Reshaping Spatiality: 
cognitive perception and the fracturing of theatrical space

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Thesis submitted for the degree of Doctor of Philosophy
Lancaster Institute for Contemporary Art
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September 2010
Declaration

I declare that this thesis is my own work and has not been submitted in substantially the same form for the award of a higher degree elsewhere.
Abstract

Drawing on the tenets of cognitive science, particularly Lakoff and Johnson’s writing on metaphor, this thesis investigates the ways in which perception is constructed spatially by focusing on contemporary artists’ engagement with rehearsal processes and performances where technology asserts control over the boundaries of space, centring specifically on the author’s own practice. This interrogation of theatricality includes three practical research projects (performances) and a three-chapter written thesis that explores the theoretical and practical concerns of artistic engagement with an understanding of space. This thesis explores the physicality of experience via cognitive science and positions it within the realm of the artist, addressing the ways in which material practitioners are always engaged in the experience of materiality.

In both the written and practical components of this thesis, I interrogate and propose that space is perceived and constructed not only physically but also experientially. One of the key methodologies of this thesis is to locate, articulate and reflect upon the complex interaction between writing and practice: how material practice affects discourse and vice versa. Chapter One investigates headspace, which is a feature of performance work that takes place largely in the head of an audience member, by using a set of techniques and technologies that subvert physical space — often including headphones worn by audience members. This chapter introduces many of the arguments of the larger thesis and establishes headspace as a viable term by reviewing the neurology of hearing and contemporary writing on sound reception, and through a dissection of four practical works, one of which was created by the author prior to this thesis: Whisper (Petralia, 2007), The Telephone Call (Cardiff, 2001), The Missing Voice (Cardiff, 1999) and Desire Paths (spell#7, 2004). Chapter Two concerns itself with aberrant pixel space, which, in the context of this project, is concerned with the internal architecture of the screen in relation to the external architecture of the stage in performance. Specifically, aberrant pixel space considers performances that use a cinematic and/or televisual frame that creates distinctions between what is in the shot, and what is not, uses the editing techniques of cinema/television, and plays with scale through its use of fragmented live performance and perfect screen imagery. Aberrant pixel space is explored through the creation of a practice-as-research performance work titled Virtuoso (working title) (Petralia, 2009), which uses screens that form the boundaries of a space whose logic is defined by the properties of the television landscape. The work of Big Art Group and Gregory Crewdson are positioned alongside Virtuoso (working title) to understand the characteristics of spaces that can be understood via the extended metaphor of the pixel. Chapter Three focuses on telematic rehearsal space, which suggests that processes of artistic creation are not fixed to specific geographical locations but are in fact transitory, existing in the interchange between physical space and the space of communication. Chapter Three specifically considers the use of videoconferencing in rehearsal processes, using three performances including two new pieces created by the author in collaboration with Tiffany Mills Company: the dance-theatre works Tomorrow’s Legs and Berries and Bulls, along with the work of other artists including Mabou Mines. The thesis concludes by interrogating the ways in which these three distinct spaces relate, reflecting on the ways in which space is contingent upon experience. Further, the conclusion discusses the ways that this thesis contributes to a new approach for understanding the making and witnessing process of live performance.
Acknowledgements

The research conducted in this PhD would not have been possible without the infrastructure, funding and reflective support of Proto-type Theater and Tiffany Mills Company, whose work is discussed in great detail throughout. My fellow Proto-type Theater company members, Rachel Baynton, Gillian Lees and Andrew Westerside not only participated materially in the creation of two of the major performance works discussed in this thesis, they also challenged me to be rigorous in my critical engagement with the work — from both professional and research perspectives. I am grateful for their patience with my often over-tax ed schedule. I am equally appreciative of the opportunity Tiffany Mills offered me to work with her company as a dramaturge for the past several years. Without the challenge of collaborating across geographic borders, much of the thinking in this thesis would never have occurred.

Dr. Andrew Quick, who has provided me with valuable insight and guidance especially in relation to understanding how my professional practice could become more critically reflective, has supervised this PhD. He helped build my confidence as a writer and encouraged me to seek out sources that I might have otherwise missed. Dr. Karen Jürs-Munby provided excellent feedback especially in the later stages of my writing and helped to sharpen my approach to the use of cognitive science in my writing. I must also thank Professor Robin Nelson from Central School, University of London whose encouragement of both my professional practice and my writing in Chapter Two have made me a better researcher. I would also like to acknowledge the support of other academic staff at Lancaster University who have offered their time generously to discuss ideas central to this thesis: Dr. Carl Lavery (now Aberystwyth), Dr. Martin Iddon (now Leeds), and Aanti Saario. I am indebted to Dr. Martin Blain at Manchester Metropolitan University Cheshire who introduced me to the concept of affordances. A special debt of gratitude must also go to Professor Jackie Stacey of Manchester University for whom I was a research assistant early on in my PhD. The time spent reading and re-reading her incredible writing set a standard of excellence that I hope to one day achieve.

The Overseas Research Council, now sadly defunct, provided the fees and tuition that allowed me to complete this PhD. The projects developed as part of this thesis have been supported and/or funded by Arts Council England through the National Lottery, Centre for Contemporary Art Glasgow, Nuffield Theatre Lancaster, Arion Dolphin Trust, Danspace, Baryshnikov Arts Centre, Dance New Amsterdam, the Creation Centre at Lanternhouse International, Battersea Arts Centre, Harkness Foundation for Dance, the Lower Manhattan Cultural Council and the many venues to which these works toured.

The first chapter in this PhD was published in an edited form in Volume 20, Issue 1 of *Contemporary Theatre Review*. The incredibly detailed feedback from their readers and from the editors Aoife Monks and Caridad Svich undoubtedly improved on my arguments. An excerpted version of Chapter Two was published in *Mapping Intermediality in Performance* (2010). I am grateful to Professor Robin Nelson for the invitation to participate in the book and also for his detailed, insightful feedback on my writing.

It was while on a long trip from Moscow to Beijing during the *Capturing the Moving Mind Conference* in 2005 that I decided to return to academia. The thrilling landscapes we moved through on the Trans-Siberian Railway were overshadowed by the mind-bending
conversations I had with Dr. Imre Szeman. In many ways, it was Imre who inspired me to consider that I might have something to offer the world in terms of critical thought. Had I never taken that trip, I may not have ended up spending the time and energy of the past many years thinking about what my practice means to me and to the greater ecology of performance studies. My sister, Rose Petralia, also deserves a gracious thanks, not only for her intensely detailed reading of my writing but also for reminding me that blood truly is thicker than water (as the saying goes). Whenever I began to doubt myself, I could always turn to her for a fresh perspective. My dearly departed friend and mentor Dooley Hitch did not live to see this PhD finished, but without even knowing it, he has inspired me throughout to keep going. I think of him often whenever I lose my way and I hope that he is resting peacefully, wherever he is.

Finally, I am humbled at the generosity and encouragement (both pastoral and financial) of my husband, Brian C. Johnson. He moved to a foreign country, changed jobs and reordered his entire life in order for me to pursue what seemed like quite a risky endeavour at the outset. His insightful eye as a former journalist has made itself known through my writing in the many corrections he has offered. I never thought I would be lucky enough to have a partner who would be willing to accept my many faults, let alone support my greatest leaps of faith. It goes without saying that this thesis would never have been written were not for Brian. There are not enough words to thank him.
# Reshaping Spatiality: *cognitive perception and the fracturing of theatrical space*

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Photograph © 2009 Julie Limberger.
**Introduction:** Experiencing space
A number of years ago, I had a particularly strong reaction to a piece by the New York based theatre company Elevator Repair Service (ERS) called *Room Tone* (2002), that is, in many ways, the beginning of the line of enquiry with which this thesis engages. I saw *Room Tone* at Performance Space 122 (PS122), in New York City, in the smaller of their two theatres, a space I knew quite well from frequently attending performances staged there. In the piece, the company had taken Henry James’ ghost-story-cum-novella *The Turn of the Screw* and mashed it up with his brother William James’ *Varieties of Human Experience*, “a psychological study of people who have had supernatural visions” (Cote, 2002). These two source texts were interwoven by ERS with fragmented dance sequences, moments of performer-audience intimacy, and occasional moments of slapstick to create a “haunting collage in which testimonials about divine ecstasy fade into scenes of a paranoid governess (Rinne Groff) guarding her wards against a sinister presence in a country mansion” (ibid). The defining features of the performance, at least as I experienced it, were the low hum (the room tone\(^1\)) that provided a constant, annoying soundtrack, and the dim lighting design which never seemed to brighten enough to allow me to make out the full details of the performers on stage. Of course, the dark lighting design and the piercing, low hum in the sound design were completely appropriate artistically to the supernatural subject matter *Room Tone* was exploring, but I ended the evening with a splitting headache.

\(^1\) A room tone “refers to the ambient sound in a room, which designers record in order to have white noise for filling in the gaps on a movie soundtrack” (Cote, 2002).
from the long time I had spent squinting in the darkness, unable to perceive the space on my own terms.

Immediately after seeing *Room Tone*, the friends with whom I had attended the piece asked me what I thought of it. I remember being so unsettled by the work that I said I hated it. Over the course of the next several years, I realised that I did not, in fact, *hate it*, but was simply unable to articulate its sensory impact on me in the immediate moments after the show. Perhaps, as the statement by Cote above suggests, the architecture *Room Tone* instigated in my psyche was just a bit too dark to face. Looking back, it is clear that the use of dim lighting and disorienting sound had not only given me a headache, but had also played a cognitive trick on me, destabilising my sense of spatial awareness and causing a (violent) reaction in response. Because I had frequented PS122 and felt a sense of familiarity with the theatre spaces, I may have expected that whatever work I was going to see would confine itself to my understanding of the spatial dimensions of the theatre. That is, my sense of the theatre’s spatial limits was caught off guard by the surprisingly simple theatrical techniques that ERS employed in *Room Tone*. By keeping my eyes strained and my ears distracted by a spatial tone that did not belong to the space that I was in, ERS not only gave me a splitting headache, but also transported me into a space for experiencing *Room Tone* that I did not expect. The space, which I knew so well, was no longer only the small downstairs theatre at PS122, nor was it merely the imagined space of a fictional, theatrical world. In *Room Tone* the space was shifted into a physical experience that left its marks on my body (via a headache) and in my memory. Indeed, in the years subsequent to seeing the piece, I have constantly returned to *Room Tone* in my mind to try to understand how a piece of theatre could have confused my senses so thoroughly. It is a common marketing trope to say that a piece of theatre will transport you to another realm.
But that imaginative, fictionalised spatial shifting is not what was at play in *Room Tone*. Using simply technologies, rather than the spectacular scenic wizardry of many big-budget goliaths, *Room Tone* managed to unsettle something fundamental in my definition of how space works and how it is even defined. I did not have the words to articulate this experience accurately at the time. It is only in retrospect that I have begun to theorise how my experience of *Room Tone* might suggest that technologies as simple as theatrical lighting and spatial sound might create alternate understandings of the limits of space.

**Research questions, terms, considerations and contexts**

Just as my experience of *Room Tone* changed over many years of reimagining and reflecting on it, so the questions at the heart of this thesis have evolved. Articulating research questions for a practice-as-research PhD is always a somewhat artificial process as it assumes a fixity that is not necessarily always possible or productive in ephemeral practices. My research questions have evolved in response to the practical explorations and critical reflections that this PhD thesis seeks to document. Now, at the end of the process, it has become apparent to me that my research has sought to answer the following three questions:

- How do domestic technologies (primarily television, headphone-based audio and the Internet) alter the way in which practitioners engage with spatiality in creating intermedial\(^3\) performances?
- How do those same technologies alter the way audience members experience and perceive the spatial elements of performance when practitioners employ those technologies?

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\(^2\) See section ‘The Framework’ for details on the methodology I am using in answering my research concerns and the section ‘The Chapters’ for an introduction of how the argument is represented in each chapter and how each chapter develops on the previous.

\(^3\) See section ‘Technology’ for more on what I mean by the term ‘intermedial’.
Because practice-as-research creates a situation where a practitioner is both inside of and outside of a creation process, is embodied cognitive science a potentially useful framework for practitioners to analyse their own work?

In answering the questions outlined above, this thesis will propose that domestic technologies (primarily video, sound, and Internet technologies) are reconfiguring the way that space is perceived and described in relation to contemporary performance practice by both audience members and practitioners. Recurring throughout my argument will be the terms technology, space and experience: big terms that in themselves could fill an entire thesis. In many ways a full analysis of these terms is not only beyond the scope of my thesis but also not necessary to understand my arguments, especially when the research contained on these pages is viewed in conjunction with the practical research (documented in the Appendices). However, it is important that the way in which I am using these terms is clear, so I will briefly touch on each of them in order to provide context for my writing.

Technology

Although the definition of technology is “the application of scientific knowledge for practical purposes”, its etymology (from the Greek “tekné”) suggests the term refers to a discourse between art and craft (Giannachi, 2004: 1; Soanes and Stevenson, 2005a). In fact, the shared etymology of art and technology could suggest that all art is technology and all technology is art. When I use the word technology in this thesis, I am referring to the external devices that mediate our interactions, making possible things that would not be possible using the body alone. In my usage, then, my fork is a technology as much as my mobile phone is one (although my fork is also a tool). However, I am not interested in forks per se in this thesis. Instead, I am focusing on electronic technologies, and
specifically domestic digital technologies that are increasingly moving from the private realm of the individual into the public realm of performance. These technologies, I believe, are of a different order than lighting, projection and other pervasive forms of stage technology because we have intimate relationships with them that change how they become meaningful. In essence, these are technologies that belong to the order of the personal rather than of the public: they are embodied technologies. More importantly for this thesis is the way in which these technologies are employed by artists; unlike usages of technology in performance in which the technology is primarily a more malleable form of scenography, the works I am discussing in this thesis are all intermedial. Greg Giesekam defines the term intermedial as:

… [a specific class of live performance work] where more extensive interaction between the performers and the various media reshape notions of character and acting, where neither the live material nor the recorded material would make much sense without the other, and where often the interaction between the media substantially modifies how the respective media conventionally functions and invites reflection upon their nature and methods. (Giesekam, 2007: 8)

Key to Giesekam’s definition is the notion that the live and recorded elements are so interrelated that they lose meaning when dislocated from one another. In this thesis I will reflect on the ways that this interconnectedness results not only in a specific quality of perceptual experience for an audience member, but is also a guiding feature inherent in the rehearsal process of artists working intermedially. It could be claimed that in many ways intermedial work owes a debt of gratitude to Bertolt Brecht’s Verfremdungseffekt, or defamiliarisation, one of his many “v-effects” that aimed to show the mechanics of theatricality as a way of creating a new understanding of what was being experienced by the audience (Hamilton, 2008). While this is true, in as much as history is cumulative, the work of this thesis is focused on, as Robin Nelson (2010: 15) puts it, “‘modern media’, their inherent (technological) inter-connectedness and their self-conscious interplay” and
“in the ‘mediatised’ in the sense of technologically (digitally) wrought, as it functions in performance”.

Technology has long been employed in theatre and there have been many authoritative studies of the impact of these on performance written by academics who are largely not practitioners, which I draw on where related in each chapter. These studies reflect an external, often historical, perspective of how and why certain technologies are impacting the production of, cultural significance of, and theory of theatrical practice. Writing from the outside of a process, of course, is in many ways less complex than writing as an artist about your own work; it affords a certain critical distance that is not informed by the act of literally making work. This is an incredibly useful perspective for someone like me, who does not have that distance, which is why I draw on many of these perspectives throughout this thesis. Some of the key writings on technology do not, however, come into this thesis in a significant way but inform the underlying context that this PhD is situated within and, therefore, bear a brief mention here.

In Chris Salter’s (2010) *Entangled*, the author provides a detailed historical analysis of the ways in which technology has been crucial to the development of artist practices including contemporary theatre practice. By reaching back to the Greeks, Salter traces the lineage of experiments in using technology on stage from mere scenographic elements to more current usages where the technology becomes so entangled with other elements of the performance that it becomes difficult to identify where the technology ends and the performance begins. He reminds us that Erwin Piscator is often cited as the first director to introduce projection to the theatre and he is known to have influenced Brecht’s use of

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projected titles in his plays to support a specific social/political agenda. Piscator was “preoccupied with raising class consciousness for the working class in preparation for the coming socialist revolution” and his productions utilised slides, rotating stages, and multiple projection screens (Salter, 2010: 33-35). His use of projection and slides was largely scenographic: he used large visual images to create effects that sought to enhance his political message (ibid.). Piscator’s employment of projection in theatre could, in some ways, be seen as a horizontal move of the screen-based technology from the frame of the cinema to the frame of the theatre house. After all, the projection of films took place in cinemas that were modelled after theatres (and sometimes were literally theatres that also featured live performance) and the relationship between the viewer and the projection screen was not drastically different in the way it was in Piscator’s theatrical projections: the language of cinema did not become translated to the language of theatre, it merely appeared in a different context. In one case, however, Piscator experimented beyond the fame of the screen. In Trotz Allen, which was a “mammoth historical pageant” that incorporated “film sequences with live performers”, the seeds of intermediality can be seen; in the piece, filmed scenes where interspersed with live choreographed sequences and the cutting between the live and the recorded built dramatic tension (ibid). In some ways, Piscator’s later experiments in using film and slides on stage suggested the potential for technology to move beyond the realm of simply supporting the theatrical intentions to actually structuring it.

In Steve Dixon’s (2007: 2) Digital Performance, he provides a comprehensive genealogy of digital performance which he describes as “all performance works where computer technologies play a key role rather than a subsidiary one in content, techniques, aesthetics, or delivery forms”. Dixon, like Salter, traces the lineage of the current use of digital
technologies to the analogue (and sometimes digital) technologies that were employed as far back as the Greeks, with a particular focus on the early avant-garde. His study is exhaustively researched and provides a useful tool for understanding how current digital arts practices relate to their antecedents, but, as one reviewer notes, the book does not provide much in the way of pedagogical guidance and much of its theoretical description is ambiguous and/or impenetrable (Farley, 2007).

Digital technologies (as opposed to the mechanical ones employed by Piscator) are a relative newcomer to the theatrical landscape. Even newer, are the media recording, transmitting or displaying technologies that have primarily found use by individual people in their private lives: televisions, iPods, mobile phones, the Internet, RIFD chips, and headphones. In the revised version of his book *Liveness*, Philip Auslander (2008: xii) claims that the major technology that orders our expectations of performance is now the Internet (in his previous volume, he asserted it was the television). The historical line from the Greek, whose “tekné” gives us the word technology, through the early avant-garde of Piscator, to intermedial performance as defined by Giesekam and Nelson, is a movement from the employment of technology as a supporting element to technology as an entangled part of the perception and creation of theatre. It is in territory of this most recent historical period that this thesis situates itself.

5 RFID stands for radio frequency identification device and are small chips that are embedded into everyday objects to cause real-world actions to occur. RFID is most commonly used in key fob devices that allow entry into locked buildings and also in some debit cards to allow ‘contactless’ payment processing.
Experience

The research in this thesis has been conducted through practice-as-research, a term which, in itself, suggests that new knowledge is being created by *doing* something in the world.\(^6\) The act of *doing* something implies a physical interaction with objects, ideas, or people, and how you describe that *doing* might be called *experience*. You can say that you *experience* an emotion, or an idea, or an inspiration, but for the purposes of this thesis at least, I presume that these non-physical terms are physically inspired. Let me explain what I mean by starting with the definition of experience from the *Oxford Dictionary of English*:

**noun**
1. [mass noun] practical contact with and observation of facts or events: he had learned his lesson by painful experience | she spoke from experience.
   - the knowledge or skill acquired by such means over time, especially that gained in a particular profession: you should have the necessary experience in health management.
2. an event or occurrence which leaves an impression on someone: audition day is an enjoyable experience for any seven-year old.

**verb**
-[with obj.] encounter or undergo (an event or occurrence): the company is experiencing difficulties.
(Soanes and (eds.), 2005)

Both the noun and the verb *experience* as defined above refer to a real-world interaction of some kind. In the case of the noun, this is articulated as having “practical contact” at its core although whether this infers *physical* contact is up for debate. The verb also refers to something that is or was an “occurrence”. So, in the most basic sense as defined by the *Oxford English Dictionary*, it seems that experience refers to something that a person has

\(^6\) For a good overview of practice-as-research as the act of creating knowledge by doing, see Nelson (2006). Practice-as-research also, in many ways, owes a debt of gratitude to Action Research, which is employed widely in the field of education. Action Research has a long history, dating back to at least the 1940s and is respected as a means to creating new knowledge through a cycle of collaborative action and reflection. Masters (1995) provides a thorough history and description of Action Research, which is a good starting point for understanding the ways its established principles could be applied to the newer area of practice-as-research.
had contact with and which might be referred to as an occurrence. The broadness of this way of understanding experience allows a lot of room for manoeuvre in terms of how the word is applied.

Staying with the Oxford reference books a moment longer, experience is defined in *The Oxford Dictionary of Philosophy* as “a stream of private events, known only to their possessor, and bearing at best problematic relationships to any other events, such as happenings in an external world or similar streams in other possessors” (Blackburn, 2008). In relation to philosophy, then, experience could be said to be “the conscious life of the possessor” (ibid). Defined this way, a mind-body split emerges where experience becomes the response of the mind to what happens to its body. This view is not scientifically accurate, as it suggests that the mind exists independently of the body. As I discuss in greater detail in Chapter Two, the mind and the body are linked in a number of complex ways and separating them creates a false sense of the way they function (and indeed how we make meaning of the world). The mind could not function properly without the body, as numerous *brain-in-the-vat* studies have shown. In these studies, a brain is shown to need “absolutely everything that the body normally provides — for example, sensory input and life support” in order to function at all (Gallagher and Zahavi, 2008: 131). Other research has shown something of the reverse: that observing physical actions in the world causes the same areas in the observer’s brain to activate as those that would be used to enact the action itself through the brain’s “mirror system” (Calvo-Merino et al., 2006: 1907). In other words, the part of our brain that causes our arms to move, for example, is the same part that imagines our arms moving, or understands what it means for another’s arm to move. The brain and the body are complexly interdependent, and any definition of experience that rests on the suggestion that they are separate is untenable.
Experience, then, in my usage of this term throughout this thesis, refers to the way that the body and mind create meaning through a process of being in the world. This definition is derived largely from the field of embodied cognitive science, which forms the framework for the way I will be structuring my argument throughout this thesis. Embodied cognitive science offers a way of thinking about practice that allows me to articulate my practical research on its own terms, without needing to separate out the doing from the meaning making. I delve more into this below in the section titled “The Framework” but it may be useful to pause here for a moment to note why cognitive science is employed by providing some context for my development as a practitioner and how it informs this research.

Embodied cognitive science appeals to my background in the experimental performance techniques of Jerzy Grotowski, Steven Wangh, Kristin Linklater and Anne Bogart, whom I studied and/or trained with in my early years as a performer. Fundamental to the approaches of each of these practitioners is the concept that the body is a storehouse of emotions and images at an unconscious level that can be accessed only through the body, not through the mind. Linklater, Bogart, Wangh and Grotowski each express his or her ideas differently and none of them, of course, discard the usefulness of the mind, but they all stress the body as an active meaning maker in the world, or container for emotion, sound or meaning. My interaction with and interest in the teachings of Grotowski spring from my undergraduate training at Warren Wilson College in North Carolina and at NYU’s Tisch School of the Arts where I became fascinated with the possibility that a character could be created from the body as a container for emotional states. Rather than trying to dredge up painful memories or somehow create a complete psychological picture

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7 For more on these practitioners see Wangh (2000), Bogart (2001; 2005), Linklater (1976) and Grotowski (2002).
for a performance, Grotowski offered me the possibility of looking at the structure of the body as a meaning maker in itself. Grotowski’s work became more approachable to me through my former teacher Steve Wangh’s incredibly useful book, *An Acrobat of the Heart* (Wangh, 2000), which puts Grotowski into a context that can include other avenues of working, but which still privileges the body. Anne Bogart’s work with viewpoints (developed from a system created by choreographer Mary Overlie and Wendell Beavers) provided me with a clever, non-narrative, non-prescriptive set of tools from which to approach making work. Her conception that it is possible to make performance by looking at the elements that form the core of performance (i.e., shape, space, movement, etc.) opened my eyes to a way of working that might be less linear and driven by instinct rather than organized by pre-determined logic. Linklater’s work with resonators, or vibrating chambers of sound within the physiology of the body, helped me to develop the technical skills necessary to be able to utilize my body as an instrument for communicating with the forms of Wangh and Bogart. In essence, all four of these practitioners seem to advocate a process that works from the outside (physical) in (psychological), as opposed to from the inside out as is commonly the case in many methods of acting.

The influence of Linklater, Bogart, Grotowski and Wangh on my early work as a performer led me to make several performance works as a director/writer that toyed with physical extremes, non-linearity and the idea of networked consciousness. This early

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8 Of course, I now recognize the potential for Grotowski’s work to be just as unwavering as the other systems Grotowski sought to destabilize. I also discovered during my training that Stanislavski’s system, which Grotowski was largely reacting against, developed in Stanislavski’s later life to include a much more physical approach to acting (Stanislavski and Hapgood, 2004).

9 I use the term networked consciousness to describe a process by which I sought to draw out the emotions and abstract ideas located within the physical bodies of my performers. I would suggest physical postures, sensations (such as the notion that the air the performers were moving through was charged, electric or dangerous, ideas borrowed from Joanne Akalaitis) and provide barriers which would lead the performers to access wildly unpredictable emotions and ideas that formed the basis for interpreting texts I had written. For more on Joanne Akalaitis, see Saivetz (2000). My early works included in this style of development include *Bunny’s Last Night in Limbo* (Petralia, 2001), *Cheap Thrills* (Petralia, 2002) and *Three Ring* (Petralia, 2003).
work developed with the introduction of elements of technology in my work from 2003; I saw this addition less as a divergence from a physical-theatre path and more as an evolution that viewed the mechanical in terms of its physicality, adding a layer of complexity to a process that retained its core principles. Indeed, my current artistic process centres on setting up situations, creating stimulus or posing questions, and then asking for a response from a spectator, audience member or participant. This approach means that my intention when creating work is not solely on content in the sense of stories or thematics (although stories are sometimes an element) nor is it solely on form (although formal innovation is a hallmark of my work). Instead, the key force guiding my creation processes is an interest that those who experience it (either as performers or as audience members) have a place in the work, that they have an experience that may go beyond an intellectual response to one that is physical, emotional or otherwise unexplainable in a disembodied, philosophical way. Of course, this investment, this physical response from an audience, can happen regardless of the intentions of a creator, but nonetheless a concern with the experience is the structural guidepost that forms the core of my process.

When I began this PhD, I was following my instincts that a theoretical framework that related to the way that my practice functions, that stressed experience, would evolve. Phenomenology might have seemed the most logical choice, but it only did part of the job for me. Phenomenology “seeks to understand to what extent our experience of the world, our experience of self and our experience of others are formed by and influenced by our embodiment” but “does not explain how the body interacts with the mind” (Gallagher and Zahavi, 2008: 136). Phenomenology alone would have left me with the ability to articulate experience in relation to my topic, but it may not have provided me enough with regard to understanding how those experiences are made into meaning. Embodied cognitive science,
on the other hand, is better positioned to use the strong philosophical work of phenomenology to help explain how doing and thinking are related. I describe cognitive science as it applies to this thesis in greater detail in the next section.

Space

Space has been theorised in a number of different ways; it has been defined in a suitably elastic way by the Oxford English Dictionary as “at once the container of everyday life (i.e. where we live) and an active agent in it (a social-acting force)” (Soanes and (eds.), 2006). The breadth of this definition supports the notion that how we conceive of space might affect how we perceive it. When I refer to space in this thesis, I am using it as both a container and as an active, lived agent. Because I am approaching my research through practice (that is, doing as meaning making), I am primarily concerned with the way space is perceived and constructed in relation to cognitive science. However, in order to fully understand the landscape within which I am working, it might be useful to briefly outline some of the major ways space has been theorised by some of the major scholars in this area.

Henri Lefebvre (1991: 4) has written extensively about space, arguing that there has been a misappropriation of the term which fails to “bridge the gap between the theoretical (epistemological) realm and the practical one, between mental and social, between the space of the philosophers and the space of people who deal with material things”. Lefebvre (ibid: 246) suggests that space has been falsely divided into three categories, which he calls “the triad”, by theorists from a wide range of artistic, scientific and literary fields. Lefebvre says that his triad of “perceived space, conceived space, and lived space — i.e. space as we see it (but also touch it, feel it, and so on), space as we design and build it, and
space as something we relate to in an emotional and affective way” are inseparable and the “real task of spatial thinking is to try to think of the three facets of space together” (Soanes and (eds.), 2006). One of Lefebvre’s (1991: 90) biggest concerns was that space was becoming fetishised “as space in itself, as space as such” as opposed to social, and therefore experienced, space. As a Marxist, much of Lefebvre’s argument is related to a resistance to commodification, to the notion that space is a thing that can be exchanged and traded. His notion of “social space” also suggests that space is materially important to how we live our lives. In describing people who exist in space, he says that the “behaviour of their space is at once vital and mortal: within it they develop, give expression to themselves, and encounter prohibitions; then they perish, and that same space contains their graves” (Lefebvre, 1991: 33-34). Lefebvre’s conception of space, although mainly philosophical, situates itself neatly with many of the conclusions I have derived about space through cognitive science, especially the notion that space is perceived through experience. I will elaborate more fully on cognitive science in relation to experience in the next section of this introduction.

Michel de Certeau (1984: 117) also places a primacy on experience when he distinguishes between a place (“an instantaneous configuration of positions”) and a space (“a practised place”). Lefebvre might insist that fixing space to a place turns it into a commodity that can be bought and sold, whereas de Certeau, unencumbered with Marxist leanings, seems to suggest that place is defined by geography and therefore exists as a thing in itself, to borrow Lefebvre’s turn of phrase (Lefebvre, 1991: 90). Indeed, de Certeau (1984: 118) describes a place as “ultimately reducible to the being-there of something dead”. De Certeau’s (ibid: 117) notion that space is created by activating a place, by taking “into

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10 For more on social space, see The Production of Space (Lefebvre, 1991: 68-168).
consideration vectors of direction, velocities and time variables” allows him to distinguish
the space of reading, of walking and of storytelling in relation to the physical places where
they occur (which are dead until activated). It seems Lefebvre and de Certeau agree on the
experienced nature of space, although the details of their position are clearly at odds.
Important to my argument in this thesis, however, is the emphasis they both place on how
experience constructs space and shapes our understanding of it.

Mark Augé does not define place or space in quite the same way as de Certeau but
experience is central to his position as well. For Augé (1995: 82) space is, usefully for his
argument, an abstract term that refers to “the non-symbolized surfaces of the planet”. He
goes on to say that the word space has become a catch-all, used widely to mean many
different things because it is often applied to “a distance between two things” and also to a
“temporal expanse (the space of a week)”. Place, on the other hand, is the symbolised
space, or place in the “anthropological sense” (ibid: 81). Augé (1995: 85) is more
concerned with the non-place, which in de Certeau’s formulation is “an absence of the
place from itself, caused by the name it has been given”. The phrase non-place was used
earlier by Lefebvre (2003: 38) to describe a place that “has no place and seeks a place of
its own”. Augé’s non-place, however, refers to those liminal places that are the product of
our age of mobility — the places that we are constantly moving through like the airport,
the bus terminal and the city street. He calls the non-place “a place of memory” (Augé,
1995: 78), which might suggest all those places we travel through (even abstract places
such as the Internet) are only conjured up in retrospect as memories void of meaning.

In each of these three views of space, experience is consistently referred to as a key
element in how space is understood. Even though Lefebvre, de Certeau and Augé take
different positions on what space (or in Augé’s articulation, place) actually is, each of their formulations takes into account the human interaction that is at play in understanding space. Earlier notions of how space could be mapped, of course, date back to the Greeks who developed Euclidean mathematics, which sought to measure, objectify and quantify the dimensions of physical reality through the use of consistent formulas known as theorems (Soanes and Stevenson, 2005b). The Greeks sought to establish fixed rules for understanding the shapes that ordered the universe regardless of any notion of experience; space was space as defined by the coordinates of lines and the mathematical equations that described physical reality (Clapham and Nicholson, 2009). With Einstein’s discovery of Relativity, however, the Euclidean concept of fixed spaces began to break down as it became clear that gravity impacts the shape of objects under its force (Philips, 2008). With Relativity, it becomes clear that experience is, indeed, key to how we understand space: an apple on Earth falls to the ground, defining the space of Earth as ordered top to bottom, while an apple on the Moon floats, defining space on the Moon as multi-directionally ordered. In many ways, the works of Lefebvre, de Certeau and Augé are each challenging Euclidean space on their own, non-mathematically based terms. Marshall McLuhan directly challenged Euclidean space when he said that “we can no longer live in Euclidean space” because technology had eliminated our ability to differentiate between inner and outer space altogether (McLuhan, 1960 in Cavell, 2003: 71). McLuhan also articulated a conception of space that focused on the active role we each place in shaping spatial relations when he coined the term “automorphic space” which refers to space that “we don’t get into but which, as it were, we put on” (McLuhan, 1959 in Cavell, 2003: 70, emphasis original). McLuhan’s automorphic space might come closest to my work as a director of theatre. With each new project I am charged with creating the space of each of my performances, of literally “putting on a performance”.
Each of these theorists offers possible frameworks for articulating and understanding my experience of the spatial elements of *Room Tone*, and each one would result in a slightly different understanding of space. While not discounting them (in fact, I will draw connections to their work throughout this thesis), my research has led me to the relatively young discipline of embodied cognitive science which links perception/movement to reason/meaning and which provides scientific support for many of the concepts of de Certeau, McLuhan, Augé and Lefebvre, among others. Rather than provide a definition of space vis-à-vis cognitive science here, I will unravel the complex ways space is constructed in each of the chapters throughout this thesis.

**The Framework**

Above, I noted that I did not choose embodied cognitive science as my framework at random. Indeed, I only came to it through my practice as it offered a “philosophy in the flesh” to borrow a term from George Lakoff and Mark Johnson (1999). In order to understand the way in which I will be discussing the works in this thesis, it is useful to start with a brief explanation of Lakoff and Johnson’s (ibid: 3) approach to cognitive science which challenges the core assumptions of Western philosophy, that “we can know our own minds by introspection, that most of our thinking about the world is literal and that reason is disembodied and universal”.\(^{11}\) Unseating these tenets, Lakoff and Johnson draw on cognitive science, which tells us the following:

\(^{11}\) Lakoff and Johnson’s sentiment certainly calls to mind the philosophy of phenomenologists who were seeking a break from Cartesian notions of perception, such as Merleau-Ponty who theorized perception as based on physical experience, embodiment and ‘becoming’. “For Merleau-Ponty, perception is always incarnate, context-specific and apprehended by a subject, and thus any knowledge or understanding is achieved through an ‘encounter’ in a subject-object inter-relationship” (Nelson, 2006: 110). A potential difference is that Lakoff and Johnson are still seating much of their arguments in the brain, although for them it is primarily in the unconscious, physical brain as opposed to the *cogito* of Descartes. Some of the
The mind is inherently embodied. Thought is mostly unconscious. Abstract concepts are largely metaphorical. (Lakoff and Johnson, 1999: 3)

Going into further detail, Lakoff and Johnson note:

The same neural and cognitive mechanisms that allow us to perceive and move around also create our conceptual systems and modes of reason. Thus, to understand reason we must understand the details of our visual system, our motor system, and the general mechanisms of neural binding. (Lakoff and Johnson, 1999: 4)

With these assertions, Lakoff and Johnson are suggesting a radical shift in the way in which we understand human perception and experience. Unlike semiotics which suggest a viewer can read the world in terms of the signs and symbols that abound, and unlike Jacques Lacan’s three orders of perception (the real, the imaginary and the symbolic) which suggest an initial ability to perceive the self as a whole being within the world that develops into an ability to read interactions within the world again in terms of symbols,\(^\text{12}\) Lakoff and Johnson suggest that physical experience is at the centre of understanding and that metaphor is used as a means by which to describe that experience. What this means for the study and reflection of performance/theatre is that many of our assumptions about what it is that people experience when they attend a performance (as spectators or performers) may be incomplete.\(^\text{13}\) For instance, cognitive science tells us, contra -semiotics and -psychoanalysis, that communication is not reducible to absolute signs and psychoanalysis, but instead that it is physical and largely contextual. As Malgorzata Sugiera (2002: 228) says, “in a context of communication all that is said, or any stimuli — gesture, gaze, movement, etc. — come [sic] with a presumption of relevance within the

\(^\text{12}\) This is a very simplistic description of both semiotics and Lacanian psychoanalysis necessitated by the brevity of this chapter. For more on semiotics see Aston and Savona (1991); for more on Lacanian psychoanalysis see Malone and Friedlander (2000).

\(^\text{13}\) There are not many published writings that make the connection between cognitive science and modes of understanding performance beyond a few essays and one edited collection. See McConachie and Hart (2006), Crane (2001) and Sugiera (2002).
interaction”. This suggests that the act of communicating is not *innately* meaningful without the physical relationships that situate it. If it is true that we evaluate the context of communication in order to understand and participate in it, then any analysis of the theatrical event has to take this into account; when we attend a theatre piece we view it within a context of knowing that we are in the role of the audience and knowing that the performers are performing, not to mention the many other contextual details that echo around us in every interaction. However experimental, environmental, or otherwise innovatory the setup of a performance space might be, in each new scenario we (as audience members) quickly assess our surroundings and develop assumptions based on both what we experience and the context within which it exists."This does not mean that we cannot be surprised, but it does mean we may not *read* work (to misappropriate a term from semiotics) in a purely objective sense. Oliver Sacks also reminds us that when we speak of context it does not only refer to our physical surroundings but also to ourselves:

Still, perceptual-cognitive processes, while physiological, are also personal — it is not a world that one perceives or constructs but *one’s own world* — and they lead to, are linked to, a perceptual self, with a will, an orientation, and a style of its own. (Sacks, 1995: 129, emphasis added)

In reminding us of our individuality, and the individuality of perception, Sacks also inadvertently touches on the fact that we are humans, and therefore our perception of the world is *human perception*.*15*

There is a great deal more at stake in investigating cognitive science’s relevance to theatre and performance studies, some of which is explored in the following chapters, but this brief introduction should suggest that it has clear relevance to performance creation and

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*14* This certainly extends to the expectations of audience members based on the marketing they have received as well, and I include the notion of expectation as part of the context of attending a performance.

*15* As humans, we have larger brains, highly studied/analyzed social networks and, most importantly egos. We can begin to understand what is at stake for humans when thinking about perception, because *we are* human. Merlin Donald, discusses the individuality of the way we perceive in his description of “Condillac sequences” in his book *A Mind So Rare* (Donald, 2001).
analysis. For instance, much performance analysis asks questions of what a particular scenic element, word, or movement in a performance might mean. Applying the principles of cognitive science to performance analysis resists this insistence on fixed, universal meaning — there is no absolute truth inscribed within the performances we witness (or perform), so questions like what did that colour choice signify or what is the meaning behind the use of microphones become an exercise in futility. Instead of searching for some pre-existing meaning in a work, cognitive science encourages the scholar to ask what their experience of the work was and how it affected them in the before, during and after moments of the performance. In other words, the influence of cognitive science might lead performance analysis into the realm of asking what did it do. The substantial alternative to two of the dominant models through which performance is often viewed (semiotics and psychoanalysis) and which cognitive science offers will inform my writing about the way we perceive space.

Lakoff and Johnson’s articulation of the embodied mind via cognitive science has caused concern among some who read their work too literally, missing the core concept of metaphor that drives their assertions. Among the most vocal in his opposition is Thomas Csordas (1999) who has argued that Lakoff and Johnson’s work does not go far enough in embracing embodiment. Csordas, criticizing Lakoff and Johnson’s earlier work, says:

Recent work has introduced the notion that the cognitive categories on which cultural knowledge is based are themselves grounded in the body (Johnson, 1987; Lakoff, 1987), and this has led to an understanding of culture as the body in the mind. This is surely an advance, but it allows the body to remain merely a source,

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17 Without wishing to pick a fight, for an example of the type of analysis I am trying to avoid here, see Weber (2004), who makes many claims about what is and is not theatre based on an apparent belief that it is possible to resolve theatricality via absolutes.
18 This thesis is not focusing primarily on semiotics or psychoanalysis. This thesis focuses on the applied nature of embodied cognitive science in relation to the making and doing of performance. Phenomenology, which could be argued to be another major model for analysing performance, is touched on throughout where it links with embodied cognitive science.
the objective raw material of representations rather than the seat of subjectivity and ground for intersubjectivity.
(Csordas, 1999: 150-151)

There is something valuable in Csordas’ desire to push the notion of embodiment to its extreme so that the focus of discussion moves away from the brain as a guiding force toward a more networked view that places primacy on the sensory receptors of the body. It is useful to remember that we are not simply machines guided by a supercomputer inside our heads, and I am certainly not advocating for any analysis that separates mind and body in this way. In fact, Lakoff and Johnson (1999: 37-38) articulate the relationship between mind-body in terms that seem surprisingly in synchrony with Csordas when they say, “in an embodied mind, it is conceivable that the same neural system engaged in perception (or in bodily movement) plays a central role in conception”. In other words doing and knowing are not as distinct as it might sometimes seem. Lakoff and Johnson are suggesting that the body is the mind in this brief passage, which they expound upon in a later section of Philosophy in the Flesh. I fear that Csordas performs a reversal of his own argument by claiming that the body is, in essence, more important than the brain. What Lakoff and Johnson, and the other embodied cognitive scientists I will employ through this thesis, do is to privilege the inter-relation between mind and body. Csordas is possibly throwing the baby out with the bathwater by dismissing the potential for cognitive science to help us understand how we make meaning in the body and out of the body. I want to stress that by invoking the potentialities of cognitive science I do not seek to flatten perception to a simple act of brainpower, as I am aware it is altogether more complicated than that.

Indeed, as Thomas Ingold (2000b: 244) states, “perception is not an ‘inside-the-head’ operation, performed upon the raw material of sensation, but takes place in the circuits that cross-cut the boundaries between the body, the brain and world”. Indeed, the crosscutting of boundaries that Ingold refers to is a fundamental aspect of theatre: the performance
flows across the boundary of the stage (whether physical or metaphorical) into the perceptive area of the audience and back again into the world in a continuous circuit, much like Ingold’s body-brain-world circuit. Mark Johnson articulates this flow from stage to audience member to world when he describes how space and experience are related to each other when listening to music. He says,

A future musical event — something that’s “coming” in a piece of music we’re listening to — exists in a musical space in front of the hearer and moves toward the hearer. When it reaches the stationary observer, it is experienced (heard), because it now exists in the present moment. Once the musical event has occurred for us, it exists only in the memory in the past, that is, in the metaphorical space behind the observer. (Johnson, 2007: 248)

Johnson’s description suggests that space is both metaphorical and physical here and that understanding how events move (or are experienced) can help us to understand what kind of space we are in. In sum, embodied cognitive science offers an approach to articulating the ways in which the physical body (which includes the brain) makes meaning of its spatial relations in the world through a network of perceptual-conceptual faculties.

The Chapters

Each of the following chapters employs embodied cognitive science to suggest that the way space is perceived and even conceived may be impacted by the way in which certain technologies shape and reshape our experience of space. Chapter One looks at the way some headphone performances destabilise the physically experienced space by creating spatially dynamic acoustics in the head of the listener. I suggest that this experience is headspace and describe it in relation to my headphone-based performance Whisper (Petralia, 2007) and the audio walks The Missing Voice (Case Study B) (Cardiff, 1999) and Desire Paths (spell#7, 2004). Key to Chapter One is a focus on how the use of stereo and binaural audio delivered through headphones in performance unsettles where the
performance space exists. By focusing on the spatial effect of the headphones, I am suggesting that how we define space, and how we experience it, can be altered by sending auditory signals to the brain/body that are not in synch with the signals being sent through our other senses. This first chapter builds the foundation for the way in which cognitive science can offer new possibilities for understanding performance work, especially for those of us conducting our work through practice as research.

Chapter Two moves from the auditory realm into the visual and looks at the way the pixel becomes the spatial referent in some performance works that use screens on stage, notably my work *Virtuoso (working title)* (Petralia, 2009). I make a metaphorical comparison between the pixel and the stage elements in *Virtuoso* by underscoring the way in which human perception sutures together fragmented sensory inputs in order to create meaning.¹⁹ Looking at the way human sight works in relation to meaning and space, Chapter Two expands on the discourse started in Chapter One around how our body/brain creates meaning through physical referents. I suggest that the scenography and performance style of *Virtuoso* effectively fracture any sense of an organic total space, which was always imaginary anyway. My analysis of *Virtuoso* emphasises the inability of performance to create a perfect whole in relation to space, and instead suggests that it is the audience member who sutures together the fragmentary performance elements into a cohesive, meaningful experience.

Chapter Three investigates both the aural and the visual in conjunction with each other, building on the groundwork of the first two chapters and moving into the complex realm of

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¹⁹ My use of the pixel as a metaphor is discussed in more detail in Chapter Two, and takes into account the differences between pixels and stage elements. *Virtuoso (working title)* was created as part of this PhD, and represents one of the practice-based outputs that contribute to my research. A DVD of *Virtuoso (working title)* is included as an appendix to this PhD.
the rehearsal room. I suggest that the notion of a rehearsal space has been problematised by the recent use of ubiquitous videoconferencing technologies in rehearsal processes not bounded by geographic proximity. Specifically, it examines the telematic rehearsal process used in two dance-theatre collaborations I have been involved in over the past few years, *Tomorrow’s Legs* (Mills, 2009) and *Berries and Bulls* (Mills, 2010a) where the space of the rehearsal room may exist in the online space between the collaborators. Augé might call the rehearsal space that I discuss in chapter three a *non-place* because the interactions take place in the transit zone of the Internet. Instead, I approach my attempt to locate the rehearsal room through the employment of cognitive science and what it tells us about how space is constructed through affordances.20 Ghosting throughout this chapter is a desire to master space; coming from the perspective of an experienced performance maker used to being able to control a rehearsal room, the process described in this chapter appears to be beyond the scope of my own physical geography owing to its telematic nature. Using cognitive science, I resituate the space of the rehearsal room as an interplay between the here, there and in-between.

Another pathway through this thesis is to follow the journey from sonic, to visual, to imaginative spaces as framed by embodied cognitive science. In each chapter, I question fundamental assumptions about how space is defined by situating my own practice alongside scientific, philosophical, and critical writings that suggest space truly is in the eye of the beholder. As this is a practice-as-research PhD, I have constructed my arguments through an active engagement with doing. In each chapter of this thesis, I reflect on my own practice, which is already reflective; in order to create the complex work I make as an artist, I am constantly responding to material and remaking it upon

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20 The rehearsal processes of *Tomorrow’s Legs* and *Berries and Bulls* were both part of my practical research for this PhD and video documentation of both pieces is included in the appendices. Affordances are discussed in detail in Chapter Three.
reflection. Mine is an art of practical revision, which is why embodied cognitive science fits so well into my articulation of my research, and why a non-practice based PhD would not have been possible. This thesis relies on the interplay between doing, thinking, and redoing in order to offer the reader a completely new way of understanding space, technology, and experience as manifested in performance. This thesis situates itself as a sometimes-playful investigation of how technology has shifted the way space is understood in relation to performance. Approaching my research from the perspective of a practitioner means that I am always referring to the inter-relation of doing and understanding; my conception of knowledge, as articulated here, relies on an embodied knowledge for which embodied cognitive science seems the perfect fit. Through the work done here, I am raising more questions than I am answering but it is my aim that these questions might suggest a new way of conceiving of how artists work with space and how audience members perceive these creations.
Chapter One: Headspace, architectural space in the brain
Headspace: architectural space in the brain

I remember hearing the sounds of footsteps going down concrete steps and then a metal gate slamming. The sounds reminded me of a large apartment block I stayed in briefly in the former West Berlin, which was immense, dark and foreboding. After the gate, there were different steps, with a heavier weight and texture to them, coming towards me, searching me out. And then a man’s voice saying, “Hello. Where are you? I can’t see you but I know you’re here.” The footsteps started getting closer. I remember thinking something ominous is about to happen. Yet, I was not in an apartment block in Berlin, and there could be no one coming to find me. In fact, I was standing in the lobby of the San Francisco Museum of Modern Art listening to sounds on headphones while looking through the viewfinder on a small camcorder. Not because I was sight seeing, but rather because I was being led in an alternate exploration of time and space by the Canadian artist Janet Cardiff with her piece The Telephone Call (2001). I have been to museums hundreds of times and often have used their audio guides as a way of getting more detailed information about the art I encounter. The Telephone Call borrows the format of an audio guide, but instead of commenting on the context or history of the art in the museum it provides a layered, narrative experience of the spaces through which it leads you. Over the course of approximately fifteen minutes, the voice of the artist led me through the museum and allowed me to eavesdrop on the conversations of those around me. Not only did I hear her voice, but I also heard a binaural recording of the museum spaces I was walking through and I saw a video recording of those same spaces through the camcorder viewfinder.\(^\text{21}\) The use of the pre-recorded sounds and images created a sense of being both

\(^{21}\) Binaural recordings are made by using a specialized set of microphones, which are worn over the ears of the person creating the recording or on a ‘dummy head’ that replicates the dimensions of a human head. By wearing the microphones in the same position that the headphones will eventually occupy, the recording captures sounds spatially true to life, storing the detailed positioning of every sound that approaches the
in the recorded past and in the live present. A strange narrative developed that Cardiff describes as being “about how our minds invent scenarios from chance meetings between people … about self-induced anxieties and how the fears we have change our perception of our world” (Cardiff and Miller, n.d.). The sense of anxiety that Cardiff mentions is tangible in the work, but more potent for me was the fascinating layering of real and recorded time that the headphone format created. My experience wandering through the SFMOMA in Cardiff’s alternate time zone has haunted me for years and is in many ways the start of a journey of discovery that this chapter explores.

*The Telephone Call* raises a number of theoretical concerns, primary among which is the notion of sound and physical presence being re-located to within a viewer’s brain through the use of headphones in live performance. I believe advanced headphone and post-headphone technologies offer unique opportunities for artists to create experiences that question notions of physicality, spatial awareness, perception and indeed the boundaries of reality. 22 In 2007, with the development of my own live performance piece, *Whisper* (Petralia, 2007), I began an investigation into the limits and potentialities of re-locating the performance space into the heads of those listening in the audience through the use of simple techniques developed for headphones. My inquiry was focused primarily on creating gaps in senses (between sight and sound, specifically) in order to tease out issues pertaining to *the real* in its most theoretical form as articulated by Lacan (1977). On reflection, however, I realized that something much more seductive was at play in the way sound seemed to create spatial dimensions in the head. After the practical exploration of position of the microphones. In other words, the sound that is recorded contains all the details of the sounds as heard from the relative position of the ears on the sides of our heads. When played back, the experience is incredibly disorienting: the sounds jump to life as if they are all around you, when in fact the sounds being played are pre-recorded and not there in your physical space.

22 Post-headphone refers to technologies such as the audio spotlight, which mimics the effect of headphones without the actual headphones (Holosonic, 2002).
these ideas via the creation of *Whisper*, I began a research into the neurology of the brain, the science of hearing and cognitive science, which has led me to term the architectural sound that this type of work creates as *headspace*.

*Headspace* refers to the way certain performance works elicit a sense of real spatial dimensionality in the head of an audience member by using a set of techniques and technologies that subvert physical space. Those techniques/technologies include (and there are certainly others):

- The use of stereo headphones, sensors, and interactive environments that blur the boundary between the performance space and the receptive space of the audience, bringing the performance closer to an audience member in a personal, tangible way, so that the performance seems to physically reside within the head of the audience member.
- Using stereo, surround- and binaural-sound to create spatial relationships with an audience member that may not be based on actual physical proximity.
- Eliminating or obfuscating physical performers to replace them with virtual or imagined ones.
- Making the subversion of real space a major component of the work by layering fictional space on top of a physically experienced real space. Work that does this is sometimes called Locative Media (Gibbs, 2004) and often takes the form of audio walks.
- Creating an inner-gaze through the use of second-person voice (you) and/or introspective text, which softens the focus of the audience/participant and places them at the centre of the work.
There are numerous overlaps in the list above with work that takes the form of virtual theatre (Giannachi, 2004), audio walks and virtual reality. There are also links to some types of theatre that take place in theatre buildings. It is important that it is clear that *headspace* is not a type of theatre, but rather an attempt to define the space where some headphone-based performance takes place. It is also a concept that, when understood, can be utilized to create incredibly seductive live (and mediatised) work. When discussing the concept of *headspace* with undergraduate students at Lancaster University, one of the frequent misunderstandings that arose was that *headspace* was indistinguishable from imagination. In fact, it is simultaneously subtler and more specific than that. In *headspace*, the world seems to be *inside you* (as a result of the listener’s relationship to the audio) and simultaneously present with other, outward images. But, more importantly, it is not only a layering of an internal, constructed *imagination* with an external *real* situation, but also that the effect is achieved using the full spatiality of sounds that are stereo, usually as heard through headphones. In *headspace*, all the dimensions of architectural space are co-located into the listener/participant’s brain. This means that hierarchies of space inside the head of the listener emerge, which locate a sound to a specific point within the dome of the head.23 As Ralf Beil says in an exhibition catalogue for the artist Janet Cardiff:

> Going beyond dramatic or psychoacoustic effects, a virtually physical, experiential space can come into being exclusively through the use of directional noises and sounds. As Cardiff says, “in our work we use that evolutionary ability to define location to create a physical narrative but also to create a sculptural space, to try to make the virtual into physical space, especially in the cinema pieces and the binaural walks.”
> (Beil, 2007: 74)

Because of sound’s ability to affect and create space in surprising ways, headphone performances provide fertile ground to “create a sculptural space, to try to make the virtual into physical space” (ibid) through an intensely focused and directed channelling of sounds

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23 This has also been called “lateralization”: a sound’s “apparent lateral position within the head” (Stern, Brown and Wang, 2005: 5).
to a discrete listener. Speaking of listening to music in an acoustically vibrant concert hall, Jourdain says:

   By surrounding us, music is transformed into an environment we inhabit, a world we are at the mercy of. Take a performance outside so that there are no walls to return reverberations, and music is reduced to one presence of many in the world rather than a world in itself. (1997: 20)

In much headphone-based performance, however, this effect is amplified exponentially: no longer are the acoustics of the room alone important, but also the acoustics within our heads. We are equally, if not more, at the mercy of the environment of sound, but unlike listening to music in a concert hall, the sound is both within us and around us. The act of listening is a process of transference that throbs, vacillates, and breathes: we are both aware of a sound’s location inside of us and undeniably feel as if the sounds are surrounding us from outside.24

The idea that binaural recording puts the listener both in a sound environment (an envelopment) and puts the sounds in the head of the listener (an embodiment) is not uniformly accepted. There are some who feel that binaural sound places the listener in the sound but do not think it puts the sound in the listener:

   Binaural rendering has several benefits for the user. Since the important cues for spatial hearing are conveyed, the user is able to localize sounds in direction and distance and to perceive envelopment. Sounds appear to originate somewhere outside the listener’s head as opposed to the in-head localization that occurs with conventional stereo headphone reproduction. The quality of binaural rendering is mostly determined by the localization performance, front-back discrimination, externalization and perceived sound coloration. (Breebaart et al., 2006: 2)

24 Blesser uses the narrative of destruction to describe this effect:

   Headphones create a spatial experience for a single individual. But for all their simplicity, when you listen to a stereophonic recording intended for loudspeakers, headphones destroy your perception of external space and location. The source location and spatial acoustics exist entirely inside your head, between your ears, not outside in the world. (Blesser and Salter, 2007: 187)
The sentiment that binaural recordings reverse the internalization of architecture and reorient it back out into the world is shared by other scholars of music when described in relation to music and sounds that are meant to be heard on their own without a theatrical encounter. Perhaps, taking a cue from cognitive science, it is not simply the mechanics of the technology that creates a sense of space in the head of a listener, but also the way in which the technology is approached, the context that surrounds it and the content contained within the technological framework.

In my introduction, I briefly touched on the way in which George Lakoff and Mark Johnson (1999) employ cognitive science to create an embodied understanding of how we make meaning in the world. Their work, along with the work of a number of other scientists and philosophers, has informed the way I have come to think of my own practice, especially in relation to what it means to experience the spatial elements of performance. It is important to note that I am not attempting an analysis that suggests the brain does all the work and acts as the central command centre for all experience. Rather, I am approaching cognitive science from an embodied perspective, which argues that there is a distinct interrelationship between the body and the brain and in that relationship meaning occurs. Shaun Gallagher and David Zahavi articulate my approach to cognition clearly in their book *The Phenomenological Mind:*

> [O]ur cognitive experience is shaped by an embodied brain. Indeed it is increasingly accepted that the brains we have are shaped by the bodies we have, and by our real world actions. Cognition is not only embodied, it is situated and, of course, it is situated because it is embodied. (Gallagher and Zahavi, 2008)

Lakoff and Johnson’s work with cognitive science provides a more playful point of departure for this particular chapter in their assertion that abstract thought is primarily metaphorical and that we primarily conceptualize experiences by using physical metaphors to explain sensation. For instance, “when we conceptualize [the] understanding of an idea… in terms of grasping an object… and failing to understand an idea as having it go right over our heads” (Lakoff and Johnson, 1999: 45) we are using the physical world to represent abstract concepts. When we say we grasp an idea, we are equating the physical act of holding onto something with understanding, and when we say that something has gone over our heads we use height and movement through space as a stand-in for our inability to understand something. Although I suspect that there may be metaphors that are not physical, Lakoff and Johnson cite hundreds as a way of suggesting that a large portion of abstract thought is conducted via metaphors rooted in the physical. These metaphors are also stored over time, so that when we encounter similar situations we have a metaphor available that helps to make sense of our experiences in the physical world. Not only are they stored, but they are also “forged and re-forged over time” as Tim Ingold (2000a: 285) eloquently argues in his essay about perception, ‘Stop, look and listen’. Csordas (1994: 151) finds Lakoff and Johnson’s use of metaphors problematic because he believes they have become “… abstracted from their bodily origins and transported to the representational structures of mind” as opposed to being “…phenomena of intelligent and intelligible bodies that animate lived experience”. But Lakoff and Johnson (1999: 78) are constantly returning to the body, not abstracting the body into the mind. They assert “meaning has to do with the ways in which we function meaningfully in the world and make sense of it via bodily and imaginative structures”. As I noted in my introduction, the

26 Lakoff and Johnson tease out the origins and universality of metaphors in Philosophy in the Flesh (Lakoff and Johnson, 1999) and Metaphors We Live By (Lakoff and Johnson, 2001).
notion that we understand our world through its physical dimension as Lakoff and Johnson seem to argue, appeals to my background as a practitioner.

Because I conduct my primary research through a process of creating situations in the world, I can appreciate the possibility that experience might be cognitively meaningful in and of itself. My investigation of headspace in this chapter benefits from the use of cognitive science as it gives me the tools to articulate my experience of making the work. I cannot remove myself from my experience at the centre of the creation process, but I can reflect on the way in which Whisper constructs an experience and what this might suggest for a broader theoretical facet of other performance works; cognitive science simply offers me the tools to do that. If abstract thought is conducted via metaphors based on the physical, what opportunities does this provoke in the creation of performance work? If we can accept what Lakoff and Johnson assert as being possible, and certainly there are those who would disagree, then my term headspace becomes a handy metaphor for explaining how sound affects a listener in headphone-based performance, and further, how the performance itself moves from out there in space to inside the head of the listener.

Using cognitive science as a framework, then, I will look at three performance works both in terms of their mechanical features and my experience of participating (as audience member, creator and/or listener) in these pieces. In order to provide an interesting cross section, I will be looking at Whisper (Petralia, 2007), a headphone-based live performance work that took place in a theatre; Desire Paths (spell#7, 2004), a headphone-based audio tour created by a theatre company that took place on the streets of Singapore; and The Missing Voice (Case Study B) (Cardiff, 1999), a headphone-based audio tour by a sound
artist that took place in London. Before delving into these works, however, I want to provide a brief discussion of some of the key features of hearing and listening.

**Hearing and Listening**

Taking the mantra of cognitive science on board, it is useful to think about the physical process that guides sound reception. What happens when we close our eyes? Our eyelids settle onto our faces; our sense of sight softens into shadows and colours, allowing the more subtle senses of sound, touch and smell to take precedence; a quieting occurs where sight shifts from being an outward process of receiving light reflection from the world around us and translating it into meaning, to an inward sight where we see shapes, colours and images in our imagination. Perhaps, we hear things we did not hear before, like the blind person whose sense of hearing has become more finely tuned than that of a sighted person. This may explain why people often close their eyes when they want to listen to music in a serious way. Closing our eyes enlivens the ears. Even without closing our eyes, the effects of sound can be astonishing.

The human sense of hearing is a relatively new and advanced evolutionary achievement. While most animals (including fish, mammals and reptiles) have some form of hearing or sound reception/response, what they hear is completely different than what most humans think of as hearing because of their brain size.

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27 It is worth noting that there are numerous artists working with headphone technologies in various contexts: theatrical, locative, virtual, etc. My goal in this chapter is not to catalogue all of them, but merely to touch on a sample that fit along a continuum of contexts and contents from the real world to the world of the theatre.

28 It is interesting to note that although sound waves are invisible to the naked eye, they can be transposed into visual representations. The popular music application iTunes includes a very basic visualization tool that maps sound waves to colors and movements. A more advanced method uses a modified “Schlieren optical system” which uses a mirror and razor blade to make heat appear (Beaty, n.d.). For more on seeing sound, see Diana Phillips Mahoney (2001).
One reason we hear music when animals don’t is that our brains are able to manipulate patterns of sound far more complex than those the brain of any other animal can manage. You’ll never see a goldfish twitching in time to a waltz, because it’s not a waltz’s notes, but rather relations between those notes, that make a body want to dance. It’s these relations... that are music, not the atmospheric vibrations that jiggle out of musical instruments. The vibrating molecules that convey music from an orchestra to our ears don’t “contain” sensation, only patterns. When a brain is able to model a pattern, meaningful sensation arises. When a brain isn’t up to the job, nothing occurs, and an animal’s experience of the world is that much less than our own.

(Beil, 2007: 62; Jourdain, 1997: 4-5)

For most animals, hearing is simply the reception of vibrations that are minimally processed by the brain to help them locate themselves, their food and, in some cases, to communicate. Human hearing also first evolved for localizing sounds, i.e. for determining where prey or predators might be in space, so it makes sense that the oldest portion of our brains (the brain stem, at the top of the spine) is where sound is first interpreted by our nervous systems once it has left our outer and inner ears. Sound is a series of vibrating particles until our brain processes and interprets those particles. For this interpretation to happen the vibration of the particles needs to be amplified, a job which our outer ears are perfectly constructed to do through their unique series of curves and valleys. In the process of amplification, sound is “diffracted and partly shadowed off by the skull” (Blauert, 1995) subtly changing the sounds entering each ear, which will later help the brain to determine the spatial relation of the source to the listener. These modified sounds then “enter the pinea-earcanal system, where their spectrum is modified by resonances” to create distortions in the sound, which further aid in placing the incoming sound in a spatial context (ibid). Once sounds reach the inner ear they “leave the physicist’s world of vibration and enter the psychologist’s world of information” (Jourdain, 1997: 12) making the essential leap into our nervous system where the brain processes the sounds.

29 For more on this “shadowing” that our heads create, see Jourdain (1997: 21). For a detailed description of the mechanics of how binaural hearing (localized sound) works see Stern, Brown and Wang (2005).

30 Our ears are constructed to amplify certain frequencies of sound over others. In humans, the ears are tuned to make speech frequencies (which are in the higher and middle range frequencies) louder. The outer ear
sound moves out of the brain stem and gets closer to the cortex, the more advanced portions of our brains begin to define the sounds or “sharpen them” to borrow a phrase from Robert Jourdain (1997: 28).

At this point in the journey of sound, it is useful to evoke Jourdain’s distinction between hearing (passive) and listening (active). We hear background noises; we hear all day long, and this activity happens in our brain stems. We listen with our cortices. In addition, there are nerve fibres that project from the brain directly into the inner ear to provide a kind of feedback circuit from the brain, possibly masking the sounds of our body when necessary or helping to filter out background noise in a loud room. So while much sound is processed by the brain stem to provide lower-level survival data, when we are actively listening to sounds we use a distinctly human portion of the brain that is able to filter out unwanted sounds. The auditory cortex is so sharp that neurons in this part of our brains respond after a hundredth of a second from a sound’s release (Jourdain, 1997: 53). We have a primary auditory cortex and a secondary auditory cortex on each side of our brains (corresponding to each ear). These are connected by a band of fibres called the Corpus Callosum that allows the two sides of the brain to share data. The primary auditory cortices are identical on each side of the brain, focused on “the properties of individual sounds” while the secondary auditory cortices are different on each side of the brain.

amplifies these frequencies, as does the middle ear (which acts as a transitional area so that sound travelling on air molecules can be heard in the fluid of our inner ear). In addition to amplifying sounds, the auditory system also acts as a means for excluding dangerous sounds. Jourdain describes the way the auditory system filters sound when he says,

The ossicles gladly transport a string quartet to the inner ear, but at a rock concert they slam on the brakes. Two tiny muscles grasp the ossicles, one pulling toward the eardrum, the other toward the inner ear. These muscles are always mildly contracted to hold the ossicles in place, but they reflexively tighten when a dangerously loud sound arrives, preventing as much as two-thirds of the sound’s energy from reaching the delicate inner ear…. Your ears also resist just the music that they should hear best: a song from your own throat. When you speak or sing, sound travels not only from your lips to the pinnae, but also straight through your head to the inner ear. In a sense, you hear yourself twice, once through the ear canal and once through bone. Bone conduction makes the sound louder than it would be otherwise, and changes the frequency content. This explains why we don’t recognize tape recordings of our own voices…no one else can ever hear your voice as you do. (Jourdain, 1997: 10-11)
Right-brain auditory cortex focuses on relations between *simultaneous* sounds. It ferrets out hierarchies of harmonic relations. The right brain has no advantage over the left when pure-frequency sounds are heard. But it comes to the fore when tones rich in overtones arrive. It is also particularly adept at analyzing the highly harmonic vowel sounds of language. In contrast, the secondary auditory cortex of the left hemisphere targets the relations between *successions* of sounds. It is concerned with hierarchies of sequencing, and it plays a prominent role in the perceptions of rhythm. Not surprisingly, the left-brain is also the seat of language, sequencing networks of ideas into chains of words. (Jourdain, 1997: 56-57, emphasis original)

After leaving the cortex, sound travels into the cerebellum, which:

- consists mainly of two hemispheres that receive their major input from the spinal cord and the cerebral cortex. However, a small, but important, part receives information from the vestibular system, the apparatus in the inner ear that signals information about our position in space and, therefore, helps us balance ourselves. (Garey, 2001)

The purpose of this complex system of listening and hearing is to allow us to *construct sounds within context* (i.e., our brains do not simply record a sound, but rather interpret it in its context to make meaning out of it) and to *hear spatially* (when sound comes at us, our position in space affects how we hear it). This quick tour through the mechanics of our auditory system seems to verify what cognitive science already tells us: our ability to make meaning, to understand a sound, to balance ourselves and understand our place in space are based in *physical processes* that are *contextual* and uniquely *human*. Given our advanced systems of hearing, it makes sense that many of us spend so much time enraptured by non-survival listening activities such as listening to music, whether recorded or live. As humans we are able to receive pleasure out of our sensory perceptions in a way that other animals seem to be biologically unable to accomplish. And in this era of iPods and mobile phones, much of the listening we do is amplified through tiny speakers on headphones. Knowing what we do about how sounds enter the brain and are processed, what effect does wearing headphones have on our perceptive systems?
Headphones as we know them today were most likely invented by BeyerDynamic in the 1930s and first sold to the public in 1937 (Anon., n.d.; BeyerDynamic, n.d.). An alternate, and difficult to verify, account says that a man from Utah named Nathaniel Baldwin invented headphones in 1910 and sold his first orders to the U.S. Navy before WWI (Bagley, 2001). The headphones created by both of these potential inventors are the descendants of the early earpieces used to amplify sounds from telephones and radio, which initially were too weak to be heard auditorily otherwise (ibid). These in turn trace their lineage to Thomas Edison’s talking machine, which he used to play the first sound recording in 1877 (Beil, 2007: 75). This etymology places the development of amplified, headphone-based sound during and at the end of the Victorian age, a time that included the first World’s Fair, increased population mobility and the first hand-held photographic cameras. This time coincided with a rise in individual-centred thinking, of the personal over the societal, and marks the beginning of globalization and the communication era. 31

Mass migrations at the end of the 19th Century and again after WWI and WWII profoundly changed urban enclaves around the world, creating more diverse and confusing cities, and rapidly increasing the speed at which ideas travelled the world. This global acceleration coincided with an increase in mass advertising, television and the rise of mega cities. It seems logical, then, that the privacy and solitude that headphones promised would be desirable at this incredibly turbulent time of change. You could even theorize headphones as a physical manifestation of the increasing solitude and personalization of the twentieth century: private listening in a time of increased interest in privacy and personal space. As Barry Blesser says, “...headphone listening is socially important simply because it allows individual listeners to maintain the privacy of their acoustic arenas while in a public setting” (2007: 191). During most of the twentieth century, however, few people had any

31 For an exhaustive history of the 20th century, see Eric Hobsbawm (1994).
use for headphones even if they could afford them, because there were few applications for them.  

The usefulness of headphones changed drastically when Brazilian Andreas Pavel invented the first portable music device, which became Sony’s Walkman in the 1970s. However, even Pavel had little idea of how radical his invention would become:

“Oh, it was purely aesthetic,” he said when asked his motivation in creating a portable personal stereo player. “It took years to discover that I had made a discovery and that I could file a patent.” Pavel still remembers when and where he was the first time he tested his invention and which piece of music he chose for his experiment. It was February 1972, he was in Switzerland with his girlfriend and the cassette they heard playing on their headphones was “Push Push,” a collaboration between the jazz flutist Herbie Mann and the blues-rock guitarist Duane Allman. (Rohter, 2005)

Suddenly, the average person had access to headphone-based listening. Headphones found their raison d’être for the masses in the Walkman, suddenly affording the average person the ability to connect physically and privately with the realm of recorded sound, and simultaneously creating an entire era of increased interest in commercial music. The name also speaks volumes about its other essential effect: allowing people to move, to walk, while listening to pre-recorded sounds. The portability of the Walkman, as much as the individuality of the device, set off a revolution in the way music is experienced that has found its latest expression in the form of the iPod. The Walkman, an incredibly personal device, also, in many ways, led to the development of a number of artistic interventions into audio technology, some of which I will look at below. But before I do, an important

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32 I remember as a child seeing my father listen to vinyl records on our massive entertainment centre (an oversized record player encased in a wood veneer) while wearing enormous headphones that dwarfed his head. I found the idea of headphones fascinating — music listened to in this way seemed to enclose me as a child in an incredibly seductive blanket of sound. When vinyl became less common and personal music devices were developed, I quickly acclimated to the effect of headphones. I am (like many people today) completely capable of navigating a busy street listening to headphones today, even while also being completely within the world of sound. This strange feeling of being both in the real world and in the world of sound is disorienting as soon as you think about it; but experienced unconsciously, it seems completely normal.
question remains: how does listening to sound on headphones affect the way we process and understand sound?

To begin to answer this question, it is useful to think about how the body interacts with the headphones. On the surface, the obvious interaction is in the physical contact of tiny amplification devices (speakers) with each ear, and often with a band of material that stretches over our heads to hold the headphones in place. In the case of ear buds, the speakers are so small that they fit within our outer ears. However, rather than acting as separate entities placed upon the head or in the ears to alter our hearing, I would suggest that headphones become intertwined with our hearing system, or entangled to use Salter’s term (2010). As Sue Broadhurst says, “rather than being separate from the body, technology becomes part of that body and alters and recreates our experiences in the world” (2006: 138). This is because we have a physical attachment to headphones when we listen, unlike when we listen to sound from speakers situated in space. They cannot remain other, separate, or the sounds they produce would be felt as sound is felt in a room with adequate space between the speaker and the listener. The closeness of the amplified sound to the body requires our hearing systems to embrace the apparatus as an extension of our natural hearing systems, to often-hypnotic effect. Indeed, “when sounds are presented over headphones, the sounds are usually perceived as being within the head” (Akeroyd, 2001). What at first might have seemed foreign (headphones), becomes assimilated by the auditory system as a set of mechanical ears, and in that assimilation the sound they produce comes closer, becomes a physical embodiment of sound, passing through the mechanics of an amplification system and literally into our brains. Whereas when listening

33 Although Broadhurst was not talking about headphones exclusively in this instance (but about digital technologies as applied in arts practices in general) it is easy to make the connection between her description of the embodiment of what she calls “new technologies” and headphones as I am describing them. She defines “new technologies” as including “motion tracking, artificial intelligence, 3D modeling and animation, robotics, digital paint, interactive sound technology, and biotechnology” (Broadhurst, 2006: 137).
to sound through standard speakers one also hears the other aural detritus of the environment, while listening on headphones those other sounds fall away, focusing the brain on the selected sounds played through the headphones. In addition, headphones have a personal relationship to the wearer that goes beyond a purely physical attachment: these objects live in our handbags, our backpacks or sit on our desks at work. We develop *intimate, private, and personal* relationships with our headphones simply due to the pervasive nature of them in our environments.\(^{34}\) The personal nature of the headphones as an object, their ability to sculpt sound, to exclude unwanted noise, and to bring sound closer raises a number of intriguing possibilities for artistic creation, especially when an understanding of the mechanics of the human auditory system and personal behaviour are borne in mind. If sound played over headphones has become part of the body, or more precisely, is in a state of becoming part of the body, then what effect do headphones have on the nature of the sound itself?\(^{35}\)

**Headspace**

As described in the preceding section of this chapter, we know that sound is first processed by the human brain as a way of locating the listener in space and indeed for locating other objects (the source of the sound) in relation to the listener. Only then, after locating the sound source spatially, does the brain process a sound in terms of meaning and emotion.

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\(^{34}\) Headphones are, for many people, a part of the daily commute, a tool for communicating (via teleconferencing, for instance), and are used to relax, avoid conversation or keep updated about world events (through podcasts, for instance). Headphones are a technology that has more to offer than the fork I described in my introduction: they are not simply tools but also become entangled in our self-identity. The proliferation of multi-coloured, patterned, and intricately adorned headphones (sold at increasing expensive prices) may be just one sign that headphones straddle a line between fashion accessory, digital tool, and an object of affiliation that aligns us with specific social or cultural groups.

\(^{35}\) For more on how technology impacts the way we think and how we relate to our bodies, see Celia Lury (1998), especially the second chapter which describes what Lury calls the “experimental individual”. She says, “every threshold, between inside and outside, private and public, past and present, is the boundary of a domain, a domain given depth by the perspective of merographic capacity. In so far as analogies are partial, each domain — the individual, society, nature — also participates and extends into another” (ibid: 13).
This primacy of spatial identification means that when we listen to music on headphones the first thing that happens is that we locate the source of the music, generally as merely to the left and to the right of our heads. This act of locating the source is nearly unconscious for most people, because we have become so accustomed to the effect of headphones. In a stereo track of music, we also hear the differences in the left and right channels, which serve to place the sounds more precisely as belonging to one side over the other. In more sophisticated recordings, such as those which use binaural recording, we also perceive depth of sound and more complex positioning which verges on the architectural.\textsuperscript{36} Binaural recordings are made by using a specialized set of microphones, which are worn over the ears of the person creating the recording. By wearing the microphones in the same position that the headphones will eventually occupy, the recording captures sounds spatially true to life, storing the detailed positioning of every sound that approaches the position of the microphones. In other words, the sound that is recorded contains all the details of the sounds as heard from the relative position of the ears on the sides of our heads. When played back, the experience is incredibly disorienting: the sounds jump to life as if they are all around you, or indeed, inside of your head. Recently, surround-sound headphones have been developed, which mimic the Dolby 5.1 surround sound technology usually associated with a set of five speakers arranged precisely in a room, but on small, personal headphones. These technologies each attempt in their own way a greater level of spatial detail to be present in the recording. When listening to a mono audio track, the level of spatial detail is relatively low. On the other hand,

[B]inaural and surround sound allow a physical experience of sound to be reconstructed in the listener’s consciousness where it then takes on hyperrealistic qualities. Like sculpture, it, too, takes on the features of volume, proportion, and physical presence.

(Mari, 2007: 14)

\textsuperscript{36} For more on the way the brain processes sound see Blauert (1995) and Jourdain (1997). For more on how binaural sound is processed by the brain see Stern, Brown and Wang (2005). For more on the idea of spatial awareness, and aural architecture, see Blesser and Salter (2007)
Taking Mari’s suggestion further, it seems that while headphones in general act as a filter to the sounds of the outside world and bring sounds closer, perhaps even becoming part of the body, surround-sound and binaural sound trick the cerebellum into thinking the sounds we are hearing are happening within and around us, so lifelike are they in terms of the mimicking of sound positioning. The cognitive trick that spatialised sound can play reorients our definition of space as belonging to the realm of physical volume, proportion and depth. With spatial sounds, the sculptural qualities Mari describes become architectural but also ghost-like: they are there (we hear them) but they are not (we do not see or feel them). Barry Blesser, one of the founders of digital music, describes the idea of aural architecture in relation to music in great detail in his book *Spaces Speak* (Blesser and Salter, 2007). His book focuses on aural architecture which he says “refers to the properties of a space that can be experienced by listening” (ibid: 5) and he describes the transposition of architecture into the brain thus: “auditory spatial awareness is the internal experience of an external environment. A physical space exists in the world, and the experience of that space exists in the listener’s consciousness” (ibid: 131). In headspace sometimes the physical space that has been created via binaural audio does not actually exist as physical space at all, as is the case with Whisper, which I discuss below. Going even further with the spatialisation of sounds in the head is a newer technology that leaves the headphones behind altogether. Developed by Holosonic, the Audio Spotlight turns sound into a beam that can be directed in a manner similar to a light beam so that sound can be focused onto an incredibly precise location (Holosonic, 2002). A person can literally walk into a spot that is inhabited by the sound. Take one step in either direction, and the sound goes completely silent. This precise directional sound creates a further complexity to the issue of sound’s spatiality by removing any sense of a source. As one reviewer of the technology remarked, “those voices in your head may be real” (Gartner,
In each of these cases the sound becomes endowed with physical dimensionality.

**Whisper**

*Whisper* (Petralia, 2007) was created over the course of six-months of scattered rehearsals, initially at the Centre for Contemporary Art in Glasgow as part of a residency I was granted, subsequently at the Nuffield Theatre Lancaster and later in rehearsal rooms at St. Martin’s College Lancaster. At the end of the first five weeks of rehearsal in Glasgow, I presented a work-in-progress showing of *Whisper* with an invited audience of forty-eight people. In this incarnation of the piece, there were four performers who stood on one half of a studio space, behind a large piece of semi-transparent polyester fabric.\(^3^9\) The performers were dressed in suits and dresses and the space behind the fabric was littered with microphones (four), microphone cables, a few theatrical lights, flashlights, small patches of carpeting, a set of small computer speakers, balloons, a bucket of water, an electric fan and various hand props.\(^4^0\) The performers each had a pair of headphones and a microphone on a microphone stand, and all of the sound ran to a sound desk located in the audience half of the studio space [see Figure 1.1]. The microphones were panned to a specific sound channel: Gillian Lees and Molly Haslund were stereo, Catherine Hoffman was left channel and Andrew Westerside (Wes) was the right channel.

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\(^3^7\) This reviewer’s comment that the sound seemed to be “in the head” when discussing the audio spotlight is merely one of dozens of cases of these advanced audio techniques being referred to metaphorically as being in the head.

\(^3^8\) See Västfjäll (2003) for more on the way spatial sound affects a listener’s understanding of presence and emotion.

\(^3^9\) Catherine Hoffman, Molly Haslund, Gillian Lees and Andrew Westerside generously volunteered their time to make *Whisper* happen. I am extremely grateful to them for their incredible commitment of time and their generosity of spirit in bringing the piece to life.

\(^4^0\) We had a number of conversations about what the performers should wear at this early stage and decided that they needed to be ‘dressed like an orchestra’ or like old time performers doing a radio play. We thought that by dressing professionally, there would be a seriousness to the ‘work’ that they were going to be doing during the performance. We wanted to look like they knew what they were doing.
Cables from the sound desk were run into headphone amplification boxes located underneath the seats in the audience, and to a smaller amplification device located in the performers’ area. These headphone amplification boxes allowed me to provide each audience member with a pair of headphones, left on each chair to be picked up when they entered the space. On these headphones, audience members could hear live texts and sounds as they were being projected into the performers’ microphones [see Figure 1.2] and pre-recorded texts and music replayed from the sound desk. On the day of the work-in-progress I operated the sound desk, a position that alters my ability to discuss the work from any remove, as I was intricately involved in performing it via my control of the sound inputs and outputs.
At this early stage of development, the performance of *Whisper* was structured as four loops of texts and sound effects that were separated by monologues, dialogue and, in one case, dance. For the first loop a pre-recorded text of approximately ten minutes was played, in which the four performers narrated a walk through a city that has features borrowed from Glasgow (where the piece was made and initially performed). The voices of the actors were digitally modified to sound deeper and slower, to highlight the fact that the text was pre-recorded and therefore possibly unreliable. A soundtrack of filmic, melodic music composed by Philip Reeder underscored the recorded text. This recorded text was written in the second person *you* voice so that when played back through the audience headphones, the listener would be placed in the work as the protagonist. While this text was being played, the live performers created sound effects into their microphones that related to specific elements of the narrative borrowing techniques from the Foley artist’s trade. For example, Molly Haslund had the job of doing all the *walking* sounds;

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41 Foley is a technique employed in the post-production of films where sound effects are created in a studio by sound artists, and then dubbed over the film to create more vibrant sounds. A good online resource for more information about Foley is available at http://www.marblehead.net/foley/.
whenever the text mentioned that the you in the story was walking, Molly would amplify the sound of her feet walking until the text said that the you had stopped walking. She also walked on various surfaces to create more accurate links with the text (i.e., she walked on a grass mat when the text mentioned that the pavement below your feet had turned to grass). Approximately eight minutes into the piece, near the end of the first loop, Gillian Lees approached the fabric curtain and began speaking live into her microphone, commenting on the text, undermining the narrative as written. This was the first moment in the work-in-progress version of Whisper where any of the actors spoke live. At this point, the recorded text describes a woman in a red coat who is “coming towards you” and Gillian contradicts this by saying “she is not actually wearing a red coat”. For the next minute Gillian sought to shift the audience focus by describing the things that were happening in the room at the moment: how hot the lighting was making it for the performers, how pleased she was that so many people came to see the work-in-progress, the fact that Catherine (who has red hair) was wearing a black suit and not a red coat. This destruction of the fictional frame came to an end with Catherine Hoffiman saying “Okay. Let’s go back. Let’s do it again.” At this, the lighting went dark, the performers reset the space in preparation for the second loop and Gillian lit her face with a flashlight. Under this shadowy light, she quickly made a confession about a time when she faked being sick to get out of work. This confession ended abruptly with a lighting shift that illuminated the performers fully for the first time. In this loop then, the primary performance modes were: (1) live sound effects synched with recorded second person text, (2) live text that seeks to denigrate the fictional text and frame, and (3) live text that is confessional, personal.

In loop two, the performers spoke the text live that had been heard on the recording in the first loop while also creating the accompanying sound effects. The difficulty level
increased substantially with the addition of the need to not only make sound effects but also speak coherently, resulting in an overall density and pacing shift. The repetition of the text was also an attempt to give the audience more opportunity to absorb the density of the material; since they will have already heard the text once, in the second listening they might be able to focus on other elements of the performance or catch details they missed the first time around. At the end of this loop with Molly Haslund’s line that mentions tears streaming down your face, Catherine approached Molly and described a time that she was at a funeral and she could not cry. This text, which is not scripted, mentioned children who are playing at the funeral, which Wes used as an impulse to behave like a child: he started popping balloons loudly into the microphone to disrupt her story. At each pop, Catherine stopped and restarted her story, until she eventually told Wes to stop. Throughout this, Gillian had been crying into her microphone, adjusting the intensity of her tears in conjunction with Catherine’s story. Catherine ended her story by saying that she wants everyone to be miserable at her funeral and Wes took this as a cue to start loop three by transforming the balloons he had been popping into the sound of gas streaming out of an oven. Reflecting back, I can see that there were three primary modes of performance in this loop: (1) live sound effects synchronised with live second person text, (2) live dialogue that is confessional, personal, and (3) directive text that shows a relation of performer to performer (as in Catherine’s instruction to Wes to stop disrupting her story).

Loop three began a destruction of the formality of the text and sounds. Gillian started with a line that related to the gas sound effect Wes was making, about a woman who was filling her flat with gas. After this line, Gillian changed the lighting to a brighter lighting cue and

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The gas sound effect coincides with part of the text that describes a woman who tried to kill herself by putting her head into her oven. Wes uses the death in Catherine’s story as a trigger to go back into the performance of the text/sounds. Importantly, the audience will have heard the gas sound effect two times by this point in the performance.
started randomly calling out lines and encouraging the others to do the related sound
effect. When they got one wrong or did not do it well enough, she would say it again. This
loop took approximately five minutes and during that time Gillian became more and more
frantic, calling out increasingly confusing versions of the text (which the audience by now
would have heard multiple times). Loop three ended when Gillian came to a line about
“the music that you heard which reminded you of San Francisco”. This line triggered Wes
to play a music fragment on a Dictaphone, and for Gillian to ask for some dancing. Molly
responded by starting a dance that involved slapping her boots and eventually Catherine
and Gillian join in. During the loud, athletic dancing, Wes came close to the fabric screen
and began answering a list of questions, without speaking the questions out loud. Molly
eventually heard Wes and left the dance to join him at the screen, where she read out the
questions without giving Wes an opportunity to answer. When Molly got to the question,
“How do you want to die?” Wes responded by saying “That’s enough. We’re going back.”
He then went to the lighting desk and turned out the lights, leaving Molly at the fabric with
a microphone. While the performers reset for loop four, Molly gave a confession about a
neighbour of hers who was on strong medication and who used to play loud music. In this
loop the performance modes from the previous loop were all present but with a more
chaotic and frantic style informing their delivery.

Loop four took the shape of a condensed version of the text that only included lines that
had sound effects associated with them. The performers ran through these fragmented
texts, performing the sounds as they spoke. After two minutes, Molly came to a line that
read “Where is she going?” to which Catherine responded, “She is going back. She is on a
horse going back.” This triggered a short sound sequence of a horse moving through the
room (and from the left channel to the right channel of the headphones), wind blowing and
As I mentioned earlier, I was the sound desk operator for the work-in-progress showing of *Whisper*, which meant that I did not get a chance to completely step out of the role of creator and into the role of spectator/audience member. I had always said that my goal for the first period of working on *Whisper* was to test whether something interesting could happen by having the audience listen to a performance through headphones, while watching that performance assemble in front of them. After taking time off, and then watching the video documentation of the showing, I came to feel that there was something very interesting at play in the way the mechanics of *Whisper* had been structured, but that it lacked focus, intention, and aural and visual clarity. These were instinctive responses based entirely on my own reaction to the material, and not based on any specific feedback from audience members. What interested me in reviewing the material was the density of the sensory input, the precision of many of the sound effects, the shifting of performance modes as a concept and the use of the you voice in the actual text. Less successful for me was the specific narrative in the baseline text (the recorded text in the first loop, which is then spoken live in subsequent loops), the confessional performance mode shifts, and the directional text that performers used to signal the beginning or end of a loop (i.e., “let’s go back”). It also struck me that the visuality of the piece was completely undeveloped and offered the possibility of creating disorienting effects if developed further. At this stage, *headspace* was only ghosting in this work — although there were sound effects coming into the headphones from different channels, there was so little cohesion that a full sense...
of a performance happening in your head did not emerge. The headphones on their own were not enough.

*Whisper* was completely revised after the work-in-progress and presented in July 2007 at the Nuffield Theatre, Lancaster, only to be revised again in a more subtle way in preparation for its subsequent tour. What is significant about the touring version of *Whisper* as compared to the work-in-progress *Whisper* described above is equally what it is, and what it is not; the only things that remained from the early version were the concept of the headphones, the second person *you* voice, the setup of the equipment, the use of Foley, and some of the specific sound effects. The text has been completely re-written to follow a more stable, consistent set of rules that allows for four primary modes of performance: (1) present-tense narration that takes the *you* of the audience on a walk in search of a strange sound along the streets of an imaginary city (with live sound effect creation), (2) past tense narration of *memories* that the *you* of the audience have, which are triggered from the main narrative (with live sound effect creation and pre-recorded musical accompaniment), (3) choreographic sequences that are sometimes layered on top of the narrations and are sometimes given space/time in their own right (with live sound effect creation and/or pre-recorded musical accompaniment), and (4) pre-recorded text that is played while the performers stand still, under complete illumination (with no sound effects). Another major shift was a move from four performers to three. In the touring version, *Whisper* is performed by Andrew Westerside, Gillian Lees, and Nicki Hobday, who each have their own microphone(s): Andrew is positioned SL and has the *right* channel of the headphones, Gillian is centre and has two stereo microphones (one at her feet and one for speaking), and Nicki is positioned SR and has the *left* channel of the headphones. Visually, *Whisper* transformed drastically [see Figures 1.3-1.5]. The semi-
transparent polyester fabric that was used as a curtain in the work-in-progress showing has been replaced by a white theatrical scrim (gauze) that can be made completely opaque or transparent via the lighting design, depending on the desired effect. Onto this scrim, giant, highly composed figurative shadows and silhouettes, colour fields, and low-tech visual effects are projected through a combination of tight choreography, clever lighting design and precise cueing.\textsuperscript{43} By adding this rich visual layer to the piece, a tension arises between the sense of sight and hearing in the audience member: sometimes the images that are seen on the screen are not what the sounds being heard suggest they should be. Throughout, a game of now you see it, now you do not is meant to tease the audience with the possibility of revelation: of the mechanics of the sound effect creation, of the performer’s bodies, and of the space itself.

\begin{figure}[h]
\centering
\includegraphics[width=\textwidth]{image.png}
\caption{“A Woman Gassing Herself”, \textit{Whisper} with lighting design}
\end{figure}

\textsuperscript{43} The lighting design was by Rebecca M.K. Makus, a long time collaborator of Proto-type Theater.
Whisper progressed from an exploration of live sound combined with recorded sounds heard through headphones to a complex toying with perception that began to destabilize any notion of where the performance itself was taking place. It could be possible to theorize that any performance happens in the interplay between the performance happening on stage and the reception of it in an audience member’s sensory perception, but with Whisper, the relation between the stage and the audience has become that much more complicated by the fact that the audience is joined to the performance via the wires of the headphone apparatus. Not only are audience members literally connected to the
performers, but also the sounds are primarily only audible through the headphones. If a casual observer were to enter the theatre after the performance had begun, he or she would witness a strange, largely silent scene. The development of *Whisper* from its early beginnings in Glasgow, where the sound was developed but the visual was not, would be reversed for this speculative visitor: the sound would be absent leaving the visual world as striking but baffling. So, much like any performance, it is in the combination of the heard and the seen that *Whisper* is completed. Unlike most performance however, the headphones act as an entry point into this juncture of sensory materials, completing the circle of the performance in the audience member’s head. The headphones are essential to the performance taking shape — what happens on the headphones is not simply the recitation of a narrative, but also the creation of a live, immersive, stereo sound environment that has the characteristics of space. *Whisper* capitalizes on the mechanics of hearing by using what has been called “spatial hearing”. As Breebaart (2006: 2) explains, “spatial hearing relies to a great extent on binaural cues like time-, level- and spectral differences between the left and right ear signals”. In other words, the difference in what is heard in the left ear versus what is heard in the right ear establishes a specific spatial relationship between the listener and the sound source. Typically, spatial hearing places the sounds in space *around* the listener, but in the case of *Whisper*, the sound is simultaneously spatially relocated into the acoustic shell of the brain and in the imagined space around the listener. To create the effect of sounds moving inside of the head, I positioned the performers in different relationships to the microphone: for a sound that was meant to be directly in the place of the listener’s ear, a performer spoke in the centre of the microphone; for a sound meant to be higher up towards the top of the head, a performer moved to the left/right of centre (depending on which way their microphone was panned);

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44 Depending on the venue, you can hear some sounds when the headphones are not worn, but it is very difficult to make out any details.
for a sound that moved across the space the performers moved from one microphone to another, pivoting around each microphone as they went, thereby creating the effect of sound moving from one side of the head, up and around to the other. These are simple techniques, but their effect is extremely seductive, especially when combined with the visual shadow play that often creates visual disjuncture to the sounds. In Whisper, take any element of the mechanics away and suddenly there is no performance. Perhaps, then, this is what makes Whisper so interesting: not only does the stereo sound physically reconstruct space within the heads of the audience members, but the visual interplay between what the audience imagines and what they see on the stage creates a tension that forces a constant revising of the experience, a constant questioning of what is real.

Whisper is not just a form, of course, but also an experience that is filled with possible meanings. As I mentioned above, I was operating the sound for the performances so my place in relation to the work as performed is somewhat compromised. However, there are certainly relationships between the aesthetics and mechanics of Whisper and the meanings it evokes which even I feel confident noting. Throughout, the text of Whisper returns to echoes of death, memory and the loneliness of feeling invisible in a city, and this content is amplified through the use of evocative sounds and striking visuals which are often fractured, scattered, and distorted. For instance, about ten minutes in, Nicki describes the street that you are walking on for the first time, pointing out two old ladies smoking cigarettes under an umbrella. Nicki says, “you wave at them but they don’t seem to notice. You wave again and listen to the sound of your hand cutting through the air”. While this is happening, the silhouette of Nicki becomes distorted and enormous on the SL side of the stage while an oversized shadow of an umbrella appears on the SR side of the stage [see Figure 1.4]. Nicki also uses a long bamboo cane to create a loud whipping sound that she
amplifies for the sound of the “hand cutting through the air”. In this sequence, the
performance draws me to the minutiae of sound (in this case my hand cutting through the
air) while also throwing up images that might call to mind a Munch painting. Importantly,
the text of Whisper is almost entirely focused on a walk through a city. For many people,
the city is experienced as a layered sonic experience; people often wear headphones as
they commute from one place to another in big cities, hearing the sounds that are playing
on their music device layered on top of any detritus from the city’s sonic landscape. The
headphones that audience members wear while experiencing Whisper correlate to the
headphones they might wear while moving through a city in their real lives outside of the
theatre. For some, this connection will not be explicit (or present at all); for others,
including myself, the headphones trigger a physical memory of walking in New York,
London, Berlin or Beijing that becomes entangled with the fictional world being narrated
via the performers’ voices. The experience of watching Whisper was not only disorienting
for me (does my hand really sound like that when I wave?), but also disturbing. The
onslaught of sensory information is not just any sensory information: it is a carefully
edited selection of rather morose narrative elements that seem to question the nature of
how we perceive the world. Even knowing what I do about how the piece was created,
when I watch Whisper, I cannot help but find my thoughts drifting to darker places. The
constant references to suicide, death and the dark potential of dreams inherent in the text
are heightened by the suggestive nature of the hazy visual imagery. The shadowy figures
on the screen merely suggest bodies and movement without fully delivering them. The
many gaps in Whisper’s sensory detail allow me to make my own connections and draw
my own conclusions. The fact that I find my mind going to dark thoughts when I watch
Whisper may say more about me than it does about the piece itself.
Desire Paths

*Whisper* is the only theatre piece that I am aware of that uses the headphone versus cinematic visuals setup that is described above, although there have been many other theatre artists using headphones both in the theatre and in the landscape of the city. The question is, does *headspace* only relate to performances which function in the manner that *Whisper* functioned, or can it work in other applications? An interesting case study is Singapore-based company spell#7’s *Desire Paths* (2004), an audio tour through Singapore’s Little India neighbourhood. *Desire Paths* was originally conceived as a performance walk called *Kinda’ Hot* (2002), which the company describes as follows:

*Kinda’ Hot* was due to be a performance tour of Little India, where spell#7 are based. Structured like a guided tour, a performer leads up to 6 people to a location, speaks and moves on. A story is told using this simple format.

(spell#7, n.d.)

Along the tour, audience members would have been given headphones and a CD player through which they would have heard whispers from the city largely in the form of conversations between a man and woman whose desire for each other becomes threaded into the cityscape of Little India. This performance never happened, unfortunately, because of Singapore’s sometimes-oppressive rules around public performances. Spell#7 was denied a license to perform *Kinda’ Hot* because it breached a rule against audience “mingling”:

Over several telephone conversations, the police explained their problem with the script. It breaches their 15-minute “mingling” rule (even though it states in the Licensing Agreement that more than 15 minutes of mingling may be permitted by the individual officer). The “mingling” rule is worded to apply to performances where there is a sudden breach of the performer/audience divide: i.e., an actor leaves the stage or an audience member is invited up on stage.

(spell#7, n.d.)
As a result of the denial of a license to perform *Kinda’ Hot* and in response to spell#7’s interest in using this material in some other way, the performance was transformed into a walking tour that could be done without a live performer: *Desire Paths*.45

*Desire Paths* takes the form of a personal audio tour: each participant is given a CD player, a pair of headphones, a map and some simple verbal instructions (i.e., watch out for traffic). They take the CD player, hit play and follow the footsteps and instructions of the voices on the audio track. The tour must be done alone (spell#7 dictates a 15-minute gap between any two people interested in doing the tour) so as to enhance the private-public nature of the experience. A reviewer describes the project thus:

> [*Desire Paths*]…fuses the themes of desire and walking in an “audio-tour” of Little India, one of Singapore’s ethnic enclaves. In *Desire Paths*, the sole audience member, armed with a CD player, walks through this rich setting of sensory delights, coaxed by the narrating “ghosts or lovers” who act as guides. They speak to the listener-pedestrian over a pastiche of recorded sounds invoking the atmosphere: temple bells, traffic, buffaloes, interviews with locals and tourists, churchgoers worshipping, the sound of hi-tech speed train doors closing, race course noises, market clamour and coffee shop banter, as well as the sound of bombs falling. Local spices and vegetables are reconfigured as poetry at one point when recited in inspired succession. The stall-lined corridors, streets, shop houses and back alleys offer a random universe of household provisions, textiles, flower garlands etc. All at once, you smell incense, jasmine, curry powders and street debris. Insinuating itself into the historical and guided tour, you discover, is a story of desire: between your tour guides Jack, a resident wanderer who “knows a bit about Little India”, and an unnamed female lover. The story grows; traces accumulate and you realize that you are in the very intersection where their love operates. The walker is part of the internal logic of their communication of shadows, traces, secrets, scraps and notes left to each other; the tour, designed by him to “lure her out”.
> (Lam, 2004)

I was able to take the *Desire Paths* tour on my last day of a two-week trip to Singapore. I decided to take the tour because I had done walking audio tours in the past by non-theatre practitioners, and I was interested to see whether theatrical influences might have an impact on the form/content of the walking tour format. It was threatening to rain the entire

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45 Not to be confused with Graeme Miller’s *The Desire Paths* (Miller, 1993).
time, which added a melancholic quality to my mood as I moved through Little India under the spell of *Desire Paths*. Although in equatorial Singapore there is a good chance that it will rain on any given day, I smiled when I heard the voice on the CD say that it looked like rain. This surprising link between an obviously recorded text and a very real physical possibility exemplifies what I find so seductive about this kind of work: the potential for the real to leak into the fictional, or for there to be a merging of the real and the imagined. The tour started with the voice of “Jack” (Ben Slater) providing a short, recorded introduction to the format of the piece, how the tour would work, and the first instruction to start walking. Over the course of the roughly 45-minute work, Jack acted as the primary guide and his voice describes historical facts about the neighbourhood, pointing out interesting shops and cafes, and eventually providing small bits of personal information that forms a subtle narrative. The piece graduates the narrative elements in slowly, linking some of the sights (flower garlands of jasmine) to elements of the story (an unnamed female character smells of jasmine). By about twenty minutes in, the narrative assumes a more primary focus, with the elements of the tour continually linking back to the characters at its heart and ghosting with the themes of desire, community and memory. Most interesting to me is how the mechanics of *Desire Paths* provide an interesting model for an engagement with *headspace* in the realm of the everyday through the structure of its text, the sound techniques it employs and the actions it encourages a participant to engage in.

As alluded to above, the text of *Desire Paths* is largely directed to the listener through the use of direct-address, second person writing that provides information about the neighbourhood as a tour guide would to a larger group tour, but with a more personal style befitting the headphone format. The main narrator, Jack, is not merely a disembodied
voice; he instead places himself in the narrative by reflecting on how he feels and what he thinks, ultimately threading in a narrative about a mysterious woman. At one point he says, “This is one of my favourite places,” and later he apologizes for the way his personal story of desire leaks into the tour by saying, “Hey. Sorry the tour turned out this way”. Jack’s text also questions the very thing you are engaged in while on the tour by commenting that tourists flock to a temple in Little India looking for something real while recognizing the absurdity of a culture that believes it can just consume something as complex as religious devotion. Using the second person, direct-address text while also including the narrator as a character served the purpose (for me at least) of acknowledging me as a participant: the text, although pre-recorded, was clearly written for me to hear and the small ways in which it personalized the journey by connecting it to the story of the narrator, to my experience on the journey and to the reality of the tour format, served to draw me into a relationship with him. We discover early on that Jack is looking for a woman, and her voice becomes a second major vocal presence in the walk. She is never named, but is the subject of many of Jack’s recollections and personal reflections. He says, “Stop at the alley way and look left. Is she there? Sometimes she walks this way”. Her voice comes in at various points to provide a differing perspective on Jack, her relationship with him and on Little India (although I could not determine a logic dictating the placement of her texts). By bringing in a second primary voice, I felt triangulated, like I was somehow the pivot point between the two characters’ desire, and that by walking through Little India on this tour I was somehow making their desire possible. The text, then, seemed to belong not only to the CD player/external world but also to somewhere within my head — it seemed as if the text being spoken was merely a small fraction of the text and that in my head somewhere lay the remaining fragments. These fragments are akin to the sensation gaps in Whisper; the

46 There are other occasional voices that are heard but these are most likely whispers from people in the local community and were less substantial from my perspective as a listener.
text in *Desire Paths* might be absolutely complete from a writer’s perspective, but the way in which I become the locus point for the two characters allows me the space to imagine what is missing, and to fill in these blanks accordingly. I am allowed the pleasure of searching for the text that might connect them in my own imagination. The feeling that I had some part to play in this narrative seems to result from the formal construction of the piece: the text is in the second person, the narrative leaks in from the tour aspect of the piece and two characters addressed me as a listener. In many ways, this matches the way text functions in *Whisper* — as both a narrative structure and a reminder of the theatricality of the experience. However, the structure of text is only one element that interests me in *Desire Paths*.

In many audio tours (at museums for instance) the listener moves through a gallery or historical site and listens to descriptions of the objects on display. Rarely are we invited on these tours to participate in any more substantial manner, to touch or to stop the tour to have a different experience. A lovely feature of *Desire Paths* that further implicated me in the performance, and added to the destabilizing effect of the competing narratives (my own and the one being performed on the CD), were several calls to action that were built into the tour but which break the fiction and allow us to engage in the world of Little India. I can remember two calls to action clearly. The first happened near the beginning of the tour along Buffalo Road, a fragrant street lined with shops selling produce and flower garlands. After giving an historical overview of the street and highlighting the many scents currently present, you are invited to stop the CD to purchase a jasmine garland (significant, as mentioned above because jasmine is later discovered to be the scent of the woman). Asking me to stop the audio tour flow in order to interact with a shop owner is a bold move by spell#7 as it risks creating disengagement with the narrative. But instead of
removing me from *Desire Paths*, it reminded me that I was at the centre of this performance; that I had to keep it afloat by engaging with the material. Further, holding a flower garland and smelling it changes the physical relationship between the listener and the material, bringing the experiences described on the audio track that much closer. I found myself consumed by the scent of flowers in a way a mere description of the scents could never have achieved. Later on the tour, you are encouraged to have a coffee at a local coffee shop, again stopping the CD to engage with the neighbourhood. These interventions into the performance open up a gap in the flow of time, so that when I dove back into the material, I found that my place in the work had deepened, evolved. Not only was I a passive listener and active walker, but I had also collected an experience that connected me to the narrative playing in my brain. More than simply guiding me along a tour through a narrative and a neighbourhood, *Desire Paths* brought me closer to both by allowing me to have interactions with the chaos of the city that were tangible: I had the smell of jasmine on my fingers to prove the reality of my experiences.\(^{47}\) Scent lingers *physically* on my hands, in this case, while the sounds of *Desire Paths* (and of Singapore) linger *physically* as new connections forged in brain neurons and as ringing in my ears.

*Desire Paths* is, after all, an audio tour so it makes sense that the mechanics of the sound creation and distribution play a key role in the effect it had on me as a participant. *Desire Paths* uses binaural recording in order to capture the detailed soundscape of the walk through Little India. The sounds of the city are played as a background to the voices of Jack and the woman. I presume that these sounds were recorded along the same route that the tour follows to create a layered audio experience for the listener: not only did I hear the recorded sounds from the locations through which I moved, but I also heard the real

\(^{47}\) For further reading about the interesting relationship between scent and Singapore, see Paul Rae’s essay in *Performance Research* called ‘Nosing Around: A Singapore Scent Trail’ (Rae and Hong, 2003).
sounds leaking through the cheap headphones from the city around me. This layering had the effect of destabilizing my sense of where the sound was coming from and can actually be dangerous. There were several times where I found myself afraid to cross a busy street because I could not tell whether the sounds I was hearing were recorded or represented a real car speeding down the street towards me. This effect did not work for me as well as it has when I have taken other similar tours (such as those by Janet Cardiff, one of which is discussed below) largely because Little India is a very noisy place and the low quality headphones provided could not always compete with the sounds of the city. Despite the tenuous nature of the binaural effect, it did add to my sense of being immersed in the work, or of the work being immersed in me. *Desire Paths* also used music at several points along the route, and for me these functioned as transportation devices that allowed the narrative to take a more reflective tone, to move into memory places. Not unlike the music in *Whisper*, which had a cinematic feel and was used to transport the audience into a performance mode that was more reflective, *Desire Paths* layered evocative electronic music that seemed to bloom in the ears. About half way through the piece, I was standing outside a café (where I had just been instructed to have a coffee) and the voices on the recording had instructed me to watch the activity of people, cars, etc. in the chaotic merging of five roads in front of me. Music swells in as the male and female voice speculate about the people who could be passing by: “She’s walked for miles. He’s lost. She’s waiting for her lover to make the first move” (spell#7, 2004). As I recall it, this use of music as a way of moving into other modes of performance was used to powerful effect consistently to introduce less directive text, to allow me to have space for dreaming, imagining and reflecting on the city through which I walked and the people who inhabit it.
I presume *Desire Paths* does something very different than *Kinda’ Hot* would have done — by having no live bodies performing the work and by forcing the tour to be a solo encounter, the audience member’s relation to the work shifts into a more unpredictable realm. I cannot imagine how the piece functions for other people taking the tour, and for me this is a large part of the work’s appeal. The individuality of experience *Desire Paths* fosters combined with the structure of the text, the public encounters the tour encourages, and the binaural audio tactics blur the line for me between the work happening out there and happening in my head. Because I was thinking about *headspace* while taking the tour, I started to wonder if *headspace* might be something like being schizophrenic: those voices, those sounds, those sensations, are they in my head or around me? Perhaps this confused sense of reality is similar to what Victor Burgin (1996: 121) calls paranoiac space; the “act of looking” has become “fragmentary” as a result of the cacophony of sensory inputs *Desire Paths* offers up. My spatial reference points are literally “torn”, as Burgin (ibid: 120) describes it, by the way the recorded sounds layer with the live ones and *headspace* is my attempt to recuperate the tears into a manageable spatial realm. Like *Whisper*, *Desire Paths* destabilizes the place of performance through the use of the headphones and attendant techniques. The headphones blur the physical space and the imagined one; Burgin (ibid: 129) might call the *headspace* that this creates “psychotic space”, which he describes as the result of experiencing an external object as if it has “invaded the subject”. In *Desire Paths* and in *Whisper* the headphones invade the listener with their spatially rich sounds, confusing the separation between the external and the internal, between the *real* and the world of dreams (ibid: 133). In *Desire Paths*, the cinematic visuals, which for *Whisper* took place on a giant screen, are replaced by the
colourful, chaotic and larger than life sensory panoply of Little India and the paranoiac images the audio elicits in the listener.48

*The Missing Voice (Case Study B)*

The artist Janet Cardiff and her collaborator-partner George Bures Miller have been making sound walks for over fifteen years that use a similar format to that of *Desire Paths*, i.e., the participant is given an audio device (a tape player in the old days, and now an MP3 or video player) and instructed to follow the voice of a narrator through a city, building or park.49 Their first long form audio walk for a city is *The Missing Voice (Case Study B)* (Cardiff, 1999) which takes place in the Spitalfields area of London, centring on a journey from the Whitechapel Library to Liverpool Street Station. For the purposes of this chapter, an entire accounting of the walk is not really necessary, and certainly others have done a much more thorough job of looking at this work in terms of its artistic integrity and relation to other locative media.50 What I am interested in is the ways in which *The Missing Voice* relates to the notion of *headspace*, so I will focus on the features of the work that relate directly. In *The Missing Voice* as in many of her audio walks, Cardiff’s voice speaks directly to the participant/listener in the second person *you* voice over headphones. Underneath her text is a highly detailed aural environment created using the binaural recording methods described elsewhere in this chapter. The incredibly high quality of her recordings is one of the main features that sets her work apart from other

48 This discussion raises the question of what constructs the cinematic landscape in terms of narrative. Ironically, just as *headspace* is not only about the reception of stereo sound heard over headphones, but also about the interplay between sight and sound, the cinematic is not only about what we see. In fact, sound could be said to be an equally important element in the creation of cinematic images. In the following chapter some of these notions are reframed in relation to the screened image.

49 There are several very good resources available on the work of Cardiff and Miller including Cardiff et al (2007), Cardiff et al (2005) and Cardiff and Miller (n.d.).

audio walks, including *Desire Paths*; the sounds are incredibly life-like and precise.

According to Cardiff, “this is the important part of the recording. The virtual recorded soundscape has to mimic the real physical one in order to create a new world as a seamless combination of the two” (Cardiff, 2005). The walk takes approximately fifty minutes, and in that time the listener walks through the neighbourhood under Cardiff’s spell, listening to her descriptions of the city (although these are not historical in the same way that they were in *Desire Paths*), wandering in and out of the present of Cardiff’s narrative and cinematic memory spaces which seem to come from the past.

When I arrived at the Whitechapel gallery, where participants pick up their headphones, I discovered that the Whitechapel Library was under renovation. *The Missing Voice* was designed to begin in the stacks of the library where Cardiff asks the participant to find a specific book that then sets the entire walk on its way. Because the library was being renovated, my walk started by standing outside the library and listening, imagining what it might have been like inside the library. In a way, this is an appropriate way to begin an audio tour of this kind: clearly the realities of the *real* world have corrupted the work Cardiff created, making it bend to the reality of its site. The malleability of *The Missing Voice* and of *Desire Paths* in response to their locations in cities keep the pieces dynamic, evolving, and highlight the many dissonances that occur between the fictional and the real. Indeed, as the curator James Lingwood from Artangel who commissioned *The Missing Voice* points out on Cardiff and Miller’s website:

> Conceived for, made for, and experienced within a particular part of a particular city, Janet Cardiff’s walks paradoxically thrive on the disjuncture between what is being heard or described and what is being seen. After five years and some 20,000 other participants, I just borrowed The Missing Voice from Whitechapel Library again. The disjunctures have become gradually more pronounced, but the work holds together just as well. I wonder now what the experience of the work will be like in a hundred years’ time. (Cardiff and Miller, n.d.)
The Missing Voice, unlike a sound work created for a gallery, unfolds with all the vagaries of the city to contend with; construction projects and changes in businesses all impart a sense of immediacy and liveness on a work that might at first seem to be completely fixed in time, pre-ordained. It is this liveness that loops me back to the subject of headspace: if the piece had no sense of something malleable, live, dynamic, there would be little to make me question the place of the performance — it would clearly belong only to the medium on which it was recorded, like a track of music played on my iPod or CD player.

The text of The Missing Voice is written as a kind of stream-of-conscious encounter with its London neighbourhood and the people who pass through its streets. As Cardiff explains:

I was trying to relate to the listener the stream-of-consciousness scenarios that I constantly invent in my mind when I see someone pass or walk down a dark alley. It is one of my frustrations as well as entertainments to constantly have these visions and voices, which are quite often scary or violent, running through my brain as I encounter the simplest of realities … Part of the process for the piece was to walk around and take notes on my mini voice recorder. While listening to these notes again in my apartment I realized how this voice became another woman, a character different from myself, a companion of sorts. This voice also seemed to metaphorically represent how we all have multiple personalities and voices. I saw the woman in the story not only as alienated from her self, but also searching for herself through this voice, play-acting, creating false dangers and love affairs, wanting her story dramatized.

(Cardiff and Miller, n.d.)

Although the text does evolve in a seemingly organic manner, it was clear to me while taking the walk that there is a narrative at the heart of the piece that follows a detective novel convention about a missing woman, who at the end of the tour turns up dead in the Thames. Indeed, in addition to Cardiff’s voice, a man whom Cardiff calls the detective on her website can be heard trying to work out who the missing woman is and why she is doing what she’s doing: “Found in her bag, two cassette tapes with a receipt and a tape
recorder ... As far as I can tell she’s mapping different paths through the city. I can’t seem to find a reason for the things she notices and records” (Cardiff, 1999). It is never completely clear to me whether the woman he follows is the voice speaking to me over the headphones (Cardiff’s), someone from my past, someone fictional, or someone real. Like *Desire Paths* and *Whisper*, *The Missing Voice* uses the second-person you voice, which made me feel all the more involved in Cardiff’s strange fiction — she was talking to me, infecting me with the logic of suspicion, disappearance and mystery that lies at the heart of this work. Also like *Desire Paths* and *Whisper*, *The Missing Voice* uses different types of text, each treated with different audio environments to indicate different times and voices. In the case of *The Missing Voice* the texts come from the male detective voice, from Cardiff in second person, from Cardiff in a detached third-person and again from Cardiff as played through a hand-held recorder. These variations in voices, vocal treatments and tenses further destabilized any sense of the present while walking through Spitalfields. As a result, a kind of third present emerges, one that only exists in the interaction between the voices, the real world and the reactions happening in my body: in essence this present is only in my head.

This work had a strange after-effect as well: walking back to Whitechapel (the piece ends in Liverpool Street Station where the listener is instructed to walk back to Whitechapel on his or her own), I felt a heightened sense of the world around me. I was looking at and hearing things in a detailed, focused way I rarely do in the city (usually I just want to get where I am going), as if by having so submerged myself into Cardiff’s rich world of aural and visual imagery for the past hour, I was now more eager to experience the complete depth of the city’s sensorium. I often move through large cities wearing headphones to block out the chaotic sounds of the city. Oddly, however, removing the headphones of
Cardiff’s fictional city triggered a heightened awareness of the sounds and sights of London. This heightening of senses was apparently not unique to me as one reviewer from the *New York Times* explains:

> Walking back quietly to the Whitechapel Library, I found my eyes wide open. I saw a man on a cell phone, iron manhole covers in the cobblestone streets, dog dung in the gutter, a fashion shoot on the sidewalk. The voice inside my head had finally stopped. I was cured.

*(Boxer, 2000)*

While for Boxer the end of the voices was a cure, for me it left me filled with even more voices, questions, but of my own making instead of dictated by Cardiff’s wanderings. Everyone I passed, every building, every car suddenly seemed a container of hidden worlds, of mystery. Although I no longer had Cardiff in my head, I was disoriented and dizzy, coming down off a strange aural high. I did not want it to end. I think this is a result of the intensity of experience that well-crafted sound works can create. Writing about Cardiff’s sound works, the curator Ralf Beil puts it thus:

> Despite the often highly visual nature of the worlds these artists create, these worlds actually originate in the heads of the visitors through exposure to carefully crafted auditory experiences which, to some extent, penetrate more deeply into the body and mind than mere images can.

*(Beil, 2007: 63)*

Beil’s notion that Cardiff’s audio walks (like *Desire Paths* and *Whisper*, I would assert) penetrate into the body brings me neatly back to the physicality of how we hear. William Gaver describes two kinds of listening: *musical listening* which he calls the type of listening in which we are concerned with the qualities of the sound (dull, soft, etc.), and *everyday listening* which is listening to events rather than sounds. He notes that the difference between these two types is about the *experience* of listening, not types of sounds or psychological approaches *(Gaver, 1993: 1-2)*. Gaver goes on to note that “a given sound provides information about an *interaction* of materials at a *location* in an *environment*”
(Gaver, 1993: 6, emphasis original), highlighting the fact that a sound bears the mark of its creation: because sound is created by vibration, if you have two items that vibrate together, the material source of these items bears through in the sound. Similarly the place where the vibration occurs is inscribed into the resulting sound (via acoustics, for instance). In Whisper, Desire Paths and in The Missing Voice, the audience/participant is asked to do a type of listening which is akin to Gaver’s musical listening but in an experience that might be more akin to his everyday listening. This type of listening might be called active listening in so much as it requires an active effort (physical, in the case of Desire Paths and The Missing Voice) to absorb the sounds, their context and their content. In each of these pieces there is a coupling of active listening (with the spatiality inherent in the sounds) and the context in which the performances take place (in the city for Desire Paths and The Missing Voice and in a theatre for Whisper). Speaking about Cardiff’s work, Mari says,

[M]any of these works are accessed via headsets that literally “enclose” the spectator in a circumscribed, distinct space, a space whose author we do not know. Under normal circumstances, we would be the creators of this sound space … One of the sources of fascination and enchantment in the works is the sensation that we are the sole receivers of the story being told. In this sense, we observe the conjunction of two moments of experience and behaviour. (Mari, 2007: 33-34)

For me, this enclosure is headspace, and the marriage of experience and behaviour is one of dissonance and disjuncture, as I will further explain below.

The Potential

Earlier in this chapter, I suggested that headspace was not only about the mechanics of binaural/surround-sound audio being played over headphones but also about the context surrounding the sound and the content contained within the recordings, a notion which bears the markings of my interest in cognitive science. The context of the creation and
performance of the works described herein range widely: from live performance created by a theatre artist in a theatre, to a pre-recorded audio tour (with suggested pauses) created by theatre artists in a city, and a pre-recorded audio tour created by a sound artist in a city. Although the setting (and artistic background) for each work is different, they share some contextual features; they each scratch at the notion of what is real through a process of purposeful sonic-visual dissonance, they all layer the recorded and live to various effect, and for each one there is a sense of the physical experience being central to the performance. The content for each is also very different, but again there are similarities: the text for each is riddled with questions, they all use the second-person you voice as the primary mode of speaking, they all use memory or time-shifts in the narratives, all of them feature some kind of story of disappearance or ephemerality, and each one has a public experience at its core (walking through the city in each case; Whisper has the additional public experience of being at a theatre performance). They each also use an intimate technology (the headphones) in more than a supporting, background, or scenographic role: the personal, physical connection an audience member has with the headphones alters their experience of these artworks by bringing them closer to other experiences they might have had. The headphones, in essence, correlate these works of art to the real lives of an audience member through their very physicality. Placing these contextual and content/thematic features next to the aural techniques that they each employ (and knowing what we do about how the brain receives sound) creates a compelling case that this type of work might be doing something unique in its approach to performance; that these works might shift the location of the performance into the space of the head.

It is also no coincidence that narratives of the city, and those of a world that has become increasingly accelerated and fractured, are being explored in forms that feature dissonance
as a key operating principle. Facebook, MySpace, Twitter and other social networking
sites seem to indicate that we are constructing the narratives of our lives via a series of
sound-bytes, fragments and contradictions. Is it not true, then, that in the modern world we
have all become detectives, piecing together our own narratives while decoding the stories
of those around us with such ease and efficiency that we do not even notice it anymore?
Perhaps the landscape of aural and visual dissonance that we have become so comfortable
living in is echoed in the potentiality of headspace. I, for one, am keenly listening.

The notion that space can be redefined through sound returns me in some ways to where I
began when I reviewed some of the major discourses around spatiality in my introduction
to this thesis. Viewed from the perspective of de Certeau’s place vs. space dialectic, the
head of a listener in headspace might be considered a place until it is activated with the
sonic (and visual) inputs that turn it into a space. Similarly, maybe the physical spaces
where these experiences take place (the city, the theatre) are also merely places until the
headphone-sounds turn them into spaces: a kind of bi-directional activation. Although the
head is certainly not an inanimate object and, in truth, is never really inactive, headspace
does imagine the physical dimensions of the human head as a receptive space where
spatial activity happens. As I mentioned earlier, Lefebvre argues that a major problem with
the way space has been theorised has been the separation between conceived, perceived
and lived space. Headspace entangles these three senses of space into a single frame linked
by the experiential nature of the audio works I cite in this chapter. Headspace is not social
space in the way Lefebvre might have defined it, but it does rely on an embodied exposure
to sensory data in order for the space to emerge. Using Augé’s definitions of space (the
distance between things and a temporal expanse) and place (the symbolised space),
headspace again seems to flirt between terms, being both a space and a place: it is created
via the distance between the sonic and visual cues and also via an imaginative process wherein the listener/viewer conjures up a space that does not exist in physical terms. Finally, *headspace* could not be considered Euclidean in any sense since it is not specifically about the non-gravitationally impacted lines and shapes of a given space. *Headspace* might, however, be closely aligned to McLuhan’s *automorphic* space in as much as each of the case studies I have cited require the listener to *put on*, or relocate the imagined world on top of the physical one.

Though none of these major discourses about space are a perfect fit for my conception of the way audio-visual stimuli can create spatiality within the brain, they each support some aspect of *headspace*, at least tangentially. None of them, however, provides the richness of detail that cognitive science has offered me in relation to my position as a practice based researcher. My notion of *headspace* evolved directly out of a focus on the way in which the mechanics of each of the audio-based performances described in this chapter creates meaning. In the next chapter, I will continue to be guided by the relationship between doing and meaning as I move into the realm of the visual to understand how screens used in theatre complicate the notion of cohesive performance space.
Chapter Two: Aberrant pixel space, the architectonics of screens in theatre
Aberrant pixel space: the architectonics of screens in theatre

The virtual camera is in our head, and our whole life has taken on a video dimension. (Baudrillard, 1997: 19)

In the previous chapter, I set out an approach to understanding artistic works that is guided by a focus on experienced perception and I investigated the way in which space can be created in the head via aural and visual cues used in performance. Ghosting throughout my discussion of headspace were cinematic space and theatrical space, two performance-oriented understandings of space that come together in this chapter. In my discussion of Whisper, the semi-transparent screen that covers the front of the stage evokes a cinema screen in terms of its scale and its seductive use of moving images that transport a viewer to a remote geographic (or imagined) space. In Whisper, the screen serves as a semi-porous barrier between audience members and performers, whereas a screen in the cinema is a vehicle for transporting pre-recorded images to a passive audience. Whisper was also housed in a theatrical space that carries the expectation of transparent illusions and boxed in boundaries of curtains, lighting grids, and shared audience seating. The theatrical space makes itself known at key moments throughout Whisper, most notably when the screen becomes transparent, revealing the mechanics of the performance area. Neither cinematic space nor theatrical space were central to my argument around headspace, but in this chapter the interaction of screen spaces in relation to theatrical spaces is paramount. This chapter focuses on my practice-as-research project, Virtuoso (working title) (Petralia, 2009) to try and understand how the use of screens on stage might affect how we comprehend and experience space.

51 Of course, in a cinema, the images are generally pre-recorded except in many of the current day live-streaming events held in movie theatres.
I grew up in the 1970s and ‘80s in American suburbia, where everything seemed just out of reach: the ongoing Cold War, Reaganomics, the evolution of the personal computer, the start of the AIDS epidemic and the mythology of the nearby space programme. I was born in 1974 in Melbourne, on Florida’s east coast near the Kennedy Space Center, where the Space Shuttle launches. As a child, I watched the increasingly frequent lift-offs from our front lawn, from the beach or from the football ground at my elementary school. When the Space Shuttle Challenger exploded in 1986 I watched it live. I remember thinking nothing of it when it happened; it just looked a little bit odd, but not apparently disastrous to a twelve-year-old boy. When I replay what happened on that day in my mind, though, I am uncertain of the authenticity of what I see; the images that come to me bear a striking resemblance to archival footage of the explosion (including the perspective and shot framing). Is it possible that my memory of the experience of watching it live is not actually my memory at all? Immediately after the Challenger disaster, I watched, passively and actively, hundreds of hours of video excerpts of the explosion cycled on my television screen. These images may have become my own. Sixteen years later the scene repeated itself in a different, more aggressive form. I was exiting the subway at Union Square in New York City when a plane flew into the World Trade Center. I saw it happen, but again, the visual images that remain in my memory are untrustworthy. In the moments, days, weeks after the World Trade Center was attacked, a twenty-four-hour parade of disturbing, repetitive images of the event played on every television channel in America. In the words of Victor Burgin (1996: 226), “the actual events mingle indiscriminately” with the memories as replayed on television. Perhaps this is because memories are not a cognitive act of recalling stored data per se. Instead, as Tim Ingold (2000b: 142) says, “it is through the activity of remembering that memories are forged”. It should be no surprise, then, that
my memories of these two highly broadcast disasters have been clouded with visions that originated on the television screen.

It is with caution and uncertainty, then, that I recall anything from my childhood, although the memories of the 1970s and ‘80s that are most vivid for me are domestic, not cataclysmic or of international significance, and are therefore less likely to have been broadcast-worthy. I remember my childhood in ambers and greens, in wood panelling and shag carpet, in Long Island Iced Teas on the patio and unfiltered cigarettes smoked at the dinner table. Mine is a childhood filled with the banality of rented homes, whose anonymous halls and cinder block walls sat at the end of cul-de-sacs or across from the local park, of the woods at the end of the street where I had my first cigarette, of the eerie light of a cathode-ray television screen beaming its messages through the neighbours’ windows at night. I remember (barely) the time before video games proliferated and, yes, even the sound of the living room, pre-MTV. I remember standing on the lawn in our front yard to watch the Space Shuttle lift off, a visible symbol of America’s belief in the new. Something of the fantastical snakes its way through my childhood memories as well. Melbourne was not only at the heart of the American space programme, but also only a short drive to the pinnacle of fantasy: Disney World. In fact, my grandmother had a stroke at Disney World and died in the Disney hospital. Disaster and death, again, but this time in the fantastic realm of the acme of simulacra (Baudrillard, 1994: 12). These flashes of my childhood are relics of what Stephan Berg (2007b: 11) has called “the unspectacular America” that is, “a picture world whose credibility largely derives from its feeling like the sum of all those images of America one has already seen”. My childhood memories are, in his words, “a reality of the second degree that comes across with the convincingness of primary reality” (ibid).
How strange to be possessed of memories that bear the mark of images that the world has already seen and which I cannot even confidently claim as my own. In many ways, this is the fate of being an American who grew up in suburbia, for American suburbia has long captured the imagination of critical thinkers and artists, and has been endlessly dissected and replayed. Jean Baudrillard (1998: 56) says of America that “the whole country is cinematic” in his account of travelling through the American West in the mid 1980s. I cannot argue with the notion of America as cinematic, but, upon reflection, I think a more accurate description of my nostalgic memory of being a child in suburban Florida is televirtual. Rather than fleeting encounters with the great expanses of the western American deserts and the unending highways of Los Angeles that Baudrillard describes, I am possessed of a long, drawn out set of experiences that appear more like episodes on small green screens in the living room of my memory. America, for me, is a country of the screen-appliance, not of the cinema.

The Television and Pixels

It is in America where television had its birth as a viable commercial enterprise in the early twentieth century when competing technologies by Westinghouse, American Telegraph and Telephone Company (AT&T) and RCA were all deployed (Smith and Paterson, 1998). The first commercial television was broadcast in 1941 in America which came after several years of experimental programming and telecasts of live events in the UK, although it should be pointed out that there were several prototypes and theoretical models for creating a device similar to television which all stemmed from Samuel F. B. Morse’s telegraph (Smith and Paterson, 1998). A good history on television is Abramson’s History of television 1942 to 2000 (2003). The RCA technology was used by EMI, an English company, to broadcast programming for the BBC as well. The key to developing commercial television, however, was selling televisions and ensuring that there was enough programming to display on those televisions, something NBC and CBS managed to do before anyone else (Smith and Paterson, 1998).
Germany and America such as the arrival of “British Prime Minister Neville Chamberlain from Munich…[to the]…Heston Aerodrome” and a speech by FDR at the World’s Fair in America (Abramson, 1998: 19). During the first few years of commercial television, network feeds distributed programmes to stations, which meant that stations had to play the programmes as they were fed them; they had no means of recording the programmes to play them back later. This changed in 1954 with the invention of recording equipment for video, which allowed channels to play recorded programmes whenever they wanted (ibid: 21). The introduction of recorded television coincided with increased ownership of television sets among suburban Americans who purchased the appliances with vigour during the late part of the 1940s leading up to the early 1950s (Boddy, 1998: 27). Television sets, themselves, were advertised as a kind of gateway to the perfect life, with the perfect family in the perfect home (Spigel, 1992: 44). Consequently, television executives recognized a potential new market among the weary post-war American population who were fleeing to “the new automobile suburbs” and seeking entertainment they were not able to enjoy during the war (Boddy, 1998: 28). The development of large suburban populations who owned television sets directly resulted in a shift of programming from being primarily “anthology drama” that was “urban-based” to “suburban-based sitcoms” (ibid: 27). These suburban sitcoms presented a homogenized view of America that has been called “unrealistically mature” by William Douglas (2003: 82) in his history of suburbia and television, *Television Families*. Programming in the early days of the suburbanization of television showed perfect neighbourhoods where everything was complete and every flower was in bloom (ibid). These images have, of course, contributed to the idealized notion of America in the 1950s, as they have been played and replayed on televisions ever since.
During my own lifetime, television has transformed itself from a largely live medium (i.e., with live studio audiences or filmed live) to one that is more multifarious; it is still identifiable as a home-based medium, although perhaps not as strictly linked to suburbia as it was once. There is an increased presence of live news channels (witness CNN and the twenty-four hour news cycle) but there are also more and more complex, high-budget programs like those on the cable channels HBO, Showtime, AMC and even on the major networks ABC, NBC and CBS which often seek to mimic the production values and scale of cinema but within the episodic format that television favours. With the advent of the Internet, television programming has again begun to morph as broadcasters have increasingly found ways to stream their content into homes on-demand and for television viewers to respond to and remix content on the fly; with interactivity, the screen is increasingly becoming porous. Baudrillard frequently dismisses television as “a screen and nothing but a screen”, yet he also notes that the television requires “a sort of immediate, instantaneous participation” in order to activate it (Gane, 1993: 30, 69). Although I appreciate Baudrillard’s desire to be provocative, there is something contradictory about insisting that a screen is only a screen while simultaneously noting that television forces an active participation: how can it only be a (passive) screen if it requires (active) participation? Perhaps this contradiction is because television content (as in television programming) and television as an object (as in the television screen) have become entwined and inseparable. Greg Giesekam in his book Staging the Screen (2007: 22) argues that we have developed complex strategies for interacting with screens that are not at all passive, but adaptive. He acknowledges that when we watch television, we do so

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54 There is an increasingly complex relationship between film and television programming not only because many television programmes are shot using film rather than video, but also because they are often shot using the structure of film itself. Indeed, HBO (Home Box Office), Showtime and AMC (American Movie Classics) all began their lives as channels that beamed films into the homes of their viewers, devoid of any original programming. It makes a certain logical sense that these channels adopt cinematic sensibilities in their made-for-television productions since their entire organizational history stems from a relationship with film.
amidst the multiple distractions of the home (the television is, after all an appliance), which means that our viewing often phases in and out of focus. With the proliferation of on-demand television and Digital Video Recorder (DVR) technologies, we are able to pause live television, or call up specific programmes from a library of choices, which gives viewers even more agency in our interaction with the screen.

Perhaps, contra Baudrillard, the content and the object-ness of the television encourages viewers to chart their own, personal and intimate, relationships to television. Unlike cinema, with its format of digestible durations, television is episodic, which suggests the potential of the infinite. It is possible to live your entire life watching the ongoing episodes of some long-running programmes, and between each episode, life happens, your perspective evolves. The format of television programming and the place of the appliance as a feature of many homes seems to actively resist being innately passive. As Paul Levinson (2001: 109) says in his book *Digital McLuhan* describing the difference in watching a film in a cinema and watching that same film on television, the television medium requires “the warmth of your participation”. This participation is greatly encouraged by the proliferation of hard-disk television recorders and on-demand services which, like the VCR, offer the “capacity for stopping and contemplating, for replaying, for moving quickly ahead” (ibid). Levinson’s use of the word *warmth*, which is obviously related to Marshall McLuhan’s (2004 [1964]: 24-35) famous notion of the television as a *cold* medium, suggests another function of the television: as a replacement for the fireplace in the modern home. Instead of gathering around the fire in the evening, families are more and more gathering around the cool glow of the television.56

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55 For instance, *Coronation Street* (Wharmby et al., 1960), which has been running since the 1960s in the United Kingdom.
56 Marshall McLuhan has a lot to say about television in his book *Understanding Media* (2004 [1964]) although his primary arguments were made prior to the great explosion of high quality television broadcasts.
Whether or not I agree that television is an innately passive media as Baudrillard suggests, I recognize that he appreciates the importance of the television culturally (he just does not care for it) and seems aware of its place as a feature of the American home. Indeed, Baudrillard (1998) eloquently articulates a peculiar combination of speed and idleness, of excess devoid of content that, he claims, is at the heart of the American suburb. For Baudrillard, it is the American people’s “fascination with artifice, with energy and space” based in a fear of the dark, the unknown, that epitomizes the American character (ibid: 51). He describes Americans’ insistence on keeping the television on throughout the night like some kind of beacon from another world that will keep us safe. It makes sense, then, that the language of television, which Baudrillard (1985: 127) ironically calls “the ultimate and perfect object for this new era”, figures centrally in the nostalgic memories of my American childhood. What object embodies the vapidity and speed of America’s obsessive fear of the dark more than the television? The radiant glow of the television is a fixture of the new American dream that keeps us company, keeps us aware of the minutia of world events, all the while reflecting its cold electronic light onto our placid faces.57

But my interest here is not entirely in the realm of nostalgia or the history of television, but in the spatiality of the screen as it relates to my own work in theatre and the work of other artists who use screens in their artistic endeavours. As science constantly miniaturizes and

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He describes the television as a cool medium, largely using the low resolution of the television sets of the ‘60s and ‘70s as his main argument. When arguing that the television as a medium required a spectator to complete some kind of process, he says, “because the low definition of the TV insures a high degree of audience involvement” (ibid: 348). This logic is no longer particularly strong since more and more television is being broadcast in high-definition. Paul Levinson (2001: 107-108) has updated McLuhan’s thinking by arguing that despite the increase in picture quality the television is still cool because it does not offer the same sensory overload that is provided in cinema. He particularly notes the scale of the screen and the lack of impressive audio technology as key gaps that television provides. As the screens in our homes get larger (and become 3-D) and our personal stereo systems get more impressive (and, indeed, as cinemas get smaller), I am not certain how this argument will hold up. It certainly bears further exploration.

57 This *dream* is, perhaps, for a bigger, flatter screen with its orgy of satellite channels, none of which have anything interesting playing.
reduces the world into its component parts, we have become capable of seeing the material
world as unitary particles that are joined together. In relation to the screen — computer,
television, or projected screen — the basic unit to which images are reducible is the pixel.
The word pixel is an abbreviation for *picture element*, insinuating that a pixel is an
elemental part of a greater whole (the picture) (TechTerms, n.d.). The notion of the pixel
as an *element* will be key to this chapter’s argument. Like Alex MacLean’s (2008) aerial
photographs of suburban American developments whose tiny plots form intricate patterns
when viewed from above, the pixel’s value on its own is miniscule in comparison to its
value when combined with other pixels. In MacLean’s images, large squares of suburbia
are carved out of empty space, effectively creating a frame for the *image* of suburbia as a
combination of similarly proportioned (and sometimes identical) houses and plots of land.
Viewed from a distance, the house-pixel loses its meaning as a house and becomes part of
a greater image, and in that shift of scale, the house-pixel becomes meaningful in a
different way (in the case of MacLean’s images, as a sign of the destruction of America’s
natural landscape). Pixels could also be seen as digital descendents of pointillism, which
was developed by George Suerat and Paul Signac in the 1880s in France (Raczka, 2009:
17). Suerat placed tiny dots of colour next to each other in his paintings to create colour
blends, based on theories about how our eyes see colour, so that when a painting was
viewed from afar, cohesive images appeared (ibid). On closer inspection, however, the
dots in his works can be seen, unmasking the points that he used to create his images. A
more playful metaphorical leap can be made between the pixel and the cell; a piece of
human skin, when viewed without the aid of a microscope, appears as a relatively cohesive
image-surface. Viewed under the lens of a microscope, however, human skin is clearly a
composite of tiny cells joined together. Taking the metaphor even further, the human body
is made up of tiny cells that combine to create the recognizable features of our bodies, just
as the screen image is made up of pixels. Just as we do not see cells, we also do not
(normally) see pixels; we see the forms they create. In each of these examples, scale and
perspective are key features: the more we zoom-in to see the details of an image, the more
its component parts reveal themselves. To provocatively use de Certeau’s formulation,
then, a pixel might be a place and the forms they create could be considered a space.

Pixels are the basic building blocks of screen-based digital images. In most cases, a pixel is
“a little square” that represents a tiny element of a larger image, and the density of pixels
along any one horizontal line on a screen signifies its relative resolution (Blinn, 2005: 82-
83). The more pixels per line, the more image detail a screen can represent. So, a screen
that has a resolution of 1920x1080 is capable of producing a better quality image than a
screen that has an 852x480 resolution, although depending on the source quality it may, or
may not, look better to the human eye (Katsmaler, 2009). A colour pixel is not simply a
little square, however, as each pixel is divided into three tall, rectangular columns that
contain data in red, green or blue colours (moving left to right). Depending on the required
shade of a given pixel, the values of each section of the pixel will change. Although three
colours might seem an inadequate selection for creating the wide-array of colours that are
possible in our world, they are (generally) sufficient because the human brain and eye are
also wired to relate colours to one of three numbers and each is sensed by a different part
of the retina (Blinn, 2005: 84). So a pixel is not, strictly speaking, the smallest building
block of a digital image since it is made up of sub-pixels that represent colour data (much
like the subatomic particles that make up atoms).

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58 I discuss the mechanics of the eye in the section “The Interface” below, which explains some of the ways the combination of the component parts of an analogue or digital pixel form into coherent images.
59 For more on the distinction between place and space see de Certeau (1998: 117).
60 LCD (liquid crystal display) screens have a native resolution, which indicates the pixel dimension that all images produced on their screen will have. When a source is played on an LCD screen that has a higher or lower resolution, the LCD screen will automatically resize it to fit its native resolution. For the purposes of this chapter, I am referring exclusively to LCD screens as those are what we used in Virtuosa (working title).
Further complicating matters is the fact that a pixel on one screen is not necessarily the same on another. With liquid crystal displays (LCDs) the screens are made up of a fixed set of pixels that do not change position or size, whereas in older cathode ray tube (CRT) displays, the pixels are not fixed (Blinn, 2005). Because LCD screens have a native resolution (i.e., fixed pixels) images that are played on an LCD screen will be either shown exactly as they are in the source (in the case of a matching resolution to the LCD screen), or stretched, shrunk or letterboxed to fit the resolution of the LCD screen. And depending on where in the world you are, not all pixels are the same size: the US video format, NTSC, has pixels that are tall and thin, while the European system, PAL, has pixels that are square (Katsmaler, 2009).

So, while it is true that pixels are the building blocks of digital images, their structure, relationship to each other and end appearance vary depending on how they are used, their hardware specification and where in the world they are produced. But what does a pixel represent and how is it related to this discussion of screens in performance? Before proceeding, it is important to make it clear that I am employing the pixel, in this chapter, as a metaphorical tool for analysing certain theatrical performances. However, this is not simply a linguistic conceit devoid of further significance. George Lakoff and Mark Johnson (1999: 543) describe the importance of metaphor when they say, “metaphors are the very means by which we can understand abstract domains and extend our knowledge into new areas”. They go on to explain that “there is no philosophy without metaphor” (ibid). Before delving into the pixel and the way in which it relates to space, it is important to understand that I am using the pixel in an extended metaphorical sense. In Chapter One, headspace fit into a classification of linguistics that might be called a “primary metaphor”,


which is a metaphor that arises “naturally, automatically, and unconsciously through everyday experiences by means of conflation” (ibid: 46). *Headspace* related one thing (the external space of a city or theatre) to another (the imagined space inside the head or in a fictional world around the listener) in a relatively one-to-one expression. From a neurological perspective, primary metaphors “are neural connections” that are learned when two distinct areas of the brain (one area dedicated to “sensorimotor experience” and the other to “subjective experience”) are activated at the same time (ibid: 57-58). In this chapter, I am using what Gilles Fauconnier and Mark Turner (2003: 79, emphasis original) have called the “meaning potential of a language form” to construct a much more playful, extended metaphor out of the pixel. Meaning potential develops when concepts, language, visual data, etc. are positioned in proximity to one another to suggest a relationship that might go beyond the sum of their parts — and crucially, when the perceiver makes a cognitive connection. My use of the pixel as a metaphor in this chapter is exploiting the meaning potential of the various stage elements, screen elements and the context in which both pixels and live performance are experienced in order to present a new understanding of the spatiality of the works I discuss herein.Unlike *headspace*, which used a direct primary metaphor, the work I am doing in this chapter with the pixel, while also metaphorical, is suggesting that the meaning potential of the pixel (or *aberrant pixel* as I will describe it below) surpasses that of a primary metaphor: I am being provocative and exploiting the “inherently creative” possibilities of human perception to juxtapose stage elements with picture elements (ibid). In this case, the pixel becomes a physically based metaphor that allows me to playfully explore otherwise intangible philosophical ideas.

The pixel is a meaningful visual coordinate that combines with other pixels to make up a more meaningful (and more complex) image. To playfully extend the pixel to the stage, we
might see all of the elements that make up a live performance as pixels (or visual coordinates), which we see in the context of the other elements within which they are situated. My line of argument here is pushing the metaphorical boundaries of the pixel in a purposefully provocative way to exploit the meaning potential in this comparison. You could say that the elements on a stage are not all apparently of the same order, as pixels might said to be; all pixels are digital information contained on a screen and the elements on stage are material in many different ways. But, I would argue that the elements on a stage are, in fact, of the same order despite being materially different. Although a body is not the same as a set piece, for instance, in the logic of the stage they serve similar functions: each stage element is a fragment of meaning that combines with the other fragments on stage to create conjoined meanings. Just as pixels combine to create cohesive images on a screen, the elements on a stage combine to represent a meaning that is cohesive (although an audience member will possibly need to complete the picture by making connections between the elements). The important correlation between pixels and theatrical elements is that they are both collections of elements that function both separately and in harmony and which are framed (by either the screen or the stage).  

By exploiting the meaning potential presented by the pixel, I am situating the spatial dynamics of intermedial work in terms that are in harmony with the language that this type of work already suggests to allow for a discussion of my work and the work of other artists that would not be possible otherwise. 

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61 It is true that a pixel may seem less meaningful to the average spectator than a body or a lighting effect because of scale, but each pixel nonetheless has a separate identity created by colour, shape and brightness.  
62 As a practitioner who is both inside of my work and seeking to reflect on it critically, I am constantly seeking new ways of expressing my experiences in terms that connect to a broader understanding of theatre, performance, and in this case, digital practices. The pixel metaphor in this chapter is providing me a way to discuss my work that surpasses the limitations of other approaches (a historical, semiotic or phenomenological analysis, for instance). For more on intermedial performance see also Staging the Screen: The Use of Film and Video in Theatre (Giesekam, 2007) and Mapping Intermediality in Performance (Bay-Cheng et al., 2010).
If this line of provocation can be accepted, then the *stage picture* could be said to be composed of the pixels of bodies, costumes, sets, lights, music, etc.\(^6^3\) William Mitchell (2001: 66), writing about what he calls the “post-photographic era” notes that “pixels work as signifiers”, that a pixel on its own does not depict anything until it is seen in a context of other pixels. You might say that this is not true of bodies on stage, since they do have meanings on their own based on gender, race, etc. While this is true, there is a difference between the cultural meaning of an object/person when viewed in isolation versus its meaning when viewed in a context on stage in combination with other objects/people. Just as a pixel does not have meaning on its own until it is put into a context, you could say, following Elizabeth Grosz (1995: 84), that “bodies are always understood within a spatial and temporal context” and therefore only have meaning in relation to their surroundings. Further, the body is transformed onstage into *something* else through the process of looking at it at all, just as the pixel changes from a coloured square (which might have another abstract meaning for the viewer) into a differently meaningful image when placed with other pixels. In essence, the pixel is meaningful via its association with other pixels, just as the elements that make up a live performance become *differently* meaningful in their association with one another. The correlation being made here between the elements of the screen and the elements of the stage unlock the meaning potential of the materiality of the stage *and* the materiality of the screen.

\(^{63}\) For a discussion of the stage picture see Brewster and Jacobs (1997).
Mitchell (2001: 66) goes on to note that when a pixel does not behave in the expected manner as in cases when it stands out of its context in some way, it is “usually seen as visual ‘noise’ and ignored”. But, Mitchell explains that this visual noise is not always a problem when he says:

… seeing pixels is not necessarily a bad thing. Prominent pixels call attention to the process by which a digital image is actually put together, in the same way that photographic grain or painters’ brush strokes can, and this may be an important part of an image’s point: the visible pixels create tensions between actual surface and illusory pictorial space, and between marking process and the object of depiction.

(Mitchell, 2001: 66, emphasis original)

Mitchell’s articulation of the “prominent” pixel as a signifier that draws attention to the process by which an image is created follows a similar line of logic that I want to expound on here. Is not the tension that he describes between “actual surface and illusory pictorial space”, similar to the gap that exists between the materiality of performance and the fictional narratives that often occur in performance spaces? In fact, much intermedial work is structured to break down the illusory pictorial space to unveil the mechanics powering its creation so that an audience member experiences both the total performance and its elementary fragments simultaneously.

Rather than adopt Mitchells’ prominent pixel, I want to push the linguistic metaphor further by suggesting that the term aberrant pixel more appropriately articulates the manifestation that occurs in some intermedial performance work, notably in my recent theatre piece *Virtuoso (working title)* (2009). The aberrant pixel is the pixel that misbehaves, that calls attention to itself, to its mechanical structure and the role it performs in a larger image (be it live or screened). Among its possible manifestations is the so-called stuck pixel that sometimes appears on LCD screens where one pixel is switched off,

64 Sometimes a chair is simply a chair, but when it is used it takes on other meanings.

65 Once again, this is very similar to Brecht’s Verfremdungseffekt.
is only green, red or blue, or flashes continuously (Sony, 2007: 7). The stuck pixel on stage might be represented by a performer who does not adjust to a new set of rules, as happens in *Virtuoso* (working title), as I will discuss below. Other manifestations, as identified by the ISO (International Standards Organization) include the dead pixel which is black and the hot pixel which appears white (Alzieu, 2007). Dead pixels might be analogous to the off-camera, or off-stage performer who drops his or her performance energy and watches from the sidelines or from backstage but is viewable by the audience. The hot pixel might be the performer who is caught on camera but is unaware of his or her image being broadcast, as in the long-running *Candid Camera* television programme (Benedetto, Dietrick and Tyrell, 1960; Carruthers et al., 1991; Funt, 1953). There is also, of course, the pixelation that occurs when an image that is broadcast on television appears broken or jumbled, which manifests itself often in intermedial work where a destruction of form is structured into the theatrical experience. By using the pixel as a metaphor, I am seeking to call attention to the materiality of the screen (and the elements that make up its images) and the materiality of intermedial performance.

In a world of screens, the aberrant pixel echoes the chaos of the live despite the mechanical and digital processes within which we all exist. Merlin Donald (2006: 4) has argued that “art is always created in the context of distributed cognition”, suggesting that artists are “highly placed” in the human-cognitive-network through the way in which they “preserve and modify” a culture’s symbols, thereby influencing how a culture views itself. Donald goes on to point out that “art is a technology-driven aspect of cognition” and that the kind of impact artists can have is directly related to the technologies available to them (ibid: 4). Following this line of thinking then, my playful employment of the pixel is not only
playful, but could be seen as part of a wider move by artists (consciously or not) to impact human cognition.66

*Virtuoso (working title)*

The pixel provides a useful metaphorical link between my desire to write about theatre via its material components and the elemental way that screen images are created. By focusing on the pixel, I am looking at the spatial building blocks of images, and extending their metaphorical agency to the spatial building blocks of my theatre performances. This exercise is not seeking to discount the materiality of the live; in fact, it attempts to find useful links between the materiality of the pixel and the materiality of live performance without ignoring the many fruitful gaps, fragments and intermingling that occur when screens are employed on stage. To start with, a provocation: in *Virtuoso (working title)* (Petralia, 2009) the stage itself is *pixelated*, and the performance of the *aberrant pixels* on stage (the performers) creates cohesive, *de-pixelated* images on the screens. Along the front edge of the performing area are three black, thirty-two inch flat-screen television monitors which sit on stands on the floor [see Figure 2.1]. Behind them is a white taped out square that is roughly nineteen feet by nineteen feet, within which are a variety of scenic elements, properties and cameras. *Virtuoso (working title)* uses four live-feed video cameras that are connected to the three flat-screen television monitors, which face the audience.67 During the course of the hour and twenty-minute performance, three performers (whose voices are amplified via wireless microphones) arrange and rearrange the materials within the space to create a series of increasingly complex shots for the cameras, and by default the televisions. The live audience witness both the creation

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66 The types of technologies this thesis concerns itself with are primarily personal technologies: those that are domestic or otherwise pervasive as opposed to technologies that are primarily theatrical and/or scenographic.  
67 The cameras are connected to the televisions via a video-switcher that controls which images are sent to which screen.
process that happens in the theatre and the images that the performers create on the television monitors, or said another way, they see both the live pixels (on stage) and the cohesive image (on screen). In addition, audience members see the differences between the on-screen and off-screen, and these differences inform how a cohesion emerges for a spectator.

Figure 2.1: The stage of Virtuoso (working title)

The narrative of Virtuoso (working title) is focused on an exploration of the television culture of 1960s suburban America leading up to the moment that JFK is shot, although this narrative serves mostly as a tool for the performers to enact their games of mediatisation. It is, of course, no coincidence that Virtuoso (working title) uses television screens to display the images created by the performers since the narrative focuses on suburbia, and television is the medium of choice of the suburban household. The images they create on the screens are always in relation to each other: sometimes the images are duplicated (i.e., the same image on one or more screen) and sometimes they are distinct (different images on each) but regardless, the images are aware of each other until a distinct break with the television occurs in the last ten minutes of the performance. For instance, when a performer is speaking to another performer, she speaks via the screen,
turning to face the other performer in the place that she is on screen. This means that sometimes the live performers who stage these images are standing next to each other (or indeed, nowhere near each other) but not facing each other in the live space. They relate their bodies to their live-feed cameras to produce the desired screen relationship, thus laying “bare the making of the performance” as is often the case in intermedial work (Giesekam, 2007: 249).

The space the performers work within (i.e., the area behind the screens) is arranged like a live television soundstage, with spaces mapped out that represent particular fictional locations within and around a suburban home (represented on stage and on screen by a dollhouse). When developing Virtuoso (working title), the collaborative team were constantly collecting production images from the filming of television, film and photographs. Of particular inspiration were several photographs by the American photographer Gregory Crewdson who has become famous for the decadent, colour-saturated photographs he takes of suburban America. His photographs have the quality of film stills for films that do not exist; they vividly capture domestic, often private moments, where something unusual is happening. In one of his most iconic images from a series called Twilight (1998-02), a woman floats in a lake in her living room, her slippers left on the stairs and a bottle of pills open on the coffee table. She looks just above the gaze of the camera, her porcelain face inexpressive and yet somehow sinister. In another, a strange beam of light shines down through the darkness of night on a pile of weeds next to a road like a scene out of Close Encounters of the Third Kind (Spielberg, 1977). The scenes repeat themselves: a naked woman stands on a strange dark spot in her bedroom as her partner sleeps in bed; a pregnant woman stands outside in the misty evening only in her underwear; a man in a suit stands in the middle of the road at night next to his car in the
rain, his car door open and his suitcase sitting on the pavement. These scenes are remarkable for their sumptuous theatricality (created largely through incredibly detailed lighting design), the way in which the photographs seem to contain an entire world inside of them like a diorama. If only you could turn the page and see what lies just beyond the frame.

Beyond the narrative link of suburbia that exists between Crewdson’s work and Virtuoso (working title), is a formal one: where Crewdson creates film stills for films that do not exist, Virtuoso (working title) is concerned with staging a television show that does not exist. The content of Crewdson’s images, based as they are on the suburb, harkens not only to the cinema but also to the televisual. His images are an inverse of the fiction that early television programming promoted about the joys of American suburbia; they are darker, tenser, and instead of the flowers merely being in bloom, they are ravenously over productive, gathered in mysterious, massive piles in the living room. Additionally, in several monographs of Crewdson’s work, production stills have been included that detail the complicated process by which each image has been constructed. These images depict complex stages surrounded by lighting equipment and cameras; within the centre of the stage everything looks perfect but around the edges a chaos of equipment reins. This became a central inspiration for the visual aesthetic of Virtuoso (working title).

All of the on-stage action of Virtuoso (working title) takes place within the taped-out space behind the televisions. The performers do not cross the tape (they are onstage when the performance begins) until the very end of the show during the only blackout. They stay within this taped enclosure as if it were a sound stage for a live television show that is

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68 Several good monographs include Berg (2007a) and Crewdson (1998-02; 2003-05).
bounded by a barrier of televisions. The televisions also function as a bank of windows into the performance space and indeed the narrative refers to them as such. But these windows are also cages that keep the fiction in its place (on the stage and in the house) while threatening to break at any moment. On the floor within the stage are nearly a hundred colour-coded pieces of tape that signify the placement of scenic elements and the positions of the camera tripods in relation to the scenes being shot [see Figure 2.2]. The tape marks function like aberrant pixels that on their own mean nothing other than tape, but when activated allow the flow of the performance to exist. They are one set of the building blocks of the live performance (and therefore the performance on screen) and without them the precision of the images on the screens would not be possible at all. These small pieces of tape are not hidden or obscured in any way, in fact, they are illuminated in the lighting design by the way the floor itself is used as a lighting surface. There is no attempt to hide any of the mechanics that allow Virtuoso (working title) to take shape: any member of the audience can clearly see the fragmented scenic items that are used to create backgrounds for shots or the large dollhouse that sits at the far upstage portion of the stage which is used to create shifts in location for the narrative of the piece. Even the performers call attention to their roles in crafting the narrative as it unfolds by literally moving cameras to create new angles, switching between acting as camera operator and as on-screen performer, and by delivering their text in a deliberately heightened performance style. Giesekam has called this “self-reflexive play with character” a key element in drawing “attention to the … construction of character” (2007: 248).

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69 We had wanted to construct a raised stage that more closely mimicked the Crewdson images, more explicitly echoing the television studio, but the costs of constructing and the logistics of touring a large set proved prohibitive.

70 I expand on the role of the text later in this chapter in the sections “Virtuosity” and “Reality and Identity”.
In *Virtuoso (working title)*, the tension between William Mitchell’s (2001: 66) “marking process and the object of depiction” is continually being rehearsed as the three performers on stage (live, aberrant pixels) stage their scenes for live-feed cameras which then appear as *whole* images on the television screens. The performance itself is a process of transference from live, physical presence into digital pixels on screen. Eventually, this transference begins to bounce back to the live as the performers respond to their own images on screen and ultimately reject the screens entirely. The scenographic and technological elements of the performance, and the performers themselves, function much like pixels in that their meaning on their own is changed when combined and viewed within a bounded frame. You might argue that pixels (as opposed to people or larger objects) on their own do not signify anything beyond themselves, except in the case of the aberrant pixel that calls attention to its digital nature. But, of course, pixels *do* signify beyond themselves by their very nature (indeed that is their entire purpose) — depending on the scale and quality of an image, pixels can be a nose, a flower petal, or a flicker of a flame (not merely *part of* any of these objects). They are only ever *merely* a pixel when
they behave against their nature by calling attention to themselves, when they are aberrant; ironically, however, even then they are signifying beyond themselves by calling attention to their role as digital construct. Just because we do not see pixels in isolation with unaided eyes, does not render the comparison to larger scale bodies null. Of course there is a difference that occurs by scaling the pixel up to human size, but this difference is a large part of what I find intriguing: how perspective changes something from being a tiny unseen element to becoming a visible, meaningful, component part. The relationship between the pixel and the stage is similar to the relationship between the aerial image of your house on Google Earth, which at first appears as a dot, and your house’s zoomed-in rooftop, which is recognizable as your own. Unlike Google Earth, however, scales are intermingled in Virtuoso (working title), so an audience member has the opportunity to perceive multiple scales at the same time. In the case of Virtuoso (working title), the activation of the elements of the performance in relation to each other, and the mixing of scales obscures the location of the performance — is it on the screen, on the stage or in the interplay between the two?

**Virtuosity**

When the audience enters the theatre, all three performers (Mark Esaias, Gillian Lees and Andrew Westerside) are within the taped-out performance area and popular music from the 1960s plays through the theatre speakers. The television screens do not relay any images; they are black. Gillian, Mark and Andrew are odd figures whose oddities become more pronounced upon examination: Mark, with a head of wiry curls (an obvious wig) wears only a yellow button-up short sleeved shirt, underpants and slippers; Andrew has an awkwardly shellacked black wig perched on top of his head and wears no shoes despite his business-like trousers and shirt; and Gillian wears a pale blue nightgown and a head of
curled hair (again a wig). The obviousness of their wigs is one of many devises used to create the theatrical wonderland that *Virtuoso (working title)* explores on stage, calling immediate attention to the constructed nature of their performance. The wigs also relate to source materials that were explored in rehearsal, most explicitly the film *Grey Gardens* (Maysles et al., 1975), which is a documentary about the cousin and aunt of Jacqueline Kennedy (both named Edie) shot in their dilapidated estate on Long Island. In *Grey Gardens* a young handyman, whom the younger Edie (Little Edie) calls the Marble Faun, styles his hair in a mass of curls that is mimicked in the wig that Mark wears. Echoes of *Grey Gardens* abound throughout *Virtuoso (working title)* although they are never made explicit, and would not be apparent unless pointed out.

The three performers smile at the audience as they enter, apparently enjoying the kitschy music playing. Once the audience has settled, the music fades out, the lights shift and the performers stand up and prepare the stage. They turn on the cameras that are positioned around the space before moving to the dollhouse at the far upstage centre of the stage. They place themselves around the house, although what they are doing is not immediately apparent. Then a soundscape starts playing at the same moment that Andrew opens the shutters on a camera focused on the door of the house. This image is transmitted to the three television screens. A five-minute sequence follows during which the audience sees the saturated miniature world of a dollhouse being filled with furniture by an oversized hand (Gillian’s). The camera pans, zooms and repositions itself until a complete kitchen is compiled in the dollhouse and on the television screens. The mixing of scales, Gillian’s oversized hand fitting tiny furniture into a *realistic* arrangement is lent an eerie air by a soundscape made up of household noises that have been processed and stripped of their
context. At the end of this sequence, Gillian walks to the downstage edge of the stage and turns on an LED flashlight that she aims at her face. The spectre of Gillian’s shadowed face echoes the dramatic lighting employed in the black and white films of Alfred Hitchcock, creating a sinister mood. She speaks, to the audience and to herself, not on camera, recalling a dream she has had, which sets up a number of themes that are replayed and rehearsed throughout *Virtuoso* (working title) over the next hour and ten minutes, most notably the notion of the house as a place where things can go wrong, to paraphrase David Lynch (Chocano, 2006).

Following this soliloquy, the performance begins to take on a momentum that is shaped by a series of scenes between Andrew, Gillian and Mark that are staged for the cameras and roughly involve a game of playing house where the rules are constantly shifting, but where the dangers of the outside world seem to always offer threat or seduction, depending on the performer’s perspective. In a sequence twenty minutes into *Virtuoso* (working title), Gillian and Mark control the game, making up the rules of engagement as they go:

Mark: No. No, it isn’t true. Ask him about the note.
Gillian: Tell me about the note.
Andrew: What note?
Gillian: Tell me about this note I have here, in my hand.
Andrew: Well, I have no idea about any note. Especially not that note.
Mark: Just tell her.
Andrew: I don’t know anything about a note.
Gillian: Who gave it to you?
Andrew: No one.
Gillian: That’s impossible. Do you really expect us to believe that no one gave it to you?
Andrew: Yes.
Mark: Ha. He admits it
Andrew: No.
Gillian: Is this your handwriting? Why are you here?

Among the sounds sampled by the composers, [zygote], are a washing machine, dishes clanking, dishwasher, and a refrigerator. These individual sounds verge on aural pixilation: sometimes the individual sounds separate enough from one another that they become recognisable on their own, and sometimes they are so interwoven that the aural image they create is cohesive — even impenetrable.
Andrew: Listen, I think I should go now.  
(Petralia, 2009)

In this sequence, Gillian and Mark are entrapping Andrew who is pretending to be a visitor, although he has been on-stage from the beginning. They use the trope of interrogation borrowed from television court room dramas such as the 1957 CBS Studio One programme *The Defender* (Mulligan, 1957) and popular cinema. The game-playing develops momentum throughout the performance and begins to articulate the house as a cage within which games are played, a notion that was inspired by the endless game-playing that the two Edies busy themselves with in *Grey Gardens* while their house literally falls down around them. Near the end, Andrew says, “the walls are falling,” an admission of the metaphorical falling of their house which ultimately results in the end of their game playing, to which Mark replies “No. No they are not”, in an attempt to keep the fiction alive (Petralia, 2009).

These scenes are technically complicated and require the performers to stand in awkward positions, to face left or right to camera in order to effect the proper directional looks between the three screens, and to place the cameras/backgrounds in precise positions without substantial preview to ensure the shots are correct. The scenes are broken by a second mode of performance largely consisting of sequences at the dollhouse where the furniture from one room is removed, the camera repositioned and new furniture placed in a new room (indicating a shift in time/space) all by the articulate hands of the performers which seem to offer varying commentary on the objects via their subtle muscular shifts. For example, in the first instance of setting up furniture at the very beginning of the piece, Gillian’s hand moves slowly and contemplatively into the dollhouse (and thus the frame of the camera/television), sometimes stopping midway in her task to make a small adjustment or to use the side of her finger in an overly delicate manoeuvre. Later, she moves with
more speed when she dismantles the living room, sliding the rug out of the frame and
collecting furniture items in groups (as when she stacks the miniature chair on a table and
slides the whole table out). Later still, Mark dumps the entire contents of a room into the
frame and then sorts out their arrangement. This progression of approaches to the
dollhouse furniture tracks along a similar path as the narrative destruction that is occurring
in the piece, a general weariness with *playing the game* and a desire (on the part of
Andrew and Gillian) to end the game entirely that is accompanied by a growing awareness
of the fragility of their own fiction. These dollhouse sequences are a play of scale where
objects on stage are loosely represented by objects in the dollhouse. In the live space, the
dollhouse is a dollhouse, but on screen it is not only a dollhouse, but also a representation
of a fictional scenic world. An audience member who looks past the screens to see the
dollhouse might experience a process similar to zooming in on an image to see the pixels
and then zooming out to see the image those pixels create. Initially, these dollhouse
sequences happen without distraction (as in the opening) but they gradually begin to be
eroded by overlapping sections of monologue and/or camera interplay.

A third mode of performance that threads throughout is a series of monologues/soliloquies
(as in Gillian’s first speech), which further the narrative and reveal the inner thoughts of
the characters. These speeches are never delivered to camera and are the only definitive
break with the play on screens that the other performance modes explore (at least until the
entire fiction breaks down at the end). Structurally, they function to alter the pace of the
performance and to allow narrative progression. While the performers deliver these
speeches, the other performers are on the fringes of the visual space, listening in. In one of
his speeches, Mark describes himself as a member of the Vietcong which causes Gillian
and Andrew to respond, deeming his fiction a step too far. Andrew, in a speech
underscored by a distorted soundtrack of Jimi Hendrix’s national anthem, describes his desire to be John F. Kennedy before detailing his sexual exploits with Mark and Gillian. This revelation encourages a flirtatious exchange between the three that is only visible off-screen. Later, Gillian describes her journey out of the house to the edge of the subdivision where the forest lies. She describes wanting to go into it, but decides not to because, “people get eaten in forests” (Petralia, 2009). This revelation inspires Andrew, who has been listening in, to push for the game playing to end in the subsequent scene. Ultimately, the televisions return to black during a recreation of the JFK assassination (although Andrew does not get to become JFK because that would signal his own death; instead this role is assigned to Mark).72

The Interface

The trauma of the screens cutting to black near the end of *Virtuoso* (working title) changes the texture of the performance space enormously; where previously, the bright glow of the televisions created a barrier between the performance space and the audience, without images, the screens recede in the stage picture. But although the screens no longer transmit images, their presence as objects presents the possibility that they might come on again with some further sensory details. These screens are omnipresent; indeed, it is hard to imagine the world at all without screens. We use them as a communication tool, for entertainment, for work and as barriers to human contact. In *Virtuoso* (working title) the screens fulfil all of these functions, but, to borrow again from Greg Giesekam, because they are positioned in relation to a visibly live performance in front of a live audience they also “become a means of playing across the interface between the material and the immaterial that characterizes postmodern understandings of reality and identity” (2007:

72 Of course, the narrative link between JFK dying and the screens going to black is intentional.
In *Virtuoso (working title)* the actions of the performers are duplicated — they can be seen live and (generally) on the screens simultaneously in a process of transference from the live pixel to the digital image — but this duplication begins to impact on the approach the performers take to their tasks, a further transference from digital pixel back into the live space as aberrant pixels. This is seen most clearly in scenes where the performers become aware of their images being projected to the audience. One example of this happens when Gillian repositions her breast to better catch the camera in a scene that involves Andrew placing his hand on her breast in a moment where he seeks her comfort. And again later when Mark steps out of his camera near the climax of the performance in order to interact with Gillian and Andrew, only to quickly return to his camera self-consciously after realizing that he is not on screen. The performers’ reactions to their on-screen images causes a re-evaluation of perspective where the screen directly impacts the live: the *pixel* performers transfer themselves into *pixel* images on the screens which then rebound into the live again as aberrant *pixels*. The on-screen image, the on-screen pixel, is meant to be final, perfect. By responding to their own images, the performers behave against the implied rules of the screen, they become aberrant. They also, of course, move between the space of the live theatre and the space of the screen, while also existing in the composed space that includes both screen and live image: in *Virtuoso*, the stage space is a composite of screened and live space where the difference between the two spaces presents a meaning-gap for audience members to fill in.

The performers are also, of course, fragmented on the screen; their full bodies are never completely revealed in the shots being staged. The cameras work as a kind of microscope, focusing in extreme close up on mouths, eyes, feet and hands or cutting off a performer’s body halfway. This invasive operation of zooming into the minutiae of the performer
allows us to see their pores, their structural components. Much like an Adobe Photoshop image that has been magnified to several hundred percent its original size, we begin to see the pixels as pixels, aberrant in their resistance to fulfilling their structural aim. When Mark asks to be kissed by Andrew in a scene near the climax of Virtuoso (working title), he approaches the camera until only his lips are in view [see Figure 2.3]. At such a close perspective, they lose their relation on screen to a face. It is only by raising your gaze to see Mark standing in front of the camera that the lips make sense. The viewer may know implicitly that the lips are Mark’s but the seduction of the close-up makes them also simply colour, form, shape, and texture. The lips become pixels, but these pixels are alive. But the process of pixelation does not end in this one-way exchange from live to screen: the macroscopic lips are out of scale with the image on the centre screen (of Andrew seated on the floor next to a chair, shot from a steep top angle) and in conflict with the other onstage performer (Gillian, who watches from centre stage, encouraging Andrew to kiss Mark). As is often the case in Virtuoso (working title) there is a multiplicity of image scales (both live and on screen) that creates a visual tension for an audience member: the eye of the spectator is delivered images, bodies and objects whose scales should preclude them from sharing a singular space. What we each see when we look at Virtuoso (working title) will undoubtedly vary depending on how we look, but there is a possibility for the spectator who takes in the whole scene, both on screen and not, to unify the stage in a pixelated image whose component parts are laid bare.
Figure 2.3: Mark kisses Andrew in Virtuoso (working title)

By visually suturing the on-screen image with the live process of image construction, an audience member witnesses the straddling between the material and immaterial, and has agency in completing the image, in smoothing over differences in pixel depth and size. Jacques Ranciere (2007: 280) suggests that theatre should seek “… spectators who are active interpreters…” who are encouraged to make the stories they see their own. The construction of Virtuoso (working title) does exactly this by inviting the audience member (Ranciere’s spectator) to create links between a multitude of visual and narrative codes. Cognitively, this process of suturing stretches the brain’s perceptive function, because as Semir Zeki has explained in his essay about ambiguity in art, “the primary law dictating what the brain does with the signals it receives is the law of constancy” (2006: 244). When we see images, these image signals are transferred to the brain and the brain processes them into meaning. In that process, the brain seeks to “eliminate all that is unnecessary for it in its role of identifying objects and situations according to their essential and constant features” (2006: 245). When the choice for the brain is simple, a solution to its stimulus happens quickly. When the brain is presented with more complex situations, or ones where
there is no immediately apparent way of understanding it, the brain goes through a process by which every possible outcome/answer is presented as equally correct. In essence, the brain handles multiplicity by recognizing the potential for there to be more than one way to interpret a situation: the brain does not require a single correct answer to any problem (ibid).

So, when an audience member is presented with the spectacle of a live body facing a camera (in profile to the audience but visible from at least the waist up from most audience seats) and a screen that appears to display an image of that live body, as happens in the close-up lips/kiss moment described above, the brain knows that the image of close-up lips on the screen relates to the body in space, but it also knows that the image on the screen is equally an abstract series of colours and textures. These two ways of understanding the spatiality of the image are not mutually exclusive; they can exist simultaneously.

Furthermore, the same “circuitry” in our brains that controls our movement also engages when we imagine movement (Lakoff, 2006: 158). The implication in this instance is that when the pixelated screened image is present at the same time as a physical presence on stage which appears to relate to that image, our mirror neurons engage in the brain allowing us to imagine what is happening physically in front of us by feeling “what it would be to perform that motion”; a transference occurs between the physical body of the performer and the body of an audience member via the screen that allows us to understand the rules of this space (ibid: 157).73

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73 Mirror neurons are “activated when a person performs a certain action or has a certain experience and also when the person observes someone else performing the same action or having the same experience” and have given rise to the theory that the act of watching someone do an activity is closely linked to doing that activity yourself (Colman, 2009). Mirror neurons are also sometimes called “canonical neurons” (Freedberg and Gallese, 2007: 200).
The mechanics of human sight play an important role in understanding my argument. As humans evolved the ability to stand upright, our sense of sight became primary, taking over from our sense of smell as the sense most important to our survival (Gallagher and Zahavi, 2008: 132). The way that images are received by our eyes and processed in the brain provide some clues as to how we perceive the spatial world around us that are useful to the discussion of the pixelation of the stage in Virtuoso (working title). Rather than give a full account of how we see, I will focus on some key aspects that relate directly to this discussion. David Hubel, who won the Nobel Prize in Physiology in 1981 for his work in understanding how visual processing works in the brain, provides a useful metaphorical introduction to the eye, when he says:

The eye has often been compared to a camera. It would be more appropriate to compare it to a TV camera attached to an automatically tracking tripod — a machine that is self-focusing, adjusts automatically for light intensity, has a self-cleaning lens, and feeds into a computer with parallel-processing capabilities so advanced that engineers are only just starting to consider similar strategies for the hardware they design. (Hubel, 1995: b8.htm)

He goes on to explain that in the eye “the cornea… and lens together form the equivalent of the camera lens”, which focuses by changing its shape (as opposed to altering the distance between a lens and an object as in a camera) (ibid). The retina, which is part of the brain but is within the eye, “translates light into nerve signals” and is structured as a series of layers, the back most of which contains the rods and cones (ibid). Rods allow us to see in dim light and cones allow us to see “fine detail and colour” (ibid). Rods and cones are arranged along the retina almost like inverse pixels on a screen: they are arranged in a pattern across the retina but instead of being the surface of an image, they are the collectors of the image. The data that is collected by the eye is transmitted to the brain by “about a million nerve fibres bundled together in the optic nerve” with a portion of the data

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74 For more on the mechanics of sight see Hubel (1995) and Hubel and Wiesel (1979).
going to the primary visual cortex where the data is processed before being sent to other parts of the brain (Hubel and Wiesel, 1979: 153).

What happens next is less clear, as the raw data of visual stimulus is translated into perception, meaning. This is partly because we are not simply brains with eyes; our experience of the world is bodily and contextual; seeing a car crash in a film is perceived differently than seeing one happen on the motorway, which is perceived differently from being in one yourself. There is a system of component parts that make up our ability to have experience at all — we cannot see without eyes, and we cannot breathe without lungs. Similarly, we cannot have images on screen without pixels (and pixels are also only one part of the experience of watching a screen). But, as in the discussion of the pixel above, the component parts of our body/brain are primarily meaningful in relation to each other. Thus the eyes are not especially useful without a means of understanding what it is they see. The cerebral cortex where all of our senses are processed is a folded, layered tissue made up of over ten billion neurons that would be approximately 1.5 square feet in surface area if spread out (Hubel and Wiesel, 1979: 150). The visual cortex, perhaps the best-studied region of the cerebral cortex, would be a mere fifteen square centimetres (ibid) and specific regions of the visual cortex in the brain relate to specific parts of our field of vision (Zeman, 1998). This means that our visual cortex is at least partially hard-wired, like an LCD screen with its fixed pixels, so that a damaged area of the visual map results in a denigrated visual image, much like a dead pixel on a screen. We also know that the cells that send data to our brains from our eyes are attuned to see not light intensity, perse, but the differences between intensities of light (Hubel and Wiesel, 1979: 154). Therefore, when we watch a performance like Virtuoso (working title) with its bright LCD
screens that have light shining through them and its relatively dark stage, the eye will be aware of the differences in intensity and naturally privilege the brighter source.

Because of the shape of the human eye, only the most central part of our field of vision has a sharp focus (Henderson and Hollingworth, 2003: 357). To compensate for this, our eyes move their focal point “around a visual scene with high-velocity eye movements called saccades”, which are bracketed by moments of fixation on the object (ibid). Despite this constant movement, we do not perceive any gaps in our visual field — our image of the world stays consistent. How this is possible is the subject of some debate, but it provides a nice parallel to what happens on screens with moving images.75 Film and video transmissions are made up of sequences of still frames that are captured at a high speed, even when displayed live as in *Virtuoso (working title).*76 But the human eye does not see the flickering of images that should accompany the display of sequenced stills because of the brightness of the images on screen: at 60HZ brightness and above, the human eye “loses sensitivity to flicker in a stream of images” and perceives the motion of images as one fluid motion (Watson and Luebke, 2005: 55). In *Virtuoso (working title)*, all of the images shown on the television screen are live, fluid and apparently true-to-life. But on stage, the construction of those images is revealed, so that a continuum occurs whereby the images that are being captured seem to be slowed down to their component part, the pixel.

The act of processing visual data does not happen in a vacuum; we understand the world around us physically and the body is constantly transmitting data that helps us to

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75 For an overview of some of the different views of how the brain compensates for the periods of movement while keeping a holistic view of the world, see Henderson and Hollingworth (2003).
76 In the US devised video standard, NTSC, film and video is captured at 29.7 frames per second and in the PAL and SECAM standards film is captured at 25 frames per second (Luke, 2002).
understand what we experience (Gallagher and Zahavi, 2008: 131). The perception of the image-on-screen and the body-in-space is placed within the context of the audience member’s physical experience: sitting in a theatre (is the chair comfortable? If not, perhaps a less inquisitive, deep engagement with the material will occur), in the dark (the screens are bright, but with poor eyesight it might be difficult to fully engage with the details of the screened image), and aware of being part of a group with fixed rules (is it okay to get up to look more closely at the screens or to talk back to the performers?). The act of sitting and facing a stage places a premium on the visual experience, which is not to imply that the aural aspect of the performance is unimportant (indeed it is crucial) but that the impact of the body being seated means that the normally rich sensorium that the human body engages with is somewhat dulled in favour of a more visual encounter. Similarly, the spatial elements of the performance are received via a mostly frontal relationship with the stage and screens.

Reality and Identity

Using live feed cameras on stage that are connected to projectors or to television screens, allows artists to explore the playful interaction between the live and the screened. *Virtuoso* (working title) fits into a long line of theatre-based work that has employed live cameras on stage to various artistic ends. The Pennsylvania-based company Big Art Group, headed by director Caden Manson describes their use of live-feeds to create visually coherent narratives as “real time film” (Wehle, 2006). Established in the late 1990s, Big Art Group have made several multi-screen live performances that vary in complexity and

77 Tom Wujec gives a simple overview of how we make meaning via sight on the TED website (Wujec, 2009).
78 Other companies who have made well-known projects involving live video-feed include The Wooster Group, Gob Squad, the Builder’s Association and Mabou Mines among many others. Greg Giesekem (2007) provides an overview of the history of screens on stage in his book *Staging the Screen*.  

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approach, but which all toy with the notion of identity on screen. In Big Art Group’s Shelf Life (Nelson and Manson, 2001) and in their follow-up Flicker (Nelson and Manson, 2002) the stage consists of three fixed cameras facing the stage that are connected to three projectors. The projectors are focused on a long screen at the front of the stage and although they are made up of the three separate images from the cameras, they appear to create one seamless image-surface. The performances consist of the creation of a film, shot and edited live in front of the audience (Wehle, 2006: 3). In both cases, Manson is engaging directly with the territory of cinema in his narratives, whether with the genre of horror films as in Flicker or with reality/documentary as in Shelf Life. The stage space in these works is static: each camera is fixed on the downstage edge of the performing area facing the performers in the same relationship as the audience gaze. The fact that the camera images are projected, as in cinema, as opposed to being displayed on television screens is important to the cinematic nature of Flicker and Shelf Life: the received images are not “sculptural” as they might be on television because cinematic projection is a case of light being shown on a surface as opposed to through a surface as on television (McLuhan, 2004 [1964]: 341). In this regard, the cameras and the projections in these Big Art Group performance do not act as microscopes, or reveal a deeper layer of action in the space, as some other intermedial work might. Instead they allow the audience to witness a pleasurable construction of a film. Flicker and Shelf Life are interesting case studies for the pixilation of the human body on stage in relation to screens, and a discussion of them adds to the landscape within which Virtuoso (working title) sits.

The pleasure for me in seeing these Big Art Group productions is in witnessing the play of identity that happens between the live and the screen. In one exemplary scene common to both shows, three actors stand behind three cameras using each of their arms to create one
arm on screen; a sort of macro-pixelation where the mega-pixels of the live join via the screen into one cohesive, mediated image. The scale of the composed arm on screen is oversized in relation to the stage space, and indeed to the space of the screen, thereby revealing the fluid nature of scale and space in mediated images. Both *Flicker* and *Shelf Life* also destabilize the concept of character across multiple skins: in the scene mentioned above a performer on stage left slowly puts their hand in the frame of the camera, moving it from one side to the other. Meanwhile, another performer (often of a different gender or race) waits by the centre camera and another by the stage right camera. As the first performer’s arm crosses the frame of the stage left camera the performer at centre stage begins moving their arm so that when the first performer’s arm has reached the edge of the frame, the centre performer is able to continue this pixelised arm across the projection screen. The same thing is repeated when the performer at the centre reaches the edge of their frame. In this example, three performers’ arms are joined to form one unified arm on screen, although the sutures between the images are apparent in the different skin colours and textures. This *real* arm on screen is indeed real, but it is not *real* in the same way as the arms that we each have on our bodies, of course, because this screened arm is fractured, fragmented in the live space and only *real* on screen. Philippa Wehle says, “the technique may be called Real-Time Film, but there is nothing real about what is going on” (Wehle, 2006: 3) in *Flicker* and *Shelf Life* because they both constantly remind audience members of their construction; they pixelate space, making possible what would be physically impossible in a non-screened space. I think Wehle might have misapplied the term *real* here, however. Although I agree with her that the *authenticity* of the fictional narrative is intentionally undercut by the revelation of its construction process, I think the result is an increased sense of the *real*, at least in the Lacanian sense of the *real* as a gap in perception (Lacan, 1977). If anything, the formal elements of *Shelf Life* and *Flicker* force
us to encounter the real, by constantly drawing attention to the real actions happening that have real consequences on screen.

The play with the relation between the live body in space and the mediatised body on screen is also a play with character and identity. The performers in Flicker and Shelf Life become interchangeable and decoupled from traditional notions of character — each performer transforms into a given character using partial costumes, matching wigs and camera choreography of the kind described above. Philippa Wehle (2006: 5), writing about Big Art Group’s work says, “when characters, first seen as one person are later played by three separate actors be they women, men, black, white, homosexual or straight, the confusion becomes total, and identity is masterfully thrown into question”. Using the screen as a barrier behind which fragmented, even pixelated, performers construct images returns us to Giesekam’s (2007: 250) assertion that much intermedial work “plays with understandings of reality and identity”.

A play with identity and reality are at work in the narrative and form of Virtuoso (working title) as well. From the beginning, the narrative suggests an uncertainty of identity, with performers constantly turning to one another and asking, “Who are you?” The answer to this question turns out to be incredibly complicated as the structure of Virtuoso (working title) forces a confrontation between the performers (who move the cameras), the characters (who talk to us in their monologues), and the characters-within-their-characters (who are performed by the characters for each other). It is never quite clear who these people really are. Is Andrew, for instance, a visiting astronaut as is suggested by the earliest scene in which he speaks? Or, since he is onstage from the beginning and seen moving out of view of the live cameras until his entrance on screen, is he performing as a
visitor? Is Mark the *Marble Faun* as Andrew calls him, and have they really had sex in the back of a Buick, or is this an invention created to incite some tension between Gillian and Mark? Did Gillian really go to the edge of the subdivision? Is Mark really Jacques Cousteau? The instability of character, and of the narrative itself, is exemplified in a sequence leading up to the final scene:

Woman: You are no one when you’re alone. We can be anyone we want here.
Man 2: Ah, but it isn’t going to last, now is it.
Man: It will. Of course it will last, it has to.
Woman: No. It won’t. You can’t have your cake and eat it too in life.
Man: Oh yes you can. We are. We are having our cake, eating it, loving it, masticating it, chewing it. We have everything we could ever want.
Man 2: But the walls are falling.
Man: No. No they are not.
Woman: I’m not hungry. This talk about cake makes me feel ill.
Man: We should keep going. We don’t have to give in.
Woman: You are just wasting time.
Man: So. I love time wasting. So do you. What has happened to you? Woman: I don’t know. I’m confused. Maybe I’m pregnant.
(Petralia, 2009)

The performers become unable to agree on the narrative, on whom they are, and even on the condition of their world. The possibilities offered by the narrative accumulate and become increasingly implausible until Mark is coerced into performing his final role as John F. Kennedy on his way to the Dallas Trade Mart with his wife Jackie. Gillian and Andrew cage Mark in a triangle of cameras so that his image appears with the proper background on the centre camera (and television screen) while two other cameras capture fragmented versions of him that appear without an appropriate background. The fragmenting of the images accompanies a pixelation of character: Andrew and Gillian seem to no longer wish to perform their roles (“It’s over. The game is over.”) as suburban stereotypes and see a restaging of Kennedy’s assassination as the final play to end all plays. Mark has become a *stuck pixel* here, operating as if the narrative progression that leads Gillian and Andrew to alter the rules of the game had never occurred, and he is left as the only image on screen as a result. Gillian and Andrew have left the screen, operating
more like *dead pixels*, off-screen, but manipulating the images that we see on the televisions [see Figure 2.4]. This sequence escalates until a series of three gunshots are articulated by Andrew, simulating the assassination of JFK and, by extension, ending the game.

![Figure 2.4: The assassination of JFK/Mark in Virtuoso (working title), where only Mark remains on screen, albeit fragmented and off-centred](image)

Further complicating matters is that the performers are all British (one Scottish and two English) and that they do not adopt American accents despite the narrative of American suburbia in which they exist. In creating *Virtuoso (working title)* the question of accents was perhaps the single most debated issue. In the end, I felt that by not having American accents the falseness of the world was more evident; this is not, after all, meant to be an accurate representation of an historical moment, nor is the audience meant to believe these people are who they say they are. By maintaining their own accents, the performers
strengthen the theatrical distance that the structure of the cameras and screens provide and their accents become *aural pixels*, if such a thing is even possible. The characters are rendered immediately in inverted commas through the maintenance of accents that would not belong in an accurate representation of American people, thereby pixelating from the start. These narratively inappropriate accents, then, become a sort of aberrant pixel; they do not belong in the narrative of *Virtuoso (working title)* except to call attention to the falseness of the situation.

Underlying the game play in *Virtuoso (working title)* is an exploration of suburban subjectivity.\(^79\) This is a world that has the flavour of the local news, with a microscopic worldview that results from the decentred nature of suburbia. A 1960 article from *Time Magazine*, describes the rise of suburbia during the decade that *Virtuoso (working title)* explores when it says:

> The wreath that rings every U.S. metropolis is a green garland of place names and people collectively called Suburbia. … Oftener than not it has a lilting polyphony that sings of trees (Streamwood, Elmwood, Lakewood. Kirkwood), the rolling country (Cedar Hill, Cockrell Hill, Forest Hills), or the primeval timberlands (Forest Grove, Park Forest, Oak Park, Deer Park). … In the old towns, the giant oaks and elms threw rich new shade across the white colonial mansions and the square, peaked-roofed clapboard houses. In fresh-minted subdivisions, sycamore striplings strained at their stakes to promise token cover for the bare houses of glass, steel, stone and shingle that have sprouted (19 million since 1940) as from a bottomless nest of Chinese boxes. (Time, 1960)

The article goes on to describe the boredom that creeps into these desolate, de-centred towns that have no natural, public gathering place, when it quotes one woman as saying, “I’m so sick and tired of seeing those same faces every Friday and Saturday night, I could scream” (ibid). The regularity of suburbia with its rigid social roles and limited connection to the urban idea-centres can be maddening, and the home often becomes a cage with the

\(^79\) For a fantastic accounting of America’s transformation into a suburban wonderland, see James Howard Kunstler’s (1993) *Geography of Nowhere.*
television at its centre. James Howard Kunstler (1993: 167) says that in suburbia, “the outside world has become an abstraction filtered through television, just as the weather is an abstraction filtered through air conditioning”. The television, then, becomes a reminder of everything outside that threatens to break the hermetic seal of the suburban home while also creating a false sense of safety and remove from the chaotic potential of the world: what is on television, after all, is not real in suburbia.

In *Virtuoso (working title)* there is nothing better for the performers to do than to play at television. McLuhan (2004 [1964]: 346) has said that “TV tends to be a close-up medium”, where the performance of actors needs to be more nuanced. The performance style of Andrew, Gillian and Mark is simultaneously in synch with and at odds with McLuhan’s statement: they do explore the close-up extensively but they also use a heightened performance style that draws attention away from the screen and back into the live space. This heightened style is a hybrid performance language that was drawn from watching early American cinema, which built on the performance style of theatre, and from watching television, which also drew on theatre. The result is a form that occasionally calls attention to itself, inviting audience members’ eyes to lift from the screen and observe the live space.

**Pixelation**

Throughout this chapter, I have asked the reader to follow an extended metaphor that uses the pixel as a lens through which to understand something unique about the way space functions in *Virtuoso (working title)*. Is there anything more substantial to my claim that the pixel is not only bounded by the screen, but is also potentially three-dimensional in some intermedial work? A human cannot be a pixel, except in theoretical or metaphorical
terms, because a pixel is a unit of a screen-based image. What I am suggesting, then, is a metaphorical comparison between the spatial realm of the screen and the stage. Just as in the case of headspace as discussed in my earlier chapter, aberrant pixel space is a theoretical conceit that suggests that the way the stage is spatially organized (as a series of independent, but related objects) is similar to how a screen is spatially organized (as a series of independent, but related pixels). Of course, pixels on a screen are normally uniform on any one screen, except in the cases discussed above, and the objects on the stage are not necessarily uniform. But in Virtuoso (working title) and other works where the main structural conceit is a transference of the live onto the screen, the live space begins to behave in a language that is not entirely theatrical, nor entirely televisual (or cinematic). When the live images being filmed in Virtuoso (working title) are transmitted to the screen, they are lost (they are not recorded in any way) just as in a live performance one moment gives way to the next without any sense of permanence (Phelan, 1993: 148). So the images become on and of the screen, but they do not behave as screened images are supposed to — they do not last. As I mentioned above, the images do, however, impact upon the live performance through the responses and reactions the performers have to their screened images, and also through the behavioural challenges performing to camera creates. The complex nature of the performance requires a reorienting of space on behalf of the performers that becomes technically driven; they begin to behave like pixels, constantly aware of their relation to the other elements on the stage in order to create the perfect screen images. In this process of response to the image, the performers do not behave as live performers are supposed to — they become part of the flow across the

80 The performers, like the pixel, also sometimes malfunction, calling attention to their fundamental materiality in the process. The precision of Virtuoso (working title) requires that every element be in its place on time and on cue. When the precision breaks down, as in the time one of the performers tripped over a cable and another one caught the camera attached at the other end, the fragility of the work is revealed. In this revelation, a keen audience member might also find their attention drawn to the minute detail of the performer-camera-performer interaction: they might see the performer in this moment in isolation, as a mega-pixel calling attention to its incongruity with the rest of the stage picture.
interface between the screen and the live. What unifies both screen and stage is the relationship between the complete image and the pixels that make up that image, be they on screen or live in space.

In *Virtuoso*, the movement between the live on stage and the live on screen, both ordered by a kind of pixelation, also informs the spectator’s understanding of space. Rather than a coherent space made up of a single flow of sensory information, *Virtuoso* has multiple spatial streams represented by each television’s internal space and the larger space of the theatrical performance area. This nesting box effect means that space functions here like a series of keyholes through which one space reveals another, which reveals another.

Returning once again to the space-place dichotomy of de Certeau that I setup in my introduction, it could be that in *Virtuoso* the place of the performance (that is the television screens and the theatre itself) is transformed into a multifaceted space through the actions of the performers and technicians, and again through the perceptual suturing together that the audience member engages in. Or, following Augé (1999: 110), the use of television screens in the theatre, which he calls “empirical *non-places*”, could be seen to change the dynamic of the performance in an entirely different way by suggesting a kind of empty consumption. Augé (1999: 110) describes the television as belonging to a space where people “coexist or cohabit together without living together”, which might suggest that, for Augé at least, in *Virtuoso* the entire space has been compromised by the inclusion of the screens. The theatre space, the live enactment of space that the performers engage in, however, must surely alter this *non-placeness*: the screens are not functioning as messengers of pre-recorded information as in Augé’s examples. Instead, they function as portals intervening in the space of the live and inviting the live to respond. This two-way system of interactions between the space of the screen and the space of the performance
area resist categorisation as *non-places*. The complex way in which the physical actions of the performers reorient camera angles and scenographic elements keep the space in a constant flow ordered by the building block of spatial images: the pixel.

In *Virtuoso (working title)*, the television screens provide a physical barrier to the audience in the theatre and a metaphorical barrier to the outside world within its narrative. Images that the performers’ report seeing on television are threatening (“Gillian: That black man, Medgar Evers was murdered. I saw it on the television.”), but their threat is mitigated by the protective surface of the screen (Petralia, 2009). The threat that this surface might break terrifies Mark, who is constantly referring to the potential of the televisions/windows to break. Narratively, the television seems to safeguard these characters from the outside world while also caging them in, limiting their ability to progress into a new, more meaningful narrative. Indeed, the only way to move out of the endless game playing comes at the expense of the televised image: when Gillian and Andrew restage JFK’s assassination with Mark in the starring roll, the television images cease. Each “bang” of the gunfire sees the *death* of a television until all that is left on stage is the dark glow of blackened screens and the sound of a recording of JFK’s death being announced on a local news channel in Texas.

In my childhood, the television served a more productive purpose. Instead of serving to protect me from the outside, it was a gateway to a whole world of concepts and cultures that were not in my immediate surroundings in suburban Florida. The television offered a horizon beyond which might lay Africa, or Europe, or beautiful men, or the morally uncertain territory of the urban jungle. Whatever purpose television serves in our daily lives, or in the narratives of intermedial work such as *Virtuoso (working title)*, the
interaction between the *live* and the image on screen is not as separate as we might
sometimes believe. Instead, a movement between the live and the screen, and back again,
suggests a more complex dynamic is at work bounded only by the pixel in its many guises.
Chapter Three: Here, there and in-between, a reconsideration of rehearsal space vis-à-vis telepresence
Here, there and in-between, a reconsideration of rehearsal space vis-à-vis telepresence

Space seems to provide the glue that holds our perceptual worlds together so that we can move and act in a manner that is most beneficial for survival. (Robertson, 2004: 247)

My perception is a prediction of what ought to be out there in the world. And this prediction is constantly tested by action. (Frith, 2007: 132)

In my previous two chapters, I have analysed some of the ways that technology has shifted the boundaries of spatial awareness in theatre vis-à-vis cognitive science. My concept of headspace suggests the possibility of performances that exist spatially in the head of the audience member, and my discussion of aberrant pixel space suggests that live-feed video used in performance creates an understanding of space based on the pixel. In both of the preceding chapters, Lakoff and Johnson’s proposition that metaphors are the way we articulate our understanding of the world allowed me to playfully unravel space via the aural and visual. The aural and visual come together in this chapter as I move from the realm of audience reception and into the rehearsal room to begin to understand how the spatial dynamics of rehearsal are changing as a result of ubiquitous technologies. The gathering of people together in a contiguous physical space in order to make something is the most basic description of my typical rehearsal process. My rehearsals have, until recently, always been dictated by the ability to gather a group of collaborators together at the same time and in the same geographical place. The shared physical space has dictated certain social structures: dressing appropriately, bathing to avoid any unwanted smells, respecting each other’s personal space. In this analogue version of rehearsal, tea breaks and side conversations have dictated as much about the process of creation as the work done in the centre of the space. Over the past several years, however, new possibilities
have developed that have upended my notion of what a rehearsal is, and importantly, where it takes place. Starting in 2007, I have been collaborating with the New York based dance company Tiffany Mills Company in the role of dramaturge and performance coach/director. Because I live and work in England, I am not able to be physically present in the New York dance studio on a regular basis. Instead, we have worked over SKYPE, an internet-based telephone and videoconferencing programme. The physical space of the rehearsal room has been destabilised as a result of our trans-Atlantic collaboration: our process occurs in a space between my home in England and the dance studio in New York, in a space that contains images and sounds, which acts as both a portal between here and there and as a space in its own right. Johannes Birringer (2004: 172) has described the destabilisation of expected spatial relationships in relation to live performance as “telepresence”. He notes that in Here I come again/Flying Birdman (ADaPT, 2004), which had seven performance sites, seven performance ensembles and seven audiences all linked via multiple screens, that the collaborators were “separate but appear to be together in a shared virtual space of the Internet” (ibid). Birringer, and others, have mostly focused on the delivery of performance using the distribution networks made available by the Internet.

In this chapter, I am concerned primarily with the way that domestic communication technologies have shifted the landscape of the rehearsal room, and the rehearsal process itself, especially in relation to notions of space.

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81 SKYPE is a free to download and free to use application that allows for phone, text and video messaging. SKYPE does not allow for multiple people to videoconference in at the same time, at least not as of this writing. It also has a paid service that allows web-to-phone calls. http://www.skype.com.
82 I use England here instead of a particular city because my home has shifted over the course of my time working with Tiffany. Initially, home meant Lancaster and by the end of this research, home meant Manchester.
83 It is worth noting that videoconferencing has been widely adopted by the corporate sector for meetings and is beginning to be used more frequently in education. For an overview of some uses of videoconferencing in education settings see Martin (2005).
84 Birringer’s project used, among other technologies, iVisit, http://www.ivisit.com/.
85 There are, of course, other artists who are using videoconferencing in various configurations in their rehearsal process including Station House Opera, Experience Vocal Dance Company and the artist Kate Craddock. Experience Vocal Dance Company use a set of tools called Remote Creation that “includes a dynamic combination of resources using Skype, FTP sites, Video sharing, online discussion boards, and
Over the past fifteen years, there have been a number of experiments with artistic collaboration that involved artists working together who were not in the same physical space, some of which I will touch on in this chapter. I was lucky enough to be part of a very early attempt at a multi-location rehearsal in 1995 with the New York based theatre companies Mabou Mines and The Gertrude Stein Repertory Theatre (TGSRT) on their project *An Epidog* (Breuer, 1996). With substantial funding from IBM and other corporate and family foundations, TGSRT set up a process where a selection of rehearsals could happen in New York but with key players directing elements of the production from California and Japan. This play with technology was both a necessity (Lee Breuer, the director of *An Epidog*, had to be in California teaching for set periods during rehearsals) and an experiment in using new technology to extend the space of the rehearsal room. This combination of necessity and an interest in experimentation runs through many of the telematic rehearsal processes I have come across. At the time, the technology was called *Person to Person* and it was meant to do exactly what it sounds like: allow each participant to see each other via videoconferencing conducted through ISDN lines (Napoleon, 1993).86 TGSRT had previously tested the technology on their 1994 project *The Diary of Vaslav Nijinsky* (TGSRT, 1994). For that occasion, which TGSRT has called the first-ever *telerehearsal*, the technology was used to link sites in Paris, Chicago, downtown New York and uptown New York (Napoleon, 1993). According to Laura Crow, one of the designers who worked on the project, the technology worked remarkably well, transmitting colour accurately, but that, “actions seem[ed] a little more jerky than they really are” (ibid). Crow’s description of the usefulness of the technology largely synchs with my own

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86 ISDN stands for instant services digital network and it refers to a form of high speed Internet access.
memory of working on *An Epidog* in the year following their first tests on *The Diary of Vaslav Nijinsky*, but with the caveat that the jerkiness of the video was extreme to the point of making the rehearsals feel unwieldy and frustrating. Nonetheless, these pioneering experiments with multi-site rehearsals were incredibly important in the development of what has now become quite a common human interaction facilitated by computers: the videoconference. TGSRT’s experiments in a dislocated rehearsal process were before the time of pervasive broadband and built-in iSight cameras, so it is not surprising that the infrastructure could not quite support the vision of the company. Fast-forward to 2010 and the entire ecosystem of available technologies has shifted, as has the cultural familiarity with the basic tools that the Internet has made available to western civilisations.\(^{87}\) There are now more people online than ever before and what was once cutting-edge, expensive technology has become pedestrian and virtually free. The relative ubiquity of cheap or free technological solutions that allow for rehearsal processes to be decoupled from geographic constraints offers up an enormous potential for artistic innovation. But the technologies are not yet perfect; the challenges and opportunities these technologies present impact the final resulting artistic work. With the advent of technologies like SKYPE, iVisit and TOKBOX\(^ {88}\) that allow multiple people to gather in a single e-space despite being in disparate geographic places, previous spatial barriers to collaboration are no longer as relevant. To be clear, I am not advocating for replacing one-to-one interactions in a shared physical space with an Internet only rehearsal process. There are many problems with working without the benefits of shared spatial understandings. However, used properly,

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\(^{87}\) For a fascinating overview of the early part of the pervasive computing revolution see Ark and Selker (1999). In this article, now over a decade old, the authors suggest that computers will be present throughout the ‘environment, allow users to be more mobile, enable more modes of direct communication between people and will be present in many more appliances and other everyday items. These predictions seem completely mundane in 2010, when they have come true, but at the time they might have seemed somewhat far-fetched.

\(^{88}\) TOKBOX is a web-based competitor to SKYPE that allows for videoconferencing via any web browser. There are numerous other videoconferencing tools available including commercial ones such as Cisco’s WebEx. SKYPE and TOKBOX are essentially free, although users pay for premium uses of both applications.
videoconferencing can be a useful tool for working with artists who simply cannot be in the same geographical place at the same time. This chapter will suggest that the use of low cost, relatively low-tech videoconferencing as a rehearsal tool destabilizes the notion of rehearsal space as a single geographic space for working. Further, I seek to unpick what these processes suggest about how we understand the nature of collaboration vis-à-vis cognitive science.89

Shared Space / Perceptual Space

This is precisely how I understand telepresence - to be present in a distant image world, which is being created as I become present in it. (Birringer, 2004: 174)

In the proceedings of the Collaborative Virtual Environments conference in San Francisco, Slater et al (2000: 2) suggest that using videoconferencing technology for rehearsal fragments “the total space; the performers never actually share the same space together”.90 Slater’s use of the word space here is implicitly physical — space as configured by the experience of touch and the immediacy of direct sensory reception. But, as my previous two chapters have shown, space is also perceptual and conceptual. Sometimes space is entirely perceptually constructed, as is the case in virtual and telematic performances such as those that take place within Second Life which, in the words of Greg Giesekam (2007: 251), “have collapsed classical spatio-temporal distinctions”. Space, in this rendering, is not so much about the experienced plasticity of the physical world as it is about the ability

89 It is important to note that I am not referring in this chapter to the telematic performances that seek to place the actual performance in cyberspace, or to the many experiments in Second Life or in virtual reality caves that have become de rigueur. Instead, this investigation is focused on the readily available technologies that artists who are non-experts might find useful. It is on the ubiquity of videoconferencing technology that I will focus my arguments.

90 Slater’s primary area of research is not focused on videoconferencing, but instead in understanding the potential of virtual environments where animated avatar representations of participants engage in 3-D worlds. For more on his work see Slater and Steed (2002) and Garau et al. (2005).
to translate sensory data into an imagined physicality. At the very least, the images that comprise the geography that avatars in Second Life move through can be seen in relation to one another so that a viewer can understand the distance between one object and another. This same decoding of spatial relationships happens when watching a live rehearsal on screen: the viewer understands the relationship between objects (walls, people, material surfaces) based on their relative arrangements to form an impression of the space that this activity takes place within. This *imaging* is not at all new in human behaviour, nor is it particularly unique to technological interactions. Indeed, the brain is constantly arranging “…‘objects’ to conform to our lay notions of geometry” (Robertson, 2004: 213-214), wherever and however we look.

Gallagher and Zahavi, whom I employed in the previous chapter to discuss how the body interacts with and perceives space, provide a more scientific understanding of the philosophical dialectic between Slater, Giesekam and Robertson.\(^9\) They break perceptual space into several types:

- **Allocentric** is the “purely objective space that can be defined in terms of latitude and longitude” (Gallagher and Zahavi, 2008: 141). This is space in the terms of mapping, where location is fixed in place via a coordinating system. Allocentric perception of space is akin to Robertson’s “lay notions of geometry” mentioned above.

- **Egocentric** “is the perspectival space of perception and action that is defined relative to the perceiving or acting body” (ibid). This sense of space is the one we use to define what is to our right or left.

\(^9\) Zahavi and Gallagher, when defining these three spatial perspectives, are trying to upend the notion that the body is ever able to be a “zero-point” in terms of perception. They note that the body itself takes up space and by living in space, we *see* in space; we cannot be objective in our perception because we are implicitly experiencing perception from wherever it is we are.
• Propriocentric involves a “non-perspectival awareness of the body in an implicit spatial frame of reference” (ibid: 144). This conception of space is bodily, in the sense that it is how we know our right arm is our right arm and our left arm is our left arm. As Gallagher and Zahavi explain, “it is the sixth sense that allows me to know whether my legs are crossed or not without looking at them” (ibid: 142).

Allocentric, then, might most closely relate to Euclidean notions of space in that no matter where you stand, New York is always north of Florida (ibid: 141). Egocentric and proprioceptive perception are notable for the way in which they relate back to the body and to the notion of an immediate physical presence to help us to understand the world around us. But in both cases, the body does not act alone; the mind is always engaged in a process of imagining (or knowing) how to situate the body either consciously or unconsciously. This might suggest that perception of space is not merely physical, nor is it merely imaginary; perhaps spatiality exists on a spectrum from the primarily physical (hands-on) to the primarily imagined.92

If the perception of space is not merely the physical reality of a room that we are presently located in, nor merely a philosophical construction, but instead a more complex concept that is embodied, then is Slater correct in his assertion that there is no shared space in rehearsal processes taking place online? In my previous chapter, I talk briefly about the way in which looking at bodies moving through space engages the same part of the brain that controls the enactment of that movement. Is it possible that the close neurological relationship between the imagining of a movement and the doing of a movement has a correlation in our understanding of space itself? If so, what does this do to the telematic rehearsal spaces that do not fit neatly into an allocentric, egocentric or proprioecentric

92 It is likely that de Certeau, Augé, and Lefebvre would all struggle to rectify their writings on space with Zahavi and Gallagher’s.
frame of spatial awareness? My own experience tells me that in the case of telematic rehearsals, space is fragmented in as much as there seem to be three or more spaces concurrently being experienced at any given time: the space of each of the two participants in my case and the space between, where these two spaces meet. But this fragmentation does not indicate a lack of shared space. While there is no shared physical space in telematic rehearsals, there is a shared perceptual and experiential space. Gallagher and Zahavi (2008: 89-105) discuss the notion that perception is inherently physical in the sense that in order to see, hear, feel, smell, etc., our bodies must engage physically; we turn our head in order to hear something more clearly. Even so-called passive forms of perception (like the street noise that might bleed in through the walls of an otherwise quiet room) rely on the physicality of the body in order for them to be perceived. In their discussion of the relation between the mind and the body in perceiving space, Gallagher and Zahavi suggest that the physicality of the objects that each participant interacts with is essential to the experience. For telematic rehearsals the screen is a shared object that is both a portal that allows a collaborator to enter into or move through space and also, in the words of Lars Elleström “the latent corporeal interface of the medium” (2010: 17); in essence an object with its own specific physical characteristics. Of course, the screen is shared conceptually but not physically in telematic rehearsals: the screen that I look at is not the same screen that my collaborator looks at although they serve the same function. Both screens convey the spatial and emotional data across geographic distances, but they are also present within the disparate spaces of their hosts (and may be in varying physical relationships with the bodies of those watching). I believe the problematic both and definition of space that this suggests might shed light on how telematic rehearsals can be understood and utilised by arts practitioners. Further, the space of telematic rehearsals complicates the three types of spatial awareness that Gallagher and Zahavi describe by creating a mode of perception that
moves between all three, sometimes lingering over more than one at a time. The continual movement between allocentric, egocentric and propriocentric understandings of space is complicated by the additional perceptual activity of conjuring up the space between here and there. Indeed, the more we peer into the light emitting canvas of screens, the more our conception of spaciousness alters, and the more important it becomes to understand how it is we define the spaces we work within.

In 2007, I began working with Tiffany Mills Company on a SKYPE-enable dance-theatre collaboration called *Tomorrow’s Legs* (Mills, 2009) which was followed by a subsequent collaboration called *Berries and Bulls* (Mills, 2010a). Between 2007 and 2010 we worked exclusively over SKYPE, except for one week in January 2009 (for *Tomorrow’s Legs*), one week in April 2010 (for *Berries and Bulls*) and four days in June 2010 (again for *Berries and Bulls*) when we worked together in New York City. In our SKYPE sessions, the dancers and Tiffany would use a laptop with a built in web camera to transmit live images and sound via SKYPE to me wherever in the world I was. For my part, I would connect from my own laptop with its built in camera. I generally wore a special SKYPE headset that included earphones and a small microphone, to reduce the amount of ambient noise from my office. The dancers used the built in microphone on their laptop. In this way, I could *attend* rehearsals held in a variety of dance studios throughout New York City despite being in Manchester, Lancaster, London, Wisconsin or Glasgow [Figure 3.1]. Our shared space for rehearsing was not only in New York, nor was it wherever I was, but rather in New York, in my office and in the SKYPE enabled space between here and there.
Collaborating without being physically present in the same room was made easier on this project because Tiffany Mills and I have known each other for several years. We met in 2002 during a residency at HERE Arts Center in New York City and had kept in touch with each other’s work. We came to our collaboration already knowing and trusting each other, but having never worked on a project together, which meant that one of the major hurdles of collaborating remotely was less problematic: we already trusted each other. Our familiarity with each other also meant that the space in which we met — the space of the Internet — was less anonymous and clinical feeling. Tiffany approached me to work with her because she was interested in finding meaningful ways to include speech in her dance work. Ideally for her, we would have been able to work together in New York City, but since this was not possible, we decided to explore the realm of internet-enabled rehearsals. We did not set out to innovate or experiment in terms of the use of SKYPE for rehearsals; it was a practical necessity borne out of our disparate geographies. Because this type of
collaboration was relatively new territory for us both, we spent several months in a phase of research that involved bi-weekly SKYPE calls, emails and the sharing of information on a private blog restricted to Tiffany and me alone (i.e., the dancers were not involved in this phase). During this phase, we were both sat at our computers in our respective offices engaging in face-to-face dialogue. Experientially, this was relatively comfortable territory for us both: it was essentially a video based phone call where the image language was that of the close-up. However, one of the imperfect aspects of using SKYPE to communicate is that it is virtually impossible to look the person you are speaking to in the eyes because of the position of the camera versus the screen (the camera would have to be directly in the centre of the screen to correct this). In face-to-face communication, eye contact can be a powerful tool for establishing trust. In the case of our early discussion-based SKYPEs, we could not look into each other’s eyes, but since we had already established trust in each other, this was not as disorienting as it might have been otherwise. The notion of a disturbed or fragmented rehearsal space was not present in the discussion phase of the project; the close-up nature of the images meant that the field of vision for both of us was extremely focused. Perceptually, the interaction that Tiffany and I were having in these conversations might be considered both egocentric and allocentric; we related to each other relative to our position on each side of a camera and we could objectively understand that Tiffany was in New York (or Italy, in some cases) and I was in the UK. We did not have to infer depth or decode movement, nor was the space between us represented via SKYPE apparently complex. Instead, we had relatively intimate conversations where every detail of our respective faces was articulated on screen and where our voices were clearly audible.

Using SKYPE for the early phase of this project, allowed us to feel more connected to
each other than simply listening to a disembodied voice on the other end of a phone call might have. Being able to see Tiffany’s face on screen when we spoke meant that I could read her responses to a suggestion, and that our communications had a more tangible feeling to them. SKYPE was not quite as good as being in the same room together, but it was far preferable to the abstraction of voice only communication. It felt somehow warmer to be able to see Tiffany than it would have been just to hear her. This warmth could be attributed to the “mediated social presence” that I experienced via the SKYPE interface.

Biocca, Harms and Gregg explain:

> Mediated social presence is the moment-by-moment awareness of the co-presence of another sentient being accompanied by a sense of engagement with the other (i.e., human, animate, or artificial being). Social presence varies from a superficial to deep sense of co-presence, psychological involvement, and behavioral engagement with the other. As a global, moment-by-moment sense of the other, social presence is an outcome of cognitive simulations (i.e., inferences) of the other’s cognitive, emotional, and behavioral dispositions.
>  
> (Biocca, Harms and Gregg, 2001: 2)

In the study that Biocca, Harms and Gregg conducted, they used a set of criteria to determine the relative experience of a participant’s engagement with “mediated social presence” that included descriptors including “cold” and “warm” (ibid). In my conversations with Tiffany, warm ranked highly as compared to when she and I spoke only via voice (as in one case where her in-built webcam was not working). Following the logic of Biocca, Harms and Gregg, my sense of a deep engagement with Tiffany’s mediated social presence might have been because I was able to infer quite a bit more about her state of being by seeing her face, the sights and sounds of the environment around her and hearing her voice, than I might have been able to in a voice-only conversation. Of course, because I knew Tiffany relatively well, hers was not merely a face, but the face of a friend.

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93 See the section “Television and Pixels” in Chapter Two for a brief discussion of the notion of temperature in relation to screens, especially vis-à-vis McLuhan’s notion of the ‘cold’ screen.
Affordance theory might provide further scientific evidence for my instinctual response that seeing Tiffany was somehow more tangible than merely hearing her. Affordance theory stems from the work of James Gibson who said that “we perceive objects in terms of the possibilities for action they offer, or afford, us” (Cornwell et al., 2003: 2, emphasis original). In his conception of affordances, the way in which we understand an object is not about the brain creating an internal image of the object being perceived, but is “an act of the whole animal, the act of perceptually guided exploration of the environment” (Gibbs, 2006: 43). This line of research suggests that when we approach an object, such as a computer screen, we understand it via interacting with it physically and mentally, and that our encounter with the object informs how we perceive it. In this case, you could say that a computer screen is meant for displaying text and images that are scalable, editable and dynamic; a computer is geared to encourage interactivity. It has many affordances that range from somewhat passive (reading) to more active (editing a video), but even the most passive (reading) requires interaction (scrolling down to read a long text, opening a document, clicking on a web page), no matter how minor.94

Further, the affordances offered by the computer are relative to the person encountering it (in this case me): I am a heavy computer user spending 8-10 hours a day at a minimum using my computer, which means that I have a deep engagement with the possibilities of my computer.95 Someone who had never seen a computer would respond to the affordances offered by the machine in an entirely different way. In my case, however, seeing a face on a computer screen via a SKYPE enabled video conversation situates the

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94 For a useful overview of some very specific affordances related to specific keys on a computer keyboard, see the conference paper given by Cornwell et al (2003) at the BRIMS Conference, Behavior Representation in Modeling and Simulation at the University of Pennsylvania.
95 A number of studies have been conducted which focus on the brain activity of novices versus experts in a wide range of fields from ballet to websurfing. See Calvo-Merino et al (2004; 2010), Carr (2010) and Noe (2009: 100). However, “brain activity is not the same as mental experience” but only one component of many that make up our experience of the world. (Firth, 2007: 15).
image (in this case Tiffany’s face) in a context of interactivity. My sense that talking to Tiffany while seeing a real-time stream of her image responding to me is warmer, more tangible, may therefore be related to the interactivity affordance of a computer screen.\textsuperscript{96} However, affordances can change over time as technologies develop. In a 2004 chapter that considers the affordances of the Internet, Boase and Wellman (1-2) describe many affordances that still seem valid today including the fact that the Internet allows for a dispersal of spatial relationships and possibly a breakdown of established social hierarchies. In the same article, the author notes that the primacy of text as mode of communication encourages “extreme behaviour” because of the lack of direct physical contact between those communicating (ibid: 2). Although there may be some validity to this affordance, in the six years since they wrote their study, the possibilities for communicating via the Internet have changed massively with the advent of low-cost videoconferencing software and the Internet’s increasing media richness: it is no longer a text-only medium and therefore its affordances have changed.

A more provocative, and playful, way of upending McLuhan’s hot/cold debate\textsuperscript{97} is the fact that the screen on which I would see Tiffany’s face was literally warm from the heat of the laptop it was attached to, and that the brightness of the LCD screen illuminated my face with its heat. Taking this provocation further, you could suggest that Tiffany and I were actually making physical contact via the complex network of cables that sent our images and voices to one another: the heat coming out of our screens and onto our faces was the result of our respective images being displayed on the screen lines of our computers. The

\textsuperscript{96} Gibson’s work on the notion of affordances has been clarified by a number of researchers (including Gibson himself) in the time since he first wrote about it in 1966 to specify that there are “aspects to which affordances pertain—namely, perceptual aspects—and others to which they do not—namely, symbolic manipulation” (Cornwell et al., 2003: 2). It is also important to note that the theory of affordances does not assume everyone perceives an object in the same way, only that the object is central to the way it is perceived.

\textsuperscript{97} See Chapter Two for more on the McLuhan’s ideas around the relative temperature of screens.
pixels that created Tiffany’s image on my screen were bombarding me with their light and their heat. As viewed through the lens of quantum mechanics this somewhat ridiculous line of exploration is actually plausible: we know the world is made up of atoms, that atoms are energetic (i.e., moving constantly) and that there are a finite number of atoms in the world, so it is conceivable to imagine a long strand of interconnecting atoms reaching from Tiffany all the way to me (Adrien and Dirac, 2004). Further, a concept called entanglement says that particles (no matter how far apart they originate) are intrinsically connected if they originated in the same quantum state (Schwartz and Begley, 2002: 225). Entanglement essentially means that the physical reality in Tiffany’s locality could actually affect the physical reality in my locality (ibid).

Our initial period of meeting via SKYPE allowed Tiffany and me to establish our goals for Tomorrow’s Legs and to create some structures for how we were going to approach working with the dancers. Up to this point in our collaboration, our interactions were largely unremarkable in my own experience; we essentially spent several months having regular videoconferences. We planned the next phase of our collaboration to work as follows: I would attend rehearsals via SKYPE one to two times per week depending on my availability, and then Tiffany and I would have separate SKYPE conversations to process what had happened in rehearsal. We also discussed technology and planned to use a high-quality external video camera connected to Tiffany’s laptop to transmit the video to me.98 In moving into the realm of the actual rehearsals with dancers, the notion of space suddenly became problematic for me. As I noted earlier in this chapter, I am familiar with a rehearsal process that involves working in the same room at the same time with my

98 We eventually switched to using the built-in camera on Tiffany’s computer as the external video camera proved too bandwidth intensive; we were getting choppy video when we used the high quality camera.
performers. The notion of working across such a vast geography presented a number of logistical and philosophical challenges to my notion of where a rehearsal takes place.

In our earliest rehearsals, Tiffany would bring a laptop to rehearsal and connect an external video camera to it. Her computer was connected to the Internet either via WiFi or a broadband cable and she would sign into SKYPE in order for both of us to be able to see the other via the SKYPE interface. These relatively simple and low-cost sets of technologies are the physical elements that allowed us to imagocentrically enter into the telematic space of our shared rehearsal room online. In the physical dance studio in New York, the dancers and Tiffany could see me as a talking head within the SKYPE video window. On my screen, I could see whatever visual information the camera picked up and as much audio as the small microphone on the camcorder recorded. My place in rehearsals was both passive (in the sense that I could not literally touch anyone) and active (I could scream out if I wanted to interrupt something). Although each of us saw different images (I saw the dancers and dance studio while the dancers saw me and my office), each of us saw the telematic rehearsal room through our very engagement with the SKYPE process. We structured most rehearsals with a starting conversation where everyone gathered around the computer in the rehearsal room so we could discuss the day’s goals/tasks, followed by the dancers performing various speaking/moving tasks, interspersed with reflection on the tasks and concluding with a wrap-up conversation where everyone again gathered around the computer. The logistics of my presence in the room on screen meant that we were not able to work as quickly as either Tiffany nor I expected: the mere fact of having to continually gather around the computer combined with the many times when I had to ask that sections be repeated because I could not hear

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99 *Tomorrow’s Legs* was created with and performed by Jeffrey Duval, Luke Gutsgell, Whitney Tucker and Petra Van Noort.
or see slowed us down enormously. This slowing down was frustrating, but it contributed to a deep engagement with the material as we were constantly repeating, reviewing and re-articulating what it was that we were experiencing in rehearsal if only so that I could get a better view of the material. This process of repetition correlates to the way that the human brain translates perceptions into conceptualisations; through practice, the embodied brain develops an ability to understand and apprehend the experiences we have and make meaning out of them (Heath, 2006: 137). In the case of the Tomorrow’s Legs SKYPE rehearsals, the doing and re-doing that the technology required not only allowed for the development of interesting performance material, but also served to build a conception of the telematic rehearsal space and its possibilities. 100

SKYPE also required that we utilise space differently than we might have normally. At each rehearsal, one of the first tasks we would do (after our group discussion around the laptop) was to set out the boundaries of the camera’s view in the dance space. Tiffany would position the laptop and then ask the dancers to walk through the space to define what the camera could see. This meant that an entire area of studio space did not exist in our telematic rehearsal room because it could not be captured on screen. And, of course, the dimensions of the telematic rehearsal room where constantly shifting both within rehearsals and between them: the laptop was sometime moved while the dancers rehearsed to allow me to see areas that were past our defined borders, and the dancers moved to different dance studios in New York throughout our process which meant that some rooms where larger than others, thereby affording us a large telematic rehearsal room. There were also times when the noise of the city or the complexity of the sound score (between music...
and speech) was so complex that the physical shape of the performance had to adjust to the realities of our telematic space. In these instances, the dancers would move closer to the laptop camera to allow me to hear or see them better [Figure 3.2]. Sometimes they came closer to see me better as well: I was not only a talking head on their screen. Often it was easier to show the dancers what I was referring to by attempting to perform their moves or demonstrate a physical relationship for them on screen. In these cases, the dancers would gather around the screen not only to hear me but also to see me. The impact of this spatial reworking was that the material itself was in a constant state of shrinking and expanding to fit the needs of the SKYPE process. The end piece contained sections where the dancers would come quite close to the audience and directly address them, as in a question and answer section that was sequenced near the middle of the final piece. It is possible that this section would never have been created had we not been rehearsing telematically: the constant need to come to close-up encouraged the use of intimate spatial relationships in the performance itself. The impact of the telematic rehearsal room on the eventual performance could be seen as one of the ways that this process is more than simply videoconferencing.\textsuperscript{101} The space of the telematic rehearsal room manifested itself \textit{live} in three-dimensions through the demands it placed on how we worked with space.

\textsuperscript{101} It is worth noting that the impact of our SKYPE process would not necessarily have been visible to an audience member since we did not call attention to it in the public performances of the piece.
The technology did not always cooperate; often we had to re-engage our SKYPE conference in order to get a better connection. Sometimes the broadband speed was so slow that we could not rehearse at all and I would have to catch up with Tiffany afterwards. The choppy nature of some of our video rehearsals was not that unlike the early Person to Person rehearsals of Epidog (Breuer, 1996). The difference is that while for Epidog the technology was a delicate threading together of bespoke equipment at the leading edge, our rehearsals were relying on ubiquitously available technology and our attendant expectations had shifted accordingly. We are now accustomed to fast streaming video, on-demand downloads and instantaneous communication. Compared to 1996 when we the technology being explored with Epidog was exciting and unique, with Tomorrow’s Legs SKYPE was often frustrating; in our own way, our use of SKYPE was pushing it beyond its intended limits. In order to improve our rehearsal success rate, we stopped using an external video camera, resorting instead to using the built in iSight camera on
Tiffany’s MacBook to reduce the size of the video stream. In addition, key rehearsals were videotaped so that higher quality documentation of performance material could be saved to the blog, which allowed me a second viewing of some rehearsals. I was also not able to attend every rehearsal, which meant that beyond reorienting myself to the telematic rehearsal room we were working in, I would have the added task of trying to understand what had happened in the gaps between my visits. Our blog and the video recordings of rehearsals, were some of the ways in which Tiffany and I sought to reduce the impact of this fragmented process.

Beyond wanting to find an interesting way to use spoken text in relation to dance, Tiffany and I had agreed that *Tomorrow’s Legs* would explore, broadly speaking, memory, loss, and our hopes for the future. As this was the first time Tiffany and the dancers were going to use significant amounts of spoken text in their work, we decided to use a form of speaking that was familiar to the dancers: storytelling. The dancers were asked to source material from their past in order to think about how they are who they are now. The final piece included: the story of the death of one of the dancer’s brothers, which was broken into three discrete sections; the story of one of the dancer’s first heartbreaks; a question and answer section that allowed the performers to momentarily step out of the material; the story of one of the dancer’s dog who was stabbed by a neighbour; a long list of the ways in which the dancer’s remember things; and, one dancer’s recollection of a family friend who was in love with him. These fragmentary texts were all developed in relation to movement and speaking tasks and were the result of a long process of editing from a large pool of material. Although the texts were primarily developed from the dancer’s own improvisations, all of it was revised and edited by Tiffany and I in an attempt to ensure there were cohesive links between the sections. We discovered, for instance, the
persistence of fruit in many of the texts. We changed all of the fruit to oranges to create a subtle thematic cohesion that we later developed into a theatrical moment near the end of the piece when a wheelbarrow full of oranges is dumped onto the stage covering the entire space.

In retrospect, many of the tasks we developed together could be seen as responses to the structure of our rehearsal process. Because I was travelling during our early rehearsals (including a trip to Korea and Sicily), and because I was not physically present in the rehearsal room, travel and distance found its way into our rehearsals. One of the earliest tasks was for the dancers to respond to a long list of cities that I created which included places that they had never heard of or been to before. This stemmed from their questions about what it was like living in England and from a desire (on my part) to find a way into text that might be more stylised and less neatly narrative. The dancers were asked to imagine what happened in these places by inventing a story that could have happened to them when they were there. From this exercise we discovered real stories from the dancer’s pasts that related to specific locations. In the end, we let go of the focus on geography, but many of the stories they resulted in were included in the final piece. We also played with blindfolds partly as a response to my growing feeling that I was impaired in my ability to fully sense everything that was happening in the rehearsals. And indeed, I was (as were the performers). The blindfolds found their way into the final piece as a symbol of one of the dancer’s inability to face his past.102 We worked together for nearly a year before any of the dancers met me in person. This meant that for all of us we had a long period of time where we were not only doing what we normally do in rehearsals (dance, direct), but also trying to penetrate through a long-distance communication to

102 In the final piece, the performer Luke, told the story of an older family friend who made inappropriate sexual advances on him. This section was performed partially blindfolded as a way of representing Luke’s fear of telling the story live on stage.
understand the various dynamics at work. Tiffany described the impact that using SKYPE had on our creation process as forcing us to articulate clearly what it was we were working on at any given time (Mills, 2010b). Because SKYPE limited our ability to experience the physical performances of the dancers, we had to use verbal communication to describe what was happening and what it felt like in the room. A focus on being able to succinctly articulate the work verbally was a challenge and an opportunity; we were both able to speak to presenters and funders from the very early stages in a way we might not normally have been able to about what it was we were making, but the relative flatness of the video meant that what I experienced was not always in synch with what was happening in the studio in New York. Because I was watching rehearsals at a remove on video, often not live but on our blog, I was constantly concerned that the material we were creating felt like it was all of the same texture: that it lacked dynamism. As a result, I pushed Tiffany and the dancers to work at the extremes, which meant that the end performance had less subtly and more sharp edges than it might have otherwise. It was only after visiting a series of rehearsals in person that I was able to fully appreciate the dynamics in the material. SKYPE altered our process, our articulation of what we made together and our conception of where a rehearsal takes place. You could say that our altered acts of communication met in between New York and England in a telematic rehearsal room that existed in the space of cyberspace, if such a place exists at all.

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103 For example, in a trio between Luke, Whitney and Jeffrey titled Lasagna 2, about the day Jeffrey found out his brother had died, the physical and the vocal performances veered between violent and nurturing. Luke speaks Jeffrey’s story while Whitney holds Jeffrey back, keeping him from reaching Luke. Eventually, Jeffrey reaches Luke and they begin a duet called Lasagna 3 where Luke holds Jeffrey around the neck, dragging him across the stage as Jeffrey slowly brings out the details of how Luke’s brother also died. The extremes in this section are viewable and understandable on screen: they transcend the potential flatness of video because they are so vivid physically and vocally. It is entirely possible that had we not worked via SKYPE, this section might have developed in an entirely different way.

104 I discuss my visit to the rehearsals in New York below.
Clay Shirky (2010: 39) claims in his book, *Cognitive Surplus*, that cyberspace is disappearing because “our social media tools aren’t an alternative to real life, they are part of it”. He argues that there is no reason to think of the Internet as a separate space from real life because the interactions that network connectivity have allowed have become completely ingrained in how we live our lives. He cites several examples ranging from carpooling websites to the Internet’s role in protests as proof that the Internet is just another tool that we use to navigate our increasing complex lives (and indeed, he argues that we spend so much time online because we have a surplus of time on our hands). But this line of argument misses a key point: although the Internet is indeed integral to the way many of us function, it has not erased the gaps between people as much as it has exposed the existence of those gaps in the first place. In the transference of information across thousands of miles of cables, we are not erasing geography — the space between *here* and *there* still exists and it is connected by an *in-between* space that consists of data packets. Whether you call this space *cyberspace* or something else seems unimportant. But you cannot deny that there is indeed a space there, even if that space is virtual. Further, there are spaces that exist only online. Second Life is a primary example, but so are many of the social networking sites that act as repositories for an increasing amount of our personal data. This data is located on servers and networks and in cables and on machines all around the world.

The space of the Internet is fragmentary and inherently distributed, but it is a space nonetheless. This assertion is partly derived from the fact that the world we perceive is “reachable but not depicted”, which is to say we are constantly perceiving the world even though we do not see every detail (Noe, 2009: 90). Alva Noe uses the example of the back of a house when she says that although we cannot see the back of the house from where we
sit, we know it is there and imagine it (ibid). I believe the same is becoming true of
cyberspace: we cannot generally see cyberspace (we see its artefacts, results, data), but we
know it exists. In the case of our telematic rehearsals, there was a lot that I could not
experience of the rehearsal room, but I could confidently believe the dancers were in fact
in a room with all the dimensionality of space. For me, though, this rehearsal space was
virtually in the sense that I received “the spatial characteristics of depth” that the room had
via my computer despite the fact that I had no material access to the space itself
(Elleström, 2010: 20). This might suggest that the difference between a real space and a
virtual space could be better described as a physically present space versus a virtually
present one: each space is real in the sense that the space can be experienced. The
difference is one of perceptual gradations.

In January of 2009, I finally met the dancers in person when I spent a week in New York
City working with them immediately prior to the premiere of Tomorrow’s Legs. Entering
into the rehearsal room felt like an act of time travel where the surreality of the SKYPE
rehearsal space was fractured and reconfigured. My assumptions about the way the
material worked or did not work was challenged by seeing the differences between what I
had experienced via our telematic rehearsals and what I experienced by being in the same
physical space with the dancers. My first surprise was seeing that one of the dancers was
significantly shorter than I had expected [see Figure 3.3]. It would have seemed like the
ability to understand the differences between sizes is implicit in the act of watching, but
somehow I had imagined the size differences differently. This is likely because the laptop
camera that I would watch rehearsals through was generally sitting on the floor, so that my
perspective was from the ground up, thereby altering my understanding of scale. Noe
(2009: 87) describes two kinds of space from the realm of cognitive psychology:
peripersonal space, which is the space “within our reach” and extrapersonal space, which is space that is out of our reach. Noe’s classifications of space are used to describe the way in which our understanding of our environment extends beyond our brain and, indeed, beyond our bodies. In the case of my mistaken understanding of scale, I was either not focused on the spatial markers in the room that might have indicated for me that a dancer was smaller than another, or the perspective from which I viewed the dancer in the extrapersonal space of the telematic rehearsal room was such that I could not re-associate it into my peripersonal space imaginatively. In other words, I was having some kind of cognitive dissonance that made it difficult for me to properly understand the scale of the New York rehearsal room. While Noe’s terms are useful in describing the actual spaces, Zahavi and Gallagher’s allocentric, egocentric and propriocentric space describe the way we perceive space. Using their terms, you could say that the egocentric frame of reference, which concerns my ability to understand where things are in reference to my position, had broken down in my mistaken perception of the dancer’s height, producing inaccurate information. Once I entered the physical rehearsal room in New York City, a different egocentric spatial relationship occurred that was more accurate to the true dimensions of the dancer’s proportions. In the virtual space of our telematic rehearsal room, scale, it seems, works differently.
One of the challenges of rehearsing over SKYPE was my ability to focus properly on the singular task of participating in the videoconference. Since computers have an affordance of interactivity that encourages multi-tasking, you could say that I was at a disadvantage simply by the mechanics of the rehearsal structure. This might have something to do with the way in which my working memory was engaged. Working memory is the outcome of our ability to have a sustained focus on one stimuli despite having other distractions or, said simply, to “effortfully concentrate on task performance” (Gevins and Smith, 2003: 114-115). In my case I was expecting my working memory to be filled with the task data related to participating in rehearsals via SKYPE. But I found this incredibly difficult as I was constantly trying to ignore emails popping up on my screen, sounds from my immediate physical environment and occasionally calls on my mobile phone. As I was often taking notes on the computer, the screen itself could not be completely overtaken by
the SKYPE window, which meant that my field of vision was crowded [Figure 3.4]. It was certainly easy to turn off a mobile phone or close my email programme for the duration of rehearsals, but environmental stimulus was less easy to ignore. In several rehearsals, the sound of sirens outside the studio in New York City made it difficult for me to hear the performers through the tiny built-in laptop microphone. In another case, the loud sound of traffic outside my office made it difficult for the performers to hear me and for me to focus on the sounds coming from my computer. Weak Internet signals would also impact on our ability to hear and focus; several times Tiffany and/or the dancers would have to literally lean in to the computer in order to hear what I was saying. In the instances where outside stimuli challenged my ability to focus, it could be said that the cognitive workload was harder and that my working memory was becoming full so that I had more information stored for immediate retrieval than I might have when simply watching the dancers perform, for instance (Gevins and Smith, 2003: 124-125). This working memory overload made it harder for me to enter the telematic rehearsal room and resulted in the fracturing of our rehearsal space into simple component parts: here and there. Although in a rehearsal process taking place face-to-face extraneous noises could also be problematic, in the case of our Skype-enabled rehearsals, the sounds were amplified, reprocessed and delivered via microphone, causing audio feedback to mask any recognisable sounds. In a process that was taking place within the same geographic space, the extra noises would be equally foreign to all of us in the rehearsal room (they would all be outside). In the case of Tomorrow’s Legs, the siren sounds were live and outside for only one half of us; for the other half they created a noise screen that blacked out any sound at all from the other participants.
Ironically, or fittingly, perhaps, I have never seen *Tomorrow’s Legs* live. Because of the same budgeting and scheduling challenges that led to our telematic collaboration in the first place, I had to be in the UK during the piece’s New York premiere and could only participate in the premiere via email updates and an exchange of photos from Tiffany. Although I was present in the week before the premiere, I can only really experience that final performance via its video documentation (see enclosure in the Appendix). There is something deeply unsatisfying about not having had the opportunity to see *Tomorrow’s Legs* with all the trappings of a theatrical setting (lights, costumes, etc) live, but in a peculiar way this disassociation from the immediacy of the live performance allows me to keep the telematic rehearsal space clear in my mind. There are few alterations to my understanding of our spatial relationship on *Tomorrow’s Legs* as a result of my non-presence at the premiere (and in any but a few rehearsals based in New York); my primary experience of the piece is associated with the spatial limitations of the screen and the cognitive experience of meeting in our telematic rehearsal room.
The Telematic Rehearsal Room

If we perceive space via our relative position to an object or objects (walls, computer screens, etc), as Zahavi, Gallagher and Noe posit in different ways, and space requires dimensionality, then is it possible that there is such a thing as a telematic rehearsal space? In my previous chapters, I employed embodied cognitive science and metaphor to suggest playful philosophical possibilities for how sound and the use of live-feed video on stage can reconfigure the experience of a performance in space.\(^\text{105}\) In both *Whisper* and *Virtuoso (working title)*, I argued that the performance space was not necessarily where it ought to be: in the case of *Whisper* the cognitive experience of the headphone-based sound and live visuals relocated the performance space into the head of each audience member, and in *Virtuoso (working title)*, the pixel became a referent for locating the interplay between screens, live performers and the fragmented space in an audience member’s perception of the various elements. In investigating the way that videoconferencing technologies might create a space called the telematic rehearsal room, of course, my focus moves away from the performance space into more uncharted territory. In rehearsals, the relationships between doer and watcher/perceiver are complicated by the inherent nature of rehearsal rooms as a site of creation. In the case of *Tomorrow’s Legs*, locating the rehearsal room has become problematic because of its distribution over geographic borders and because of the way that the technology we employed impacted on the material we created.

A simplistic view of our rehearsal process, and of those employed in *An Epidog* and *The Diary of Vaslav Nijinsky* would suggest that the only spaces involved are those that

\(^{105}\) F. Elizabeth Hart (2006) discusses a number of broader issues relating to cognitive science, phenomenology and the performance space in her excellent book chapter ‘Performance, Phenomenology and the Cognitive Turn’.
contained live bodies (i.e., my apartment and the dance studio where Tiffany Mills Company rehearsed). What this misses, however is the dimensionality that emerges when using live videoconferencing for more than simple meeting or information sharing.

Rehearsal is often a chaotic blending of talking, moving, writing, presenting, and experimenting with scenographic elements (its affordances, you might say), and these behaviours require the spaces they take place in to function differently than a meeting room. Even the most active meeting, generally requires little more from its space than a table and chairs, a data projector, flip chart and possibly a phone. Rehearsal rooms have much more multifarious requirements, often bespoke per project. The addition of SKYPE as an intervening technological medium must surely have impacted any sense of the location of the rehearsal room in *Tomorrow’s Legs* because it broke the barrier of the spatial needs of a typical rehearsal. For me, the dancers were remotely located and located on my screen. For the dancers it was even more complicated: they moved through a physical rehearsal room that was limited by the frame of the webcam, their levels of vocal projection were dictated by the sensitivity of a built-in microphone, and they had a mixed-scale version of me to contend with since I sometimes appeared as a talking head and sometimes could be seen full body. In essence, we had two geographic spaces whose meeting point was limited by the requirements of a technological medium; a third space in between. Further, whereas a meeting room does not stand in for anything other than what it is (a place to meet), a rehearsal room is standing in for an eventual performance space (be it theatre, gallery, or other site). Likewise, when we watch a pre-recorded film or video on screen the spaciousness of the medium is apparent but not tangible — I cannot reorient my view of the space in a film (at least not yet); I am at the will of the director and editor in my understanding of the space inside the screen. In the case of the telematic rehearsal, however, space is malleable within its limits; although I am aware of the absence of the
physical presence of the dancer (and their replacement instead by a screen), I do have the
ability to interact tangibly by, for instance, asking a dancer to come closer or move further
away.\textsuperscript{106} I can ask the \textit{camera} to be reoriented so that I capture a different part of the dance
studio. The space of a telematic rehearsal is organised around the spaciousness of the
camera lens but altered by its interactivity.\textsuperscript{107} I am at once editor, cinematographer,
director and technician and the space that my medium lives within is multifarious — both
here, there and in between.

In establishing a conceptual framework for understanding distance learning, Mark Childs
(2010: 198) describes what he calls the “media environment” which he says “employs a
notional use of space in order to provide a field upon which the participants can interact”
and “share an aspect of themselves within this space, i.e. they have presence…” His
“notional use of space” relates to the way in which a user relates to the space itself. He
suggests that there are two “relationships with the virtual world” that dictate whether there
is a space online or not: processes where the technology is merely a support system for
real-world, physical interactions and processes where the technology allows for the
adoption of “completely different online identities” (ibid: 204-205). Childs goes on to
clarify this line of argument by saying that a performance “designed specifically to take
advantage, and avoid the disadvantages, of the affordances of the virtual world will be
subject to a different set of restrictions” and would therefore involve a space between the
various live component parts (ibid: 205). Following this line of thinking, it could be argued
that in the case of \textit{Tomorrow’s Legs}, there is no space between us since we were using

\begin{footnotes}
\item[106] Jem Kelly (2010: 56) eloquently articulates this problem in relation to the use of videoconferencing in the
performance work of Station House Opera thus: “the two-dimensionality of the screened images is a constant
reminder of their physical absence.”
\item[107] Randal Walser (1991: 51) describes the differences between film, theatre and the Internet vis-à-vis
interactivity as follows: “Film yields little power, as it provides no way for its audience to alter screen
images. The stage grants more power than film does, as stage actors can “play off” audience reactions, but
the course of the action is still basically determined by a script. Cyberspace grants seemingly ultimate
power.” Thanks to Toni Sant (2003), whose PhD provided me with this reference.
\end{footnotes}
SKYPE primarily to allow us to create a performance where the technological process used to create it would not be explicitly apparent. However, Childs does not take into account the rehearsal process, focusing instead only on the final performance.

In *Tomorrow’s Legs*, the technology implicitly altered the materiality of the collaboration and of the end performance itself through the way it affected our use of physical space and the choices we made in relation to content. For example, the content, format and staging of the *question and answer* section of the piece were all derived entirely from our SKYPE process [see Figure 3.5]. In this section of *Tomorrow’s Legs*, which happens midway through the piece, the performers pull out chairs and sit in them quite close to the audience. They begin speaking as if in the middle of a post-performance *question and answer* session. The physical proximity between audience member and performer mirrors the relationship that I had with the dancers in rehearsal, albeit without the computer screen. Tiffany and I had an instinctual desire to somehow transpose the play with depth that happened in rehearsal onto the final performance, and in one of our sessions I asked a question about the truth of one of the performer’s material that resulted in a short improvisation where the dancers asked each about their stories. We liked this material enough to mould it into a fragment of material that could be placed into the stream of the dance in order to disrupt the piece’s energy and shift its mood. In our early experiments with this material we discussed having a live feed of me that would allow the *question and answer* section to happen live between the performers and me in front of the audience. But this seemed to over-theatricalise a relatively simple interaction, and was not technically feasible. We preferred a subtler nod to our process so we kept the close physical proximity of performers to audience member that echoed our rehearsal process.
Our telematic process also impacted the text that the dancers speak in the question and answer section; it refers to elements of narrative from throughout the piece and the notion of truth:

Jeffrey: (Jeffrey begins as if he’s been asked a question by the audience.) It’s about 95% true. The only part of my story that isn’t true is that it was an apple tree in our back yard, not an orange tree.

Whitney: Up until three weeks ago, my solo was 100% true. It was during a phone call with my mom that I discovered that River wasn’t even our dog. I was telling her how funny it was that Don Sanders ended up in a dance piece. (Smile.) She also informed me that River wasn’t stabbed in the leg. Rather, Don released him from a fox trap when he got caught.

Petra: So, Don is a good guy, not a bad guy.

Whitney: Yea. And, River lived with us for just six weeks, not six months. The last thing she said was that River never ran away. She took him to the humane society to be put down.

ALL: (Nod of recognition.)

Whitney: So now I’d say my story is about 6-7% true.

Petra: Well, my story is to be determined. But, I think it will have a happy ending.

Luke: What I can’t remember is whether I told my dad that Doug asked me to come to Ecuador with him, or if he tried to kiss me. (There’s a moment of silence before the group begins to disassemble the Q&A. Luke is led upstage by Jeffrey and he places the dancers place the blindfold on him.)

(Mills, 2009)

The text spoken by Jeffrey and Whitney refers to material that has preceded this section, while the text spoken by Luke and Petra refers to material that is yet to come in the performance. The entire process of Tomorrow’s Legs could be said to have been intensely impacted by the affordances of the computer to the point that non-linearity in the spoken text presented itself as an obvious parallel to the way Tiffany and I would cut, copy and paste text fragments from rehearsals onto our shared blog and reassemble them. In the instance of the question and answer section, the cut-up nature of our process is on display for all to see. Similarly, starting the question and answer in mid-stream, mimicked closely my own experience of attending rehearsals: in almost every case the dancers would have been warming up for thirty-minutes to an hour before I arrived online and I would catch them midstream in movement or speech and have to work backwards to understand what I
had missed. Further, as I discussed above, our rehearsal process required more stopping and starting than would have been necessary in a rehearsal process taking place in the same geographic space. In our process, the dancers had to sometimes come to the camera to explain what they were doing and then go right back into a physical sequence. In the question and answer section, this stopping to explain themselves was followed by a virtuosic dance and spoken text section by Luke, Petra, Jeffrey and Whitney that explored the story of Luke and an older family friend. These structural details will not have been evident to an audience member watching Tomorrow’s Legs, but understanding how the technical and physical constraints of the rehearsal process lingered in the performance of the piece suggests that the way in which we worked materially altered our outcome.

Therefore, although the performance of Tomorrow’s Legs did not contain a telematic space, the rehearsal process did, since the technology functioned as more than a tool for collaboration. Our SKYPE-enabled process inscribed itself on the material we created through the limits and possibilities it offered spatially and temporally.¹⁰⁸

Figure 3.5: The “question and answer” section of Tomorrow’s Legs in performance

¹⁰⁸ Near the end of Tomorrow’s Legs, a section we called the I remember section was also influenced by the need to come close to the camera in rehearsals. When we developed it, the performers sat by the computer to speak to me while the rest of the company performed behind them. In addition, in order for me to see all of the movement material via my SKYPE window, Tiffany had to utilize a diagonal choreography; the entire section was built diagonally across the studio space for the camera/me. We never altered or restructured the choreography for I remember in performance because the diagonal became inscribed in the work.
The impact of sustained practice working within SKYPE was that Tiffany and I became attenuated to the possibilities, probabilities and limits of the technology and were therefore able to better navigate the complex interplay between the three spaces that we simultaneously rehearsed within. We realised that at first we were assuming that rehearsing over SKYPE would be the same as rehearsing in the same room; we discounted, indeed, did not even consider, the fact that using videoconferencing in the way we were would fundamentally change our process. Once we adapted our working methods, recognising that SKYPE altered how we could work, we were able to have a more fluid engagement with each other and the material. This learning is a fundamental aspect of the way perception works. As Schwartz and Begley explain:

> It is a commonplace observation that our perceptions and actions do not take place in a vacuum. Rather, they occur on a stage set that has been concocted from the furniture of our minds. If your mind has been primed with the theory of pointillism (the use of tiny dots of primary colors to generate secondary colors), then you will see a Seurat painting in a very different way than if you are ignorant of his technique. Yet the photons of light reflecting off the Seurat and impinging on your retina, there to be conveyed as electrical impulses into your visual cortex, are identical to the photons striking the retina of a less knowledgeable viewer, as well as of one whose mind is distracted. The three viewers “see” very different paintings. … Mental states matter.
> (2002: 220)

The sense that a “mental state” matters may explain why a telematic rehearsal room emerged in the process for me. Perhaps by repeatedly rehearsing over SKYPE a familiarity with the technology allowed my mind to develop an advanced spatial understanding of our virtual rehearsal room (or the imaginative, metaphorical potential of one at least). Unfortunately, the only way to fully understand whether I was perceiving space differently when working over SKYPE versus working with the dancers in New York would be to conduct studies on my brain activity. Using EEG or even fMRI might at least explain what
areas of my brain where engaging in the various perceptual setups. What conclusions could be drawn from this, of course, remain to be seen.

An Epilogue: Taking the Bull by the Horns

On our subsequent collaboration, *Berries and Bulls* (Mills, 2010a), the dynamics of space were altered yet again. *Tomorrow’s Legs* opened to critical and popular acclaim, which led to several producers and venues offering further support to Tiffany Mills Company to create a follow-up piece that developed on the use of text in their dance performances. Again, Tiffany invited me to collaborate and again we met in the telematic space of SKYPE. Having experienced the dynamics of working across temporal and spatial distance with *Tomorrow’s Legs*, we began the rehearsal process of *Berries and Bulls* with more speed; as in any second collaboration, we had developed a shorthand that allowed us to understand the limits and opportunities of our process. In our case much of what we learned during *Tomorrow’s Legs* related to understanding the dynamics of the space in which we were working. As a result, we made the following changes to our process:

- We prepared clearer tasks in advance that Tiffany could communicate (instead of counting on SKYPE to be clear enough for me to deliver the tasks).
- We spent more time in rehearsal with the dancers working on their feet instead of constantly gathering around the computer to hear what I thought. Instead I would either take notes to share with Tiffany afterwards or only intervene when I had a strong reaction. Tiffany and I also had more side-conversations while the dancers were working, which she then communicated to the dancers.

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109 An electroencephalogram (EEG) shows electrical activity within the brain and Functional Magnetic Resonance Imaging (fMRI) “measures which brains regions are activated” during activities such as perception (Calvo-Merino, 2009: 4; Gevins and Smith, 2003).
• We chose rehearsals for me to attend where they would show more developed work. Tiffany and I would design and plan rehearsals in detail and then often Tiffany rehearsed without me to enact these tasks. I would then review material that had been evolved from those tasks to help refine and evolve the material.

• Tiffany filmed more rehearsals so that I could come to rehearsals having already seen an uninterrupted, high-quality version of the material before seeing it in the sometimes unstable telematic rehearsal room.

We also recognised the importance of having a face-to-face rehearsal period early in the process to build up a mental inventory of faces, bodies and behaviours that we could refer to in our telematic process. After visiting New York to attend Tomorrow’s Legs rehearsals live and in person, our process improved greatly. We viewed this as a sign that having me present in New York helped me to later imaginatively understand what the dancers were doing when I saw them in my SKYPE window. For Berries and Bulls, we rehearsed via SKYPE following the principles listed above during the autumn of 2009 and the early months of 2010. Then, in April 2010, I spent ten days in New York working with the company at the Baryshnikov Arts Centre who had granted us a residency in their studios. This period of work proved to be the most fruitful and dynamic rehearsal period for us across both pieces. Whether this was a result of the focus that being in the same physical space creates, or the added nuance that our conversations could have, we ended the residency period with seventy-five percent of the raw material of the piece created (we started the residency with twenty percent of the material in place). The sense that working in the same physical space was more productive than working telematically, suggests that there are still problems with the configuration we are using. Whether we will develop more fluency over time, or whether we need to alter our technological setup, is yet to be seen,
but it is clear that the benefits of working telematically outweigh the option of not working together at all.

The alterations we made to our process for *Berries and Bulls* were in direct response to the mechanics of our shared telematic rehearsal room and to our experiences on *Tomorrow’s Legs*. We were novices when it came to understanding the realities of working over SKYPE when we began working on *Tomorrow’s Legs* and our unfamiliarity with the technology meant that we were constantly revising and re-evaluating our working methods — the technology shaped how we worked. In *Berries and Bulls*, we had the benefit of having been through the process before so we were able to allow the technology to affect how we work in a more considered way. We chose how we would adapt our process before it began, as opposed to having to continually re-invent it as we did on *Tomorrow’s Legs*. This is a minor difference, perhaps, but seems to support Schwartz and Begely’s (2002: 220) notion that “mental states matter” since our understanding of the telematic rehearsal room had shifted, allowing us to work more as experts than as novices.

Perhaps, as Baudrillard might suggest, what is really at stake is an unravelling of any sense of real space at all. He says, the “reign of the virtual is also the reign of the principle of uncertainty” where nothing is as it seems (Baudrillard, 2005). In his discussion of the violence of the virtual, Baudrillard (ibid) seems to agree with Clay Shirky’s (2010) more recent provocations that the separation of the offline and the online has become a false one. Baudrillard’s (2005) argument is not rooted in cognitive science or neuroscience as Shirky’s is, but instead in the philosophical view that “nothing is real anymore” and that the “Internet merely simulates a mental space of freedom and discovery” where “nothing

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110 Rehearsals of any kind often involve a process of re-evaluating working methods. The difference in the case of the telematic rehearsal might be that the revisions were led by the technology, not by the content that is being produced.
exists beyond” search parameters. If this is true and the Internet is merely a simulation that extends outwards from our own lived experiences, than perhaps the telematic rehearsal room that I have described in *Tomorrow’s Legs* is merely a simulated space. But, if the boundaries are as porous as Baudrillard suggests, a simulated space may be no less real than a physically tactile one. When Alva Noe (2009: 132) says that “all presence is virtual … in the sense that the world is present as reachable, rather than as depicted”, she suggests that the binary between *real* space (and this *real* presence) and *simulated* space may be a less than useful dialectic. In fact, the “genuinely active, outgoing, socially engaged” behaviour that rehearsing for *Tomorrow’s Legs* encouraged via our telematic rehearsal process, is symptomatic of the reality of the spatial relationships we engaged in (ibid: 134). Whether you call it simulated, telematic or something else, I experienced it as a real space.
Conclusion: Fractures, figments and futures
Fractures, figments and futures

If we are to understand consciousness—the fact that we think and feel and that a world shows up for us—we need to turn our backs on the orthodox assumption that consciousness is something that happens inside us, like digestion. It is now clear, as it has not been before, that consciousness, like a work of improvisational music, is achieved in action, by us, thanks to our situation in and access to a world we know around us. We are in the world and of it. We are home sweet home.

(Noe, 2009: 272-273)

In the Introduction to this thesis, I articulated three related research questions that asked how domestic technologies, when employed in intermedial performance work are reconfiguring the experience of space by both audience members and practitioners. To answer my questions through practice and theoretical/philosophical research, I have used embodied cognitive science as a framework that allowed me to be both inside of and outside of the research. Of course, research of this nature is naturally limited by the format in which it is represented and this written thesis is only a small portion of the answer to the questions I set out to explore. It might be more accurate to suggest that this thesis does not, in fact, completely answer the questions of the larger PhD but that, instead, it explores the relationship between the practical research, an analytical reflection by the author, and the writing of others to situate itself as the beginning of a larger inquiry into how artists might employ cognitive science as a framework for discussing their own work. This conclusion, then, does not conclude the research, per se, but instead will review some of the ways in which my research questions have begun to be answered and suggest some of the challenges that it presents to future researchers.

Recently, my husband and I have been considering buying an apartment or a house of our own. The space we live in has such an impact on how we feel, what we think and even our physical health that the process of imagining our new home has taken on an incredible
We have begun an exercise of envisioning the perfect place for each of the activities that you do in a home and comparing these with the limitations of the actual homes we are finding. Mark Johnson (2007: 20) talks about the way we know our world, we understand space, by “being in touch” with it through contact at the “visceral” level and Alva Noe, in the quotation above, describes the way our place in the world defines consciousness itself. Imagining our future home, then, is only really made meaningful by the associations we can make with moving through an actual home (which may be why online property advertisements are more meaningful when they include a floor plan and/or virtual tour). As I mentioned in Chapter Two, the imaginative process is as much a physical, visceral act as is one that involves holding an object in your hand. In fact, this act of comparison between the imagined and the physically present is not that different than much of the argumentation I have been making in the past three chapters. While I hunt for a home in one narrative, in this thesis I am really hunting for the space of creation and spectatorship and suggesting that experience is the key to unlocking its location. Throughout, I have been wondering, where is the rehearsal room, the theatre, or even the performance?

There are many possible answers to my conundrum in terms of locating the spaces I have discussed in this thesis, and the discourse around space has long sought to position them according to varying philosophical or scientific vantage points. Rather than debating other perspectives however, I am proposing an approach to understanding performance, where it takes place, and is created that is based on experience. My bias as a practitioner (whose research happens by doing something spatial, material and collaborative in the world) gives me a specific engagement with material and meaning that is supported by the work

111 There are numerous studies about the impact of the spaces we live in on our mental, emotional and physical health. For a few good ones see Bachelard (1964), Halpern (1995) and Jencks and Heathcote (2010).
of embodied cognitive science. Rather than seeing my practice as divisible into a subject-object relationship that might allow critical distance, a key component of much performance analysis, I prefer to follow Mark Johnson’s belief that being in the world is an essential part of meaning making; that separating how we move from what we move is a false proposition. He says:

What philosophers call “subjects” and “objects” (persons and things) are abstractions from the interactive process of our experience of a meaningful self-in-a-world. It is one of the primary facts of our existence that we are not now and never were, either as infants or throughout human history, alienated from things, as subjects over against objects. There is no movement without the space we move in, the things we move, and the qualities of movement, which are at the same time both the qualities of the world we experience and the qualities of ourselves as doers and experiencers. (Johnson, 2007: 20)

He goes on to describe the notion that our experiences of moving through the world build the metaphors (he calls these spatial-movement metaphors) through “image-schemas” in the brain that allow us to make meaning of the spaces, objects, people and concepts we encounter (Johnson, 2007: 30, 141-143, 176). Johnson is, of course, being purposefully provocative by arguing against the subject-object binary that makes up one of the major conceptions of modern philosophical discourses. But his research is not merely a provocation; it is also supported by the concept of the embodied mind which tells us that “concepts and reason both derive from, and make use of, the sensorimotor system” meaning that “the mind is not separate from or independent of the body” (Lakoff and Johnson, 1999: 555). The embodied mind, is key to my argument that experience matters when it comes to understanding the world around us. I propose that a reversal of what Johnson says about movement may also be true: without movement there can be no space,

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112 Schemas are “the mind’s way of characterizing concepts through a collection of identifiable attributes” (McConachie and Hart, 2006: 228). The brain stores experiences and categories them based on “attributes” that it can easily identify. In perception, schemas are used as a way of generalizing about a situation to try and quickly make meaning through associations. Schemas exist for a “broad spectrum of situations, experiences, and sensations, enabling basic forms of cognition” (ibid).
or at least no way of comprehending that space as anything more than an image. Even the playful spaces of *headspace*, *aberrant pixel space*, and *telematic space* require an understanding of movement in order for their physical architectures to make sense. Without being able to locate sound in space, *headspace*, would not be possible; without an ability to correlate fragmented stimuli into a cohesive visual picture *aberrant pixel space* could not occur; and, without the ability to project one space onto another, and to imagine the physical dimensions of a remotely located space, *telematic space*, would simply be an online chat. In other words, as the *brain-in-the-vat* experiments I mentioned earlier show, a brain alone is not enough to perceive space fully; a body *is* required.

This thesis does not simply, however, repurpose research and writing on cognitive perception and apply it to theatre. By using the conceptual framework of embodied cognitive science to investigate the use of technology in intermedial performances, I am opening up a new way of considering space in performance that focuses on the way space is created by the body. I began this written thesis by asking whether cognitive science might offer a potential critical framework for artists who are seeking to be critical of their own work despite being inside of it. By employing cognitive science throughout this thesis, I believe I have answered this question directly in the affirmative. Of course, there are problems with cognitive science that I have covered throughout including those who find it overly reductive or potentially too focused on immovable fact. But, by combining

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113 This reversal, in many ways, is possible because space is experienced in *time*. The humanistic geographer Yi-Fu Tuan (2001: 160), who has written extensively about place and space, posits that “although space and time can be separated for purposes of analytical efficiency” (as I do here), “in experience space and time are inseparable”. He has also articulated the importance of time to the way we *experience* the world when he says “it takes time to know a place” (Tuan, 1975: 164), that “movement makes it possible for location to be transformed into place” and that an understanding of abstract space develops *out of movement* (Tuan, 2003 [1977]: 6, 52). His ideas, although not based in cognitive science, are supported by (and support) much of the research I have gathered in this thesis. I have “separated” time and space for the sake of “analytical efficiency” as Tuan notes is possible, but I am not unaware of the complex relationship between the two axioms. Indeed, my focus on the *physical* and on *movement* (especially in Chapter Three) echoes time’s impact on space throughout.

114 Needless to say, I am referring to the body/brain here, as described throughout this thesis.
many different perspectives on cognitive science with philosophy, neurology and first-hand descriptions of practice, I believe the limits of the framework have been appropriately nuanced. What this exploration suggests is that cognitive science, especially as employed within this thesis, requires a healthy dose of scepticism in order to prove useful. For example, my focus on experience as a key component for understanding space has led me to look at the mechanics of human perception, especially in relation to sight and sound, but it has also suggested that the way we understand the world is not limited to the reality of physical existence, although it is informed by it. *Headspace*, is not a real space in Euclidean terms. I am not suggesting that the actual dimensions of a head’s interior alone dictate how works like *Whisper, Desire Paths*, and *The Missing Voice* take shape. Instead, I am suggesting that the head becomes a metaphorical container for the imagined spaces these works elicit. What is important here is not that we imagine the literal space inside the head as the location of these works, but that their architectural sounds belong to an imagined space that carries the reverberations of sometimes real, sometimes fabricated spaces. In addition, the personal nature of the headphones impacts on the way these works function; because headphones are an essentially domestic, intimate technology, the way that an audience member/listener experiences artworks that utilise headphones is different from artworks delivered via less intimate means. The experience of *Whisper, Desire Paths*, or *The Missing Voice* is as much about the physical relationship between the headphones as it is about what sounds come through them. The implication of *headspace* is that in order to really understand where the space of the performance is it is crucial to consider how human perception processes the interaction between recorded and live sounds (and visual stimuli). To view the space of Janet Cardiff’s many audio walks as simply the city or the gallery or even the audio recording misses the fundamental interaction between the many spaces that her works engage with. *Headspace* uses the physicality of our sense of
hearing as a way of suggesting that imagined space, heard space, might be as powerfully affective as the physical spaces we move through. Heard space alone may not have this: *Headspace* also relies on contradictory sensory information; the sounds playing through headphones are often dissonant with the live sounds of the physical geography, while the visual imagery *as described* (verbally) frequently rubs up against the visual imagery *as perceived* (optically). The entanglement of sensory data in intermedial work such as *Whisper* and Janet Cardiff’s audio walks resists the historical conception of scenery/design as separate from meaning/content: in these works the many media involved are inseparable. Embodied cognition is perfectly suited to handling perceptive dissonances and one of the ways this is done is through metaphor. *Headspace*, then, is a metaphorical way of understanding where the performance *is* in many intermedial, headphone-driven artworks.

Similarly, the pixel is a useful metaphor for describing the fracturing that occurs in *Virtuoso* (*working title*) and in the works of Big Art Group— not because these theatre pieces are only composed of pixels, but because correlating the behaviour of pixels *on screen* to the bodies and objects *in space* offers a surprising set of possibilities for understanding the physical dimensions of the theatre. As I note in Chapter Two, William Mitchell (2001: 66-67) describes the pixel as a building block for images and says that they generally only make *sense* in the context of other pixels, except in cases where they become “prominent”, as he calls them, by becoming pixelated. When we perceive an image made up of pixels, our brains quickly suture together what we are seeing into coherent images. This same perceptive suturing together happens when we watch theatre; it is the process of understanding the spatial dynamics of an experience that unfolds in

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115 As I noted in Chapter Two, there are many other artists working with screens on stage. To review them all would be unnecessary and is not feasible given the scope of this thesis.
front of or around us that allows the fragmentary elements of performance to become meaningful. When we watch live performance, as when we watch a moving image on a screen, we have agency as an audience member: we can look where we choose or choose not to look at all. Regardless of where we focus our attention when we look at a performance on screen or live, we make connections, links, and associations. Attention works differently when only watching a screen (as in a cinema) or only watching a live performance (in non-intermedial performance) as the brain/body has less work to do in organising the stimuli being received: they are of the same order. In intermedial work, a mixing of media occurs that invites an audience member to see the differences between the elements, but our perceptive systems continue to look for those connections, links and associations. Of particular interest to me and the research this thesis articulates, is the way in which the building blocks of screen images can be correlated to the building blocks of stage images, and how the space of the screen is simultaneously deep (in the sense that its pixel depth allows for objects to appear in front of or behind other objects) and flat (in the sense that it is physically bounded by real space outside of the screen). In Virtuoso (working title) the mixed scales, depths and frames of the stage and television screens, create a perceiving environment that is aberrant in the sense that the spatial building blocks (pixels, if you will) resist Euclidean spatiality. The cubic space of the theatre is, of course, the physical space that Virtuoso (working title) takes place in, viewed in the most basic way. But within the black box, audience members are invited to create their own understanding of Virtuoso (working title) ’s spaciousness. The pixels in Virtuoso (working title) are both the squares that make up the live images being relayed onto the screens and the bodies and objects that fall outside of the screen borders. Further, the screens themselves are like giant aberrant pixels that make themselves known as different, individual, and unique while also contributing to a scenography that has clearly been
designed to create a total (chaotic) stage picture. The screens in *Virtuoso (working title)* are not just any screens, of course: they are television screens and so are therefore perceived in relation to their association with the home. The televisions in *Virtuoso (working title)* are domestic technologies that serve a purpose beyond the scenographic; they order the logic of the visual narrative. In *Virtuoso (working title)* and in many of the works that use live-feed screened images on stage, space is experienced as simultaneously multiplicitous and coherently whole, even if it is only whole in our imagination. As Shirley Brice Heath (2006: 133) says, all “art always pushes toward some sense of connection and completion” even if the artwork is “perceived and conceptualized as not yet complete, whole, or fully satisfying” as it might be in much intermedial work.\(^{116}\) I am using aberrant pixel space as a way of translating Heath’s notion of the move towards completion into the complex sensory world of screen-based intermediality. In *Virtuoso (working title)* knowing where the space of the performance is depends on where you are looking and how you look. My analysis of it suggests that aberrant pixel space provides a way of encapsulating the both and nature of its spatiality: it is both on screen and off, both on stage and off.

There is a lot we do not know about how perception works, especially once stimuli is received by the eye and enters the brain. But with performances like *Virtuoso (working title)*, where it is asked to process multiple levels of spatial detail, it is at its most impressive. Indeed, as others have suggested, performance might in fact have a role in evolving the embodied mind, stretching its perceptual faculties to ever more extraordinary heights.\(^{117}\)

\(^{116}\) Heath is a Professor at Brown University and at Stanford University where she conducts research in literature, linguistics, international studies and dramatic arts (Turner, 2006: xi). In her chapter ‘Dynamics of Completion’, Heath considers the way in which art impacts on the way we are able to make connections between disparate realms, to make creative leaps and to understand not only what something is but also what it means. See Heath (2006).

\(^{117}\) For more on the role of art in evolution, see Merlin Donald (1991; 2001; 2006).
The boundaries of physical geography have been complicated enormously with the invention of the Internet and the proliferation of Internet uses. Cyberspace has allowed people to share their views, exchange ideas and, often, to literally meet despite being located thousands of miles apart. Cyberspace is unique because it is invisible in the conventional sense (you cannot see the geography of cyberspace using anything other than data visualisation software) while still feeling tangible (it is accessed physically via keyboards, touch screens and voice commands). The language we use to describe the Internet is also riddled with physical metaphors: chat rooms, notice boards, web spaces. Alva Noe’s (2009: 90) notion that perception of space does not require full visual access to a space may be why so many of us have adopted cyberspace as a kind of second home and may have something to do with the imaginative way the networks that feed the Internet have been articulated spatially. Cyberspace may or may not be a space anymore depending on whether you believe Clay Shirky’s (2010: 39) assertion that the Internet has integrated itself into our daily lives so much that there is no longer a separation between real space and cyber space. In my analysis in Chapter Three of the telematic rehearsal process, the space that exists between the real rehearsal space in one physical location and the real space in another is tangible because it has real world impacts; the domestic technology of the Internet literally alters the way space is experienced. In *Tomorrow’s Legs* and in *Berries and Bulls* the rehearsal room was fragmented between New York, Manchester and a million lines of code somewhere in-between. This in-between space became our meeting place, our virtual rehearsal room. The web camera dictated much of our use of space in the real rehearsal room in New York, altering our artistic decisions in the process. Shirky uses this real world impact as an argument for why cyberspace should no longer be considered a distinct space, but this argument is a bit like saying my old apartment is less real because I no longer live there. The rehearsal space for *Tomorrow’s Legs* and *Berries and Bulls*
cannot be defined by a limited understanding of standard rehearsal practices; our rehearsal room was, like the performance space of *Virtuoso (working title)* and the aural experience of *Whisper*, both multiplicitous and clearly located between two physical geographies.

I am using metaphor throughout to explain and understand the spaces that are created by the performances I analyse, but metaphor also plays a strong role in the actual content of *Whisper*, *Virtuoso (working title)* and in both *Tomorrow’s Legs* and *Berries and Bulls*. In *Whisper* the metaphor of a looped walk through a city is used to interrogate the cyclical nature of life. The text begins and ends at the same place, alone in bed listening to the sound of water dripping. What happens between is a walk through an imagined city where a life flashes before the eyes (and ears) of an audience member, as in the last moments before death. The entirety of *Whisper* could be understood as a dream, where sleeping becomes a metaphor for death: both the death of perception (loss of sound) and literal death (as in the many suicides that riddle the text). In *Virtuoso (working title)*, American suburbia becomes a metaphorical cage, which is mapped onto the stage via the taped out performance space and made visible on screen via the dollhouse. Within the fiction of *Virtuoso (working title)*, the characters are trapped in their games while on stage the performers are trapped by their reliance on the camera’s lens. The trauma of John F. Kennedy’s death becomes a metaphorical link to the trauma of the characters/performers breaking out of their cage: his death signals the end of an era historically and the re-performance of it on stage signals the end of *Virtuoso (working title)* itself. Throughout *Tomorrow’s Legs* and *Berries and Bulls* metaphors of distance and space are toyed with choreographically and textually. In *Tomorrow’s Legs* this is most evident in the way closeness to the audience in the question-and-answer sequence signals that the performers are, metaphorically at least, stepping out of the performance to relate directly with
audience members. In *Berries and Bulls*, which is still very much in development, much of the text focuses on distance, touch and the possibility that things in the past (or even behind you) no longer exist. Tangible, physical space becomes a metaphor for reality in *Berries and Bulls*, where the ability to touch someone equates to them really being there.\(^{118}\) The metaphors in the content of each of these works are all, again, essentially physical in nature and they are all also based on my perception of the work; another viewer might very well find different metaphors at play when describing *Whisper, Virtuoso (working title)*, *Tomorrow’s Legs* and *Berries and Bulls*, which is the beauty of our incredibly unique senses of perception. It is only by reflecting on my practical research through the lens of cognitive science, especially the writing of Johnson and Lakoff, however, that I came to realise the metaphorical content of these works. Without the use of their writings on metaphor, I might never have realised how important metaphor is to the way in which I work as an artist researcher.

In Chapter One, I briefly touch on the evolution of the human hearing system and note that the oldest part of our hearing system is largely concerned with locating a potential predator or prey in space. I also note that the brain evolved to allow for more complex usages of sonic data that reach beyond simply surviving. This pattern of evolution is consistent throughout all of the perceptive systems of the body; the embodied brain has evolved to allow “people to know where and what an object was as well as what it was doing” (Solso, 1996: 189). Knowing what an object is doing, relies on an ability to understand how an object or being relates to its context and what possible meanings it might have; it requires the ability to make connections between past experiences and the potential meanings a situation could have. Artists have long understood this, consciously or unconsciously, and

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\(^{118}\) *Berries and Bulls* is very much still in development, however a transcript of the current text is included in Appendix Three. The first two scenes in the text demonstrate the relationship between touch and reality most clearly.
have built “cues” into their artworks that suggest what purpose a given object (or person) might have (ibid). In live performance, these cues are all the more tangible as they exist in space and in time unlike cues in painting, photography or sculpture, for instance, where the cues are more or less fixed to a canvas, frame or plinth.\(^{119}\) Because watching a performance involves “being there”, which is much “more vivid, immediate, and intense than imagining being there”, as you do when reading a book or looking at a work of visual art, the array of cues available to theatre artists are much more wide-ranging then they are for other artists (Mancing, 2006: 197). In the case of *Virtuoso (working title)*, for instance, an audience member does not only see the people and objects on stage and on screen; they also make associations between these elements that create meaning out of otherwise fragmentary pieces and their perception is affected by their physical proximity to the work.\(^{120}\) As the creator of *Virtuoso (working title)*, I built in cues to help an audience member understand the relationship between each element and what they might mean: the choice to match the on-screen/on-stage backdrops with the furnishings of the miniature dollhouse on stage was meant to help an audience member associate the miniature world of the dollhouse with the performed world on stage. Whether or not an audience member made this connection for him- or herself, I was nonetheless attempting to link two distinct domains visually for an audience member. I was providing cues to help structure the perception of *Virtuoso (working title)* and guide it in the direction of my artistic intentions. I do not claim that I was consciously doing evolutionary work with *Virtuoso (working title)* or with any of the pieces described in this thesis, but by attempting to answer my

\(^{119}\) Of course, where an artwork is viewed may alter the way cues built into the work are perceived, but the cues are relatively fixed once they are painted/photographed/sculpted.

\(^{120}\) In the case of *Virtuoso (working title)*, for instance, the televisions are placed at the downstage edge of the space. Depending on the particular angle of the seating in a given venue, the televisions were sometimes unfortunately obscured for some audience members. This drastically changed the way in which they perceived the work, not only because they were aware that they could not see the televisions very well but also because they knew that other audience members in better seats could see the televisions. Undoubtedly, the physical relationship between audience member and performance area affects the way cues are read, and I, for one, played with this specifically in the way the live edits from one screen to another were designed (to try and allow for people even with partial views to get the most out of the work).
research questions it is possible that I may have inadvertently discovered the potential
cognitive work that art can do. It is possible, then, that the cognitive science framework I
adopted might not only be useful for reflecting on and analysing practice-as-research, but
it might also be useful in the construction and design of future practical research projects.\(^\text{121}\)

Each chapter of this thesis seeks to articulate the proposition that space is a construct of
human perception and that much intermedial work problematises the location of
performance: whether through a combination of aural and visual cues, as articulated in
Chapter One, in reference to the pixel in Chapter Two, or in terms of the *between* space of
the Internet in Chapter Three. This thesis proposes that the embodied mind is capable of
literally reshaping space by reordering the fissures, fragments and fictions that technology
introduces into theatrical space into a meaningful form. Throughout, I suggest that the
embodied mind is active in creating space, in imagining or perceiving the complex spatial
relationships between the sights, sounds and other stimuli of the performances I describe.
This creative perceptual process troubles the boundary where the mind stops and the body
begins, where I end and where the *space* I am in begins. These boundaries are already
troubled, though, as “there is no principled reason even to think that our bodies stop where
we think they do” (Noe, 2009: 128). Cognitive scientists, phenomenologists and
psychologists have a lot of work to do in understanding the way human perception works,
but what we do know suggests that the border between our physical and intellectual
spheres is much more porous than it might sometimes appear.

\(^{121}\) For more on the role of art in evolution, see Merlin Donald (1991; 2001; 2006).
As I noted above, it is only at the end of a long process of living with and reflecting upon the practical research I have done for this thesis that I have become aware of the potential to my own practice of metaphor and of embodied cognitive science. There is a lot more work to be done in understanding the complex relationship between the embodied mind and the perception of performance works: even more in understanding and articulating the relationship between cognitive science and the creation of performances. My approach to space in this thesis, with its focus on experience and technology, has been concerned with the way multiple sensory inputs alter the way space functions (and perhaps where it is). As a director and writer, I engage with space by physically altering the elements in it to create some kind of a response in my audience members. I build walls, hang curtains, install televisions and collaborate across distance using the Internet. These interventions are second nature; they come with the territory of being an artist or at least with the way that I am an artist. By considering what the implications are of the choices I have made and how cognitive science allows me to articulate what I have created without ascribing fixed meaning to my work, this thesis offers up a potential model for making and reflecting on practice. The doing that I refer to so often in this thesis is inherently reflective, but the key has been finding a way to articulate the knowledge locked in that reflection. Embodied cognitive science’s focus on the physical encounter is an obvious fit for an artistic process that is itself always physical.

It is in the troubled ground between disciplines (sonic art, theatre, film, television) and between conceptions of how we perceive the world (via experience, imagination and/or intellect) that this thesis hopes to create a pathway for other artists. By raising concerns and suggesting potential strategies, as opposed to providing neat answers delivered in tidy boxes, this thesis provides a model for artist-researchers to engage with their own practice...
critically, reflectively, and within the confines of academia without sacrificing the integrity of their artistic explorations. Understanding the cognitive work that artists do has given me a new appreciation for the impact that artists, including myself, can have on the way we understand the world around us: how art can go beyond the sphere of purely aesthetic experience. My hope is that this thesis will not only add to the discourse on spatial perception, but that it will also encourage others to see the potential in employing embodied cognitive science in their making and reflecting processes. Particularly, I encourage others to resist the urge to limit their research by assuming the only way to articulate their practice is through frameworks that insist on a subject - object separation. The assumption that an artist might be able to objectively reflect on own work is incredibly problematic because the very “… nature of human conceptual systems makes it impossible for us to be objective maximizers of univocal, consistent self-interest” (Lakoff and Johnson, 1999: 559). In other words, it is not possible or particularly meaningful to attempt to speak about our own work using the object - subject divide because in many cases we are both. It is unrealistic for artist researchers to count on a ability to remain fixed to either (or both) of those positions, largely because most of our everyday reasoning happens at an unconscious level and is therefore not particularly accessible (ibid). As makers who are inherently embedded in our work, it is essential that we do not suggest a false ability to separate ourselves from the work we create. I also hope that others will take up the many questions outlined in this research to explore how a rehearsal process guided by embodied cognitive science might be employed in the creation of work and how the this work might be applied to other categories of work (for example pervasive media based performance and virtual performance). As I noted earlier, the field of embodied cognitive science, especially in relation to theatre and performance studies, is young; the more practitioner-researchers who contribute to the emerging discourse in which this thesis sits, the better.
Appendix One: Chapter One Materials

In support of Chapter One, I am including a DVD with video footage of Whisper along with a PDF of the text. Please note that Whisper was not produced as part of this PhD.

All video © Proto-type Theater 2007.

Whisper’s development was supported by the Arion Dolphin Trust, the Centre for Contemporary Art, Glasgow, and the department of Theatre Studies (now LICA) at Lancaster University.

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Appendix Two: Chapter Two Materials

In support of Chapter Two, I am including a DVD with video footage of *Virtuoso (working title)* along with a PDF of the text for reference purposes only.

All video © Proto-type Theater 2009.

*Virtuoso (working title)*’s development was supported by the National Lottery through Arts Council England, the Nuffield Theatre Lancaster, Lanternhouse International and the Storey Creative Industries Centre.

Duplication and distribution of these materials is strictly prohibited without written consent of the author.
Appendix Three: Chapter Three Materials

In support of Chapter Three, I am including a DVD with video footage of *Tomorrow’s Legs*, work-in-progress footage of *Berries and Bulls* along with images from rehearsal and a transcript of the text for each piece. Please note that it is the *rehearsal process* for these works that are being submitted as the practical component of this PhD.

Images are © Peter Petralia 2008-10 and Julie Lemberger 2008-10. Image credits are included on the DVD.

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