actor to achieve *scenic faith*, which is the actor's ability to 'believe' in the fictional world (Vakhtangov 1983, p. 141).

This article foregrounds the importance of congruency between the actor and visual effects and defines green screen technology with specific reference to the actor's role and challenges. It provides a possible solution by incorporating Stanislavsky's *magic if*, which requires the actor to ask himself 'What if' the proposed circumstances were true (Stanislavski 2010, pp. 52-54). The *magic if* assists the actor in achieving *scenic faith* (Stanislavsky 1967, p. 430). This article discusses recent discoveries in cognitive neuroscience to substantiate the implementation of the *magic if* to circumvent the challenges created by the green screen environment. The study provides a possible strategy to the actor to circumvent the challenges created by this technique.

Body

This article reports on a qualitative research project and utilises knowledge gained from a critical engagement with published scholarship and media sources. Behind-scene-footage of films implementing green screen technology was used. The triangulation of green screen, the *magic if* and cognitive neuroscience culminated into the development of explorations and strategies which could enhance the actor's skills when entering the green screen environment.

The Actor, visual effects and the green screen

In contemporary film and television the elaborate use of visual effects can be seen in works such as *Avatar* (Cameron 2009), *Once Upon A Time* (2011-), *Oz the Great and Powerful* (Raimi 2013), and even in works not considered to be visual effect works such as *CSI: NY* (2004-) and *Grey's Anatomy* (2005-). The importance of the actor being congruent with visual effects which forms part of the designed reality is critical. The visual effects team aims to create the vision of the filmmaker (Finance & Zwerman 2010, p. 37), while the actor endeavours to achieve the same vision through his acting. Barker and Austin (2000 p. 171) argue that special effects have to persuasively represent the diegetic world or "realistic fictional world" and be narratively cohesive, which allows the spectators to have faith in the diegetic world and to associate with the characters and their predicaments. Without congruency between the actor's character and the designed world, the narrative diegetic world will break down and destroy the (photo)realism of the effects. Keane (2007 p. 74) suggests that such a lack of congruency is visible in *The Lord of the Rings: The Two Towers* (Jackson 2002) when the CG character of Gollum seems weightless in a fight with the character Sam (Sean Astin). Here the lack of congruency between the real-life actor (Astin) and the CG character (Gollum) negatively influences the diegetic realism.

¹ Both the colours green and blue can be used; it depends on the colour and content that needs to be replaced as replacing that colour will replace all corresponding colours of the scene (Ryan Connelly in *Film Riot*, 2010).

Contemporary visual effects are mostly constructed by digital technology which has the capacity to manipulate images (Keane 2007, pp. 44, 61). Digital compositing within visual effects constructs a new image by altering and merging pre-existing images, where the goal of the constructed new image is to be perceived as if it was shot in the same conditions with one camera (Brinkmann 2008, p. 2). Each image that needs to be composited into a final composition can be seen as a layer. When the composition is complete, the separate layers or components become a single indivisible image or “stream” (Manovich 2002, p. 139). These composites can be comprised of an unlimited number of layers, which determine the complexity and cost of the images (Finance and Zwerman 2010, pp. 16-17). This illustrates the countless components that might be added after filming and which the actor has to incorporate into his imagination while shooting the scene.

Green screen technology or *matte processing* facilitates this process and permits the filmmaker to film the actor in front of a green screen and in post-production, substitute the green with whatever environment the filmmaker wants (Hanke & Yamazaki 2009, p. 2). Jeff Foster (2010, p. 13) frames the green screen procedure as follows:

The blue or green screen production process is primarily made up of three elements: the foreground subject, the colored screen background, and the target background that the subject is composited into...the matte is generated from the background color on original film or digital video footage and composited digitally through hardware or software applications...

Different uses of green screen

Green screen technology may be used for digital set extension. Here the screens are combined with existing set pieces, as demonstrated in the mini-series *John Adams* (Hooper 2008) (Foster 2010, p. 105, 108):



Figure 1: Green screen as backdrop as seen in *John Adams* (Hooper 2008).

In addition, green screen technology can construct the entire virtual set, where the actor can be filmed within a complete green room and then composited into a completely new designed environment, as seen below in *Ugly Betty* (2006-2010).



Figure 2: Green screen and the virtual set. America Ferrera in Ugly Betty (2006-2010). (“Still by author” taken from Stargate Studios Virtual Backlot Reel 2009)

Consider how complete ‘virtual worlds’ were generated in the film *Avatar* (Cameron 2009) (*Avatar: the filmmaking future is now* 2010, p. 2).

Another use of green screen is to cover part of the body with ‘green’, where the green area can then be erased and replaced digitally. In the film *Planet Terror* (Rodriguez 2007), the character Cherry Darling has a semi-automatic leg extension. *Scenic faith* is critical to achieve congruency between the physical leg and the imaginary weight, feel, walk impediment and body influence of a semi-automatic.



Figure 3: Body Replacement. Rose McGowan in Planet Terror (Rodriguez 2007). (“Still by author” taken from The 10 Minute Film School: Planet Terror [sa]).

In the film *Alice in Wonderland* (Burton 2010), green screen was used to create an entire outfit for Stayne, the Knave of Hearts (*Alice in Wonderland – Behind the scenes [Part2]* [sa]).



Figure 4: Green screen wardrobe. Crispin Glover, Johnny Depp and unknown actor in Alice in Wonderland (Burton 2010). (“Still by author” taken from Alice in Wonderland – Behind the scenes [Part2] [sa]).

The actor’s actions had to integrate with the character’s wardrobe digitally placed on him during postproduction. Similarly, green screen can even insert whole virtual characters, as can be seen above, where an actor is entirely enveloped in green to be substituted later by a CG character.

In the preceding examples, the actor faces the challenge of reacting and responding ‘as if’ his character was in the proposed circumstances that are finalised in postproduction. While an actor may be assisted by a pre-visualisation or moving storyboard as in *Land of the Lost* (Silberling 2009) (*Science of the Movies* 2009), for the actor to fully share in the filmmaker’s reality - to ‘believe’ in the constructed diegetic world and function within it - the actor needs imagination. Given the emphasis on the actor’s belief in his environment through the use

of imagination, an acting approach that stimulates and centres around the imagination is crucial. Stanislavsky's *magic if* is such an approach.

The actor: searching for a strategy

Stanislavsky's system consists of exercises and techniques developed to aid the actor in credibly portraying a character in the diegetic world by achieving *scenic faith*. Through conscious techniques the actor can stimulate the subconscious (Stanislavski 2010, pp. 17-18). Although this study focuses on the *magic if*, its implementation requires an understanding of other ideas and processes Stanislavsky promoted:

- *Experiencing* is achieved when the actor believes in the diegetic world and is 'living' in the now, within the moment of the scene (Carnicke 2009, pp. 129-130, 218; Stanislavski 2010, pp. 70, 154), and as the character, is absorbed within the environment (Spolin 1970, p. 642).
- *Psychotechnique* describes the synchronisation and communication of body/mind (Merlin 2007, p. 21; 2010a, p. 14; 2010b, pp. 4, 27) and its interrelatedness (Carnicke 2009, p. 222). The psychophysicality of the actor consists of three 'inner motive forces' or 'inner psychological drives': mind, emotion and will (Stanislavsky 1973, p. 247; Stanislavski 2010, p. 276; Merlin 2007, p. 162; 2010b, p. 15). Stanislavski (2010, p. 280) posits that the activation of one of these elements would activate the others. This concurs with Merlin's (2010b, p. 15) view that an engaged imagination geared towards the action will generate emotions authentic to the proposed circumstances. Within the green screen environment this is crucial.

The *magic if*

This study positions the *magic if* as a possible solution to the green screen challenge as it encourages the actor's imagination. The *magic if* assists the actor to 'believe' in the diegetic world, to entice creativity, and to generate feelings that are recognised as authentic within the character's proposed circumstances (Stanislavsky 1973, p. 50; Stanislavski 2010, p. 52). The *magic if* operates in conjunction with the given circumstances (Stanislavsky 1973, p. 51; Stanislavski 2010, p. 52). The given circumstances is shaped by the knowledge that can be deduced from the text (Gordon 2006, p. 51; Carnicke 2009, p. 218), including the history, social environment and any detail that might influence the character's actions (Carnicke 2009, p. 218). The production, directorial ideas and the presentation medium must also be considered (Carnicke 2009, p. 218; Merlin 2010a, p. 101). By acknowledging all these circumstances which are congruent to the design of the diegetic world (crucial to green screen), the actor has a foundation on which he can build his imaginative surroundings and create the character. The imaginative construction and created character leads the actor within the green screen space to answer the question "What if these circumstances were true?".

The implementation of the *magic if* requires the actor to accept the imaginary diegetic world, but it also spurs the actor toward action. As Stanislavski (2010, p. 67) put it, "What would I do if my fiction became fact?". Importantly, it is through action that imagination is communicated (Stanislavski 2010, p. 84). This question has been rephrased by many acting teachers as "what would I do if I were the character in the situation?" (Kemp 2012, p. 109). This reformulation is crucial as it encourages the actor to incorporate the character's personality (Kemp 2012, p. 109), an important step for the actor's actions to be congruent within the diegetic world and the visual effects.

The *magic if* thus permits the actor to infuse the virtual reality (a designed environment with given circumstances) with the lived green screen reality, which in turn connects the reality of the actor with the reality of the character. The actor uses the following components to build and sustain the diegetic world: imagination, sense memory, concentration, observation, communion, action and relaxation. All these components will be discussed later in the article.

A Neuroscientific foundation

As acting exhibits human behaviour, acting strategies need to be revisited from a neuroscience perspective (Blair 2008, p. 23). Each human organism, and therefore actor, has essentially the same brain structures and functions, which only differs in information and environmental reaction due to each individual's knowledge and experience (Lutterbie 2011, p. 12). Through brain imaging techniques neuroscientists obtained pictures of mental processes and cognition (Blair 2008, p. 11; Nataraja 2008, p. 72). The information gathered by these images is valuable to the actor and his own acting processes as it provides insight into brain processes (Blair 2008, p. 3).

Nataraja (2008, p. 156) posits that control over unconscious behaviour is possible through conscious understanding. This point suggests a parallel with Stanislavsky's view of accessing the subconscious through conscious strategies. Although the brain is divided into different areas it has to be considered that the brain operates in coordination and multimodality (Lutterbie 2011, p. 81). An important system that demonstrates this coordination and multimodality is the limbic system (Angevine 2002, p. 324), which includes the hypothalamus, hippocampus and amygdala and is responsible for emotion, behaviour and memory (Nataraja 2008, p. 61; Lutterbie 2011, p. 82). The functioning of the limbic system can be associated with Stanislavsky's 'inner psychological drives'. The limbic system, based on experience and existing need, reacts and interacts with the immediate surroundings and circumstances (Ward 2006, p. 28) in a way that promotes the involvement of the actor's own experiences in traversing green screen environments.

From a connectionist perspective (Kemp 2012, p. 94), the brain can communicate and activate multiple regions for a mental function due to the neural pathways that connects across the all-inclusive brain (Carson, 2010, pp. 45-46). This coordinated processing is denoted as parallel processing (Ward 2006, p.8; Nataraja 2008, p.53). Neural pathways are constructed from neurons, the essential component of any nervous system, which receive, process and communicate information quickly and accurately between each other (Kandel 2006, p. 443; Nataraja 2008, p. 48). Together these neurons form networks or "maps" which represent the self and the world (Damasio 2010, p. 18). To successfully navigate and operate within the environment these maps are activated (Blair 2008, p. 20).

Neurons and maps can be strengthened and altered. Neuroplasticity is the ability of the neural pathways to modify according to experience and environment (Nataraja 2008, p. 49; Kogan 2010, p. 86). The created maps are in a continuous shifting state (Damasio 2010, p. 66). The actor can take advantage of neuroplasticity to enhance and strengthen the brain maps concerned with the implementation of the *magic if* and its components. This can be done through exercising and repetition. The more a neural connection is activated the more it is embedded and strengthened (Nataraja 2008, p. 62; Kemp 2010, p. 95), resulting, if utilised correctly and with the required discipline, in a performance that is congruent with the diegetic world.

Neuroscience and the *magic if*

Within cognitive neuroscience the "as-if" body states, constructed from somatic experiences, are closely related to Stanislavsky's *magic if* (Blair 2008, p. 79) and substantiate the *magic if's* implementation by the actor. The "as-if" body states permit the brain to create and experience a body state not congruent with the present reality (Damasio 2003, p. 116). This allows the actor to create and experience the body state of the imaginary character within the imaginary circumstances "as-if" it were real. Experiencing these fictitious body

states is possible due to the perception of body states being imbedded in the maps of “somatosensing regions”, simultaneously aiding action by engaging the somatomotor regions (Damasio 2010, pp. 102-103).

The use of the *magic if* is also supported by Carson’s *envision brainset*, which are the neural maps responsible for the imagination (Carson 2010, pp. 16-17). The *envision brainset* works with mental imagery and hypothetical events recovered and instructed through related brain processes to those that process real events (Carson 2010, pp. 104, 107). Hypothetical thinking explicitly relates to the *magic if*; as Carson (2010, p. 110) states, this is a person’s ability to think in “What if?”.

Having established the neuroscientific background for the use of the *magic if* in an acting context, the study now turns to the various components of the *magic if* the actor needs to be aware of or even engage with.

a) *Imagination and sense memory*

Imagination consists of mental images forged from memories and environmental information (Kemp 2012, p. 110), it has the ability to arouse feelings associated with these images (Stanislavski 2010, p. 74), and the ability to consider “fictional circumstances” as reality (Carnicke 2009, p. 219). Sense memory is the recalling of sound, touch, sight, smell and taste (Easty 1992, p. 24). A memory is the reactivation of an existing neural pattern (Blair 2008, p. 20). It is stored within several brain areas, with each area storing different information of the memory. The existing pattern connects the areas when the memory is recalled (Carson 2010, p. 42). Actors implement their imaginary senses when utilising imagination (Stanislavsky 1987, pp. 20-21). Visual stimuli and imaginary recall activate similar neurons; this activation within the various regions, including the hippocampus and amygdala, is dependent on the object being imagined (Kreiman, Koch and Fried 2000, pp. 357-358). Thus imagination stimulates both memory (hippocampus) and feeling (amygdala). This is true for the other senses as any imaginary input activates similar areas to the actual sensory input and influences a person’s actions (Carson 2010, p. 108).

Vivid mental pictures and sensory recall activate similar neural maps as actual sensory stimuli and therefore appropriately influence his actions within the scene. With green screen the detailed imagined condition will aid the actor in experiencing the proposed circumstances. This experiencing and simultaneous existence is crucial to green screen acting. A theory pertinent to this co-existence of the physical and imaginative space is Fauconnier and Turner’s conceptual blending. This is a mental creation where two perceptions are compared and blended into a new perception (Lutterbie 2011, p. 174; Kemp 2012, p. 119). Fauconnier and Turner applied this theory to the audience view of the actor/character and reality/fiction relationship. Kemp (2010, p. 104-105) theorised that it can be applied to the actor’s perspective of the actor/character relationship. This study suggests that it can be applied to the actor’s perspective of the reality/fiction or green screen/fantasy relationship as well. Conceptual blending incorporates the body’s location, experience and configuration of the space (Lutterbie 2011, p. 174). Lobdell (2000, pp. 185-186) suggests the “Place” exercise which urges the actor to experience the moment of a specific place within the imagination through sensory detail, first with the eyes closed and then open so that the physical and imaginative worlds co-exist.

Stanislavski (2010, p. 72) argued that the most effective way for the actor to engage his imagination is by being an active participant within the imagination from a first person perspective, as this will elicit appropriate inner responses. Jackson, Brunet, Meltzoff and Decety (2005, p. 758) founded that imagination of oneself as a first person active participant stimulates neural networks more comprehensively than imagining another person in action. This substantiates Stanislavsky’s view of being an active participant or active imagination, in order to activate additional relevant neural patterns. The activation and preservation of imagination and sense memory requires concentration.

b) Concentration and observation

Concentration facilitates imagination (Stanislavsky 1967, p. 429), assists in controlling the images (Chekhov, 1991:9), and preserves the actor within the diegetic world among all the possible distractions (including green screen) of the 'outside' world (Gordon 2006, p. 46). Neuroscientifically, attention refers to the ability to prioritise what needs to be dealt with (Blair 2008, p. 61). This ability allows for the attention to connect to the essentials of the moment and immediate environment.

The control of attention is based on top-down (behavioural) and bottom-up (sensory input) sources (Vecera & Luck 2002, p. 270). The actor will utilise behavioural control as the green screen environment produces limited sensory input. Behavioural or top-down control is associated with the frontal brain area (Vecera & Luck 2002, pp. 271-272). Another attribute is that attention stabilises the spatial map (Kandel 2006, p. 312) which is critical in navigating the green screen space. Attention towards an event calls for observation. The actor creates from the given circumstances, imagination and his observations (McGaw, Stilson & Clark 2012, p. 98). Through observation and experience the actor can stimulate the imagination (O'Brien 1983, p. 132), and create characters congruent to the diegetic world (McGaw et al. 2012, p. 98).

The concept of neural reentry reveals the significance of observation. Edelman (in Kaag 2009, p. 196; Lutterbie 2011, p. 110) describes this process as the activation of neural maps of past experiences pertinent to the current lived situation; simultaneously developing new neural maps (influenced by the preceding maps), as a new experience. Past neural maps influence the current reactions of the person, while creating a new experience that will influence future behaviour congruent to the upcoming situation. Observation thus becomes crucial in building a neural repertoire for the actor relevant to various situations.

c) Communion

McGraw et al (2012, pp. 126-128) posits that the actor has to remember that there are always feelings and thoughts, or relations, to the environment. These relations reveal the stimulus behind actions. There is an endless exchange of actions (inner and outer) or *communion* (Stanislavsky 1973, pp. 194, 197) with the environment. Cognitive neuroscience agrees that when the organism involves an object there is a relation between the two (Simpkins & Simpkins 2010, p. 44). Relation is crucial as indicated by Chaikin, where he uses the image of a burning house to define the actor's relation to it – is he the owner, neighbour, witness, or journalist (Hulton 2010, p. 168)? Each relation will elicit another reaction. It is through communion using the imagination that feelings are aroused (Merlin 2010b, p. 185). This is substantiated by neural patterns firing and eliciting emotional responses when a real or remembered occurrence or object is detected by the brain (Damasio 2003, p. 53).

d) Action

Within film and television the actor's actions are crucial (Baron & Carnicke 2008, p. 1). Discovering the character's actions within the designed diegetic world and executing them successfully will promote congruency; but will also elicit appropriate feelings (McGaw et al. 2012, p. 28). This calls for congruency between the director's vision of, and the actor's interpretation of the designed world. When working within a virtual world a visual effects supervisor would generally be on set to ensure the actor's actions are congruent to the virtual world that will be added in post-production (*Science of the Movies* 2009). Action is crucial to psychophysicality for David Zinder (in Zarrilli 2009, p. 20), who states that the physical can stimulate the

imagination. Shared maps between physical movement and that of imagery or abstract thought, permits the body to kindle imagination (Kemp 2010, p. 109; 2012, pp. 99, 110-111).

The actor's relation to space is important as he will function within the physical green screen space and the virtual world space. Imagined space and physical space are represented or constructed differently within the brain (Ward 2006, p. 143), yet the hippocampus houses neurons or "place cells" which generate a spatial map of the environment and assists in navigating through the said environment (Simpkins and Simpkins 2010, p. 146). These neurons are also activated during the imagining of an environment (Ward 2006, p. 148). This insinuates that the actor can use these "place cells" to generate and learn (hippocampus is responsible for memory) the spatial map of the physical environment, as well as the imagined environment.

e) **Relaxation**

Relaxation expels tension within the body which can inhibit the creative progression necessary for acting (Stanislavski 2010, p. 120; Krasner 2012, p. 24). Relaxation is integral to promoting psychophysicality through the communicative "inner motive forces" (Merlin 2007, p. 32). Nataraja (2008, p. 31) and Lutterbie (2011, p. 22) agree on the influential and universal nature of the body and mind. When psychophysically relaxed, the actor can naturally adjust to the given circumstances of the diegetic world (Merlin 2007, p. 69), which is crucial to congruency. Tension impedes incoming sensations (Lobdell 2000, p. 181); when these sensations are imaginary (green screen), tension can significantly inhibit such sensations and prevent congruency.

A practice that is geared toward the holistic function and expression of the human organism, incorporating all the components discussed to access the *magic if*, is guided imagery. This strategy creates images which influence the body emotionally and physically (Hart 2008, p. 295) and involves the senses and emotions (Naparstek 2000, para. 2). Mental imagery can assist in experiencing sensory stimuli not present in the physical environment (Carson 2010, p. 108). This is substantiated by the discussions above on the *magic if*, imagination and sense memory. When applying guided imagery the following must be adhered to: internal quieting (relaxation), external quieting (concentration), intention, and relation with sensations and emotions (Epstein 1989, pp. 14-16, 23).

Explorations

The explorations designed within this study are based on the interrelatedness of green screen, the *magic if* and neuroscience; these explorations assist in the development of the skills actors require (supported by neural plasticity) to implement the *magic if* when entering the green screen environment. The successive explorations build the actor's capacity:



Figure 5: Schematic representation of explorations building toward strategy.

Below is one of the designed explorations incorporating relaxation, concentration, observation, imagination and sense memory. This exploration should result in greater congruency between actor and virtual environment.

Imagination and given circumstances exploration: familiar stories

- Close your eyes and take a few deep relaxing breaths.
- Decide on a specific familiar story, for example Romeo and Juliet.
- Decide on a specific scene in the story, for example the balcony scene.
- Place yourself actively (first person point of view) in the proposed environment from the perspective of one of the characters, for example Romeo.
- Vividly imagine all the sensory stimuli: What do you see from your chosen perspective? What do you hear? What do you smell? What do you physically feel in the environment from this perspective?
- As you vividly imagine all the sensory input, take your time and exist in this imaginary environment. The imagined environment must be vibrant and have movement, for example animals running around or Juliet coming out onto the balcony, because static imagery and moving imagery engage different neural maps.
- Now change your perspective to another character, for example Juliet.
- Vividly imagine all the sensory detail from her perspective.
- As you vividly imagine all the sensory input, take your time and just be in this imaginary environment. The imagined environment must be vibrant.
- When ready, take a few deep relaxing breaths and open your eyes.

Executing this exploration daily prepares the actor to accept various circumstances while constructing the diegetic world within his imagination. The actor needs to visualise and act according to the specifications of the director's or visual supervisor's ideas, resulting in congruency with the designed world added in postproduction. This exploration engages and strengthens the relevant imaginary neural patterns, which re-creates experiences congruent to the imagined environment and facilitates the manipulation of the imagination. Such manipulation in turn activates different neural maps (Carson 2010, p. 109).

Conclusion

This research project identified the challenges green screen poses to the actor and how the *magic if* can be implemented to circumvent these challenges. Drawing from cognitive neuroscience the *magic if* was substantiated and a strategy and explorations were developed to access the *magic if* when entering the green screen environment. The following were considered:

- Green screen: Implemented by the filmmaker to incorporate an alternate reality when constructing the diegetic world. By limiting the external stimuli the actor has to imagine, feel and act according to the designed reality that will be added in postproduction.
- *Magic if*: An acting strategy that stimulates the imagination in constructing the desired diegetic world for himself. This will lead to action, feeling and congruency with the designed world.
- Cognitive Neuroscience: Studies of the human brain and behaviour has substantiated the implementation of, and provided insight into the accessing of the *magic if*.
- Explorations and strategy: The knowledge gained through neuroscience assisted in the development of skill explorations and a strategy to implementing the *magic if* when working with green screen technology.

Filmmakers can, through digital design and compositing, create extraordinary environments, props, wardrobes, and digital characters, yet the actor adds to creating a sense of authenticity in the scene. Altogether, the utilisation of the above (imaginative and neuroscientific) processes and techniques should allow for a reciprocal congruent relationship between the designed virtual environment and the actor.

References

- Alice in Wonderland: behind the green screen – Part 2. [sa]. [Online Video]. [O]. Available: <http://www.fanpop.com/clubs/alice-in-wonderland-2010/videos/11415984/title/alice-wonderland-behind-scenes-part2> Accessed 30 May 2013.
- Angevine, JB. 2002. Nervous system, Organization of, in *Encyclopedia of the human brain, four-volume set, Vol. 3*, edited by VS Ramachandran. [s.l]: Academic Press, 313–371.
- Avatar: the filmmaking future is now. 2010. James Cameron and crew bring breathtaking stereoscopic 3D film to life using Adobe Creative Suit Production Software. [O]. Available: <http://www.adobe.com/showcase/casestudies/avatar/casestudy.pdf> Accessed 30 May 2013.
- Barker, M & Austin, T. 2000. *From Antz to Titanic: reinventing film analysis*. London: Pluto Press.
- Baron, C & Carnicke, SM. 2008. *Reframing screen performance*. Ann Arbor, MI: University of Michigan Press.
- Blair, R. 2008. *The actor, image, and action: acting and cognitive neuroscience*. London/New York: Routledge.
- Brinkmann, R. 2008. *The art and science of digital compositing: techniques for visual effects, animation and motion graphics*. Second edition. Burlington, VA: Morgan Kaufmann.
- Burton, T (dir). 2010. *Alice in Wonderland* [Film]. Walt Disney.
- Cameron, J (dir). 2009. *Avatar*. [Film]. Twentieth Century Fox.
- Carnicke, SM. 2009. *Stanislavsky in focus: An acting master for the twenty-first century*. Second edition. New York: Routledge.
- Carson, S. 2010. *Your creative brain: seven steps to maximize imagination, productivity, and innovation in your life*. San Francisco, CA: Jossey-Bass Wiley.
- Cole, T (ed.) 1983. *Acting: a handbook of the Stanislavsky method*. New York: Three Rivers.
- Cole, T & Chinoy, HK (eds). 1970. *Actors on acting: theories, techniques, and practices of the world's great actors, told in their own words*. New York: Three Rivers.
- CSI: NY. (2004–). [Television Programme]. Jerry Bruckheimer Television.
- Damasio, A. 2010. *Self comes to mind: constructing the conscious brain*. New York: Pantheon.
- Easty, ED. 1992. *On method acting*. New York: Ivy Books.
- Epstein, G. 1989. *Healing visualizations: creating health through imagery*. New York: Bantam Books.

- Finance, CL & Zwerman, S. 2010. *The visual effects producer: understanding the art of business of vfx*. Amsterdam, Boston, MA: Elsevier/Focal Press.
- Foster, J. 2010. *The green screen handbook: real-world production techniques*. Indianapolis, IA: Wiley.
- Gordon, R. 2006. *The purpose of playing: modern acting theories in perspective*. Ann Arbor, MI: University of Michigan Press.
- Grey's Anatomy*. (2005–). [Television Programme]. Shondaland.
- Hanke, J & Yamazaki, M. 2009. *Greenscreen made easy: keying and compositing techniques for indie filmmakers*. Studio City: Michael Wiese Productions.
- Hart, J. 2008. Guided imagery. *Alternative and Complementary Therapies* December, 14(6): 295–299.
- Hooper, T. (dir). 2008. *John Adams*. [Television Programme]. HBO Films.
- Hulton, D. 2010. Joseph Chaikin and aspects of actor training: possibilities rendered present, in *Actor training* edited by A Hodge. Second edition. London: Routledge, 164–183.
- Jackson, P. (dir). 2002. *The Lord of the Rings: The Two Towers*. [Film]. New Line Cinema. WingNut Films & The Saul Zaentz Company.
- Jackson, PL, Brunet, E, Meltzoff, AN & Decety, J. 2006. Empathy examined through the neural mechanisms involved in imagining how I feel versus how you feel pain. *Neuropsychologia* 44(5): 752–761.
- Kaag, J. 2009. The neurological dynamics of the imagination. *Phenomenology and the Cognitive Sciences* June, 8(2): 183–204.
- Kandel, ER. 2006. *In search of memory: the emergence of a new science of the mind*. New York: Norton.
- Keane, S. 2007. *Cinetech: film, convergence and new media*. New York: Palgrave Macmillan.
- Kemp, RJ. 2010. Embodied acting: cognitive foundations of performance. PhD dissertation, University of Pittsburgh, Pittsburgh.
- Kemp, R. 2012. *Embodied acting: what neuroscience tells us about performance*. London/New York: Routledge.
- Kogan, S. 2010. *The science of acting*. London: Routledge.
- Krasner, D (ed.). 2000. *Method acting reconsidered: theory, practice, future*. New York: St. Martin's Press.
- Krasner, D. 2012. *An actor's craft: the art and technique of acting*. New York: Palgrave Macmillan.
- Kreiman, G, Koch, C & Fried, I. 2000. Imagery neurons in the human brain. *Nature*, November, Vol. 408: 357–361.
- Lobdell, P. 2000. Practicing the paradox: addressing the creative state, in *Method acting reconsidered: theory, practice, future*, edited by D Krasner. New York: St. Martins Press, 197–187.

- Lutterbie, J. 2011. *Toward a general theory of acting: cognitive science and performance*. New York: Palgrave Macmillan.
- Manovich, L. 2002. *The language of new media*. Cambridge, MA: MIT Press.
- McGaw, C, Stilson, KL & Clark, LD. 2012. *Acting is believing*. 11th edition. Boston, MA: Wadsworth.
- Merlin, B. 2007. *The complete Stanislavsky toolkit*. London: Nick Hern.
- Merlin, B. 2010a. *Acting: the basics*. London/New York: Routledge.
- Merlin, B. 2010b. *Beyond Stanislavsky: the psycho-physical approach to actor training*. London: Nick Hern.
- Naparstek, B. 2000. *What is guided imagery?* [O]. Available: http://www.healthjourneys.com/what_is_guided_imagery.asp Accessed 20 May 2013.
- Nataraja, S. 2008. *The blissful brain: neuroscience and proof of the power of meditation*. London: Gaia (Octopus Publishing Group).
- O'Brien, ME. 1983. *Film acting: the techniques and history of acting for the camera*. New York: Arco.
- Once Upon A Time*. (2011–). [Television programme]. ABC Studios.
- Raimi, S. (dir). 2013. *Oz the great and powerful*. [Film]. Walt Disney Pictures & Roth Films.
- Ramachandran, VS. (ed.). 2002. *Encyclopedia of the human brain Vol 1–4*. [s.l]: Academic Press.
- Rodriguez, R. (dir). 2007. *Planet Terror*. [Film]. Dimension Films, Troublemaker Studios, Rodriguez International Pictures & The Weinstein Company.
- Rodriguez, R. (dir). [sa]. *The 10 Minute Film School: Planet Terror*. [Online Video]. [O]. Available: <http://www.veoh.com/watch/v155666065pb5n67y?h1=ten> Accessed 13 March 2013.
- Science of the Movies. 2009. *Episode #1.13*. [Television Programme]. Authentic Entertainment. Broadcast: 10:30, 25 August 2011, Discovery.
- Silberling, B. (dir). 2009. *Land of the Lost*. [Film]. Universal Pictures, Relativity Media, Sid & Marty Krofft Pictures & Mosaic Media Group.
- Simpkins, C & Simpkins, AM. 2010. *The dao of neuroscience: combining eastern and western principles for optimal therapeutic change*. New York: WW Norton.
- Spolin, V. 1970. Creative experience, in *Actors on acting: theories, techniques, and practices of the world's great actors, told in their own words*, edited by T Cole & HK Chinoy. New York: Three Rivers, 641–648.
- Stanislavski, K. 2010. *An actor's work*. Translated by J Benedetti. London: Routledge.
- Stanislavsky, C. 1967. *My life in art*. Translated by E Hapgood. Middlesex: Penguin Books.

Stanislavsky, C. 1973. *An actor prepares*. Translated by E Hapgood. London: Lewis Reprints.

Stanislavsky, C. 1987. *Creating a role*. Translated by E Hapgood. London: Eyre Methuen.

Stargatefilms 2009, Stargatefilms.tv: Stargate studios virtual backlot reel 2009. [Online Video]. [O]. Available: <http://www.youtube.com/watch?v=clnozSXYF4k> Accessed 12 March 2013.

Ugly Betty. (2006-2010). [Television Programme]. Silent H Productions, Ventanarosa Productions, Reveille Productions, Touchstone Television (2006-2007), ABC Studios (2007–2010).

Vakhtangov, E. 1983. Preparing for the role, in *Acting: a handbook of the Stanislavsky method*, edited by T Cole. New York: Three Rivers Press, 141–151.

Vecera, SP & Luck, SJ. 2002. Attention, in *Encyclopedia of the human brain, Vol. 1*, edited by VS Ramachandran. [s.l]: Academic Press, 269–284.

Ward, J. 2006. *The student's guide to cognitive neuroscience*. New York: Psychology Press.

Zarrilli, PB. 2009. *Psychophysical acting: an intercultural approach after Stanislavsky*. London/New York: Routledge.