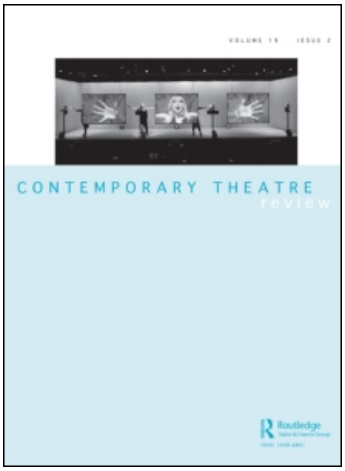

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Headspace: Architectural Space in the Brain

Peter Salvatore Petralia

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 sightseeing, 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*.[1] 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[2] recording of the museum spaces I was walking through and I saw a video recording of those same spaces through the camcorder viewfinder. The use of the pre-recorded sounds and images created a sense of being both 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.'[3] 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 that this article 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*

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1. Janet Cardiff, *The Telephone Call* (San Francisco, curated by John S. Weber for the exhibition '010101: Art in Technological Times' at San Francisco Museum of Modern Art, 2001).
2. Binaural recordings are made by using a specialised 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 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.
3. Janet Cardiff and George Bures Miller, *The Telephone Call* (n.d.) <http://www.cardiffmiller.com/artworks/walks/telephonecall.html> [accessed 1 January 2008] (Para 1 of 13).

within a viewer's brain through the use of headphones in live performance. My experience of *The Telephone Call* awakened in me an interest in the possibilities of creating alternate ideas of time and space through the use of headphone-based performance. I believe advanced headphone and post-headphone[4] technologies offer unique opportunities for artists to create experiences that question notions of physicality, spatial awareness, perception and, indeed, the boundaries of reality. In 2007, with the development of my own live performance piece *Whisper*, 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.[5] 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.[6] On reflection, however, I realised 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 these ideas via the creation of *Whisper*, I have begun 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 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. 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 with the head of the audience member.
- Using high-quality stereo surround sound and binaural sound to create spatial relationships with an audience member that may not be based on actual physical proximity but which nonetheless have the features of architecture.
- Eliminating or obfuscating physical performers to replace them with virtual or imagined ones represented sonically, or otherwise placing a primacy on the sonic elements of the performers.
- Making the subversion of real space a major component of the work by layering fictional space on top of a physically experienced 'real' space.
- 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, audio walks and virtual reality.[7] There are also links to some types of theatre that take place in theatre buildings. It is important that I be clear that *headspace* is not a *type* of theatre, but rather a feature present in certain types of performance, and a concept that when understood can be utilised to create incredibly seductive live (and mediatised) work. *Headspace* is not simply imagination; in fact, it is simultaneously subtler and more specific than that. It is akin to the type of sight you have when your eyes are closed, where the world seems to be *inside you* and simultaneously present with other, outward images. It is not only a layering of an internal, constructed *imagination* with an external *real* situation, but also an effect 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.[8] 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

4. Such as the audio spotlight, which is essentially a speaker that can direct a beam of sound at a precise physical location, mimicking the effect of headphones without the actual headphones. Holosonic, 'Audio Spotlight Technology' (2002) <http://www.holosonics.com/technology.html> [accessed 19 December 2007].
5. Peter Petralia, *Whisper*, Proto-type Theater, Lancaster (Nuffield Theatre, 2007), 4 July 2007.
6. See Jacques Lacan, *Ecrits: A Selection*, trans. by Alan Sheridan (London: Tavistock Publications Limited, 1977).
7. See Gabriella Giannachi, *Virtual Theatres: An Introduction* (London: Routledge, 2004).
8. See Richard M. Stern, Guy J. Brown, and DeLiang Wang, 'Binaural Sound Localization', in *Computational Auditory Scene Analysis: Principles, Algorithms, and Applications*, ed. by DeLiang Wang and Guy J. Brown (Hoboken: John Wiley, 2005), pp. 147–78.

> 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.'[9]

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'[10] through an intensely focused and directed channeling of sounds to a discrete listener. In much headphone-based performance the acoustics of the room become less important than the acoustics *within* our heads. The act of listening becomes a process of transference that throbs, vacillates and breathes: we are both aware of a sound's location inside us and undeniably feel as if the sounds are surrounding us from outside.[11]

The idea that binaural recording both puts the listener *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. Some scholars argue that binaural recordings reverse the internalisation of architecture and reorient it back out into the world, especially in relation to music and sounds that are meant to be heard on their own without a theatrical encounter.[12] If this is true then perhaps it is not simply the mechanics of the technology that creates *headspace*, but also the way in which the technology is approached, the context that surrounds it and the content contained within the technological framework. The best way to understand the dynamics at play, and indeed to understand the practical application of *headspace*, may be to look at artistic works where it is present.

Whispering

In 2007, through a residency at the Centre for Contemporary Art in Glasgow and with support from Nuffield Theatre Lancaster and Lancaster University, I began creating *Whisper*, an exploration into how disjunctures between the synchronous senses of sight and hearing can break or shift our perception of time, space and, indeed, the *real*. In order to develop the notion of *headspace*, I will look at *Whisper* in terms of its mechanical features from the perspective of my experience of participating in the creation and viewing of the piece.[13] At its most conceptual, *Whisper* was an attempt to endow the sonic experience of the audience member with a spatial experience of a place, time and emotional context. *Whisper* had a deceptively simple structure whereby three live performers spoke into microphones, created live sound effects using techniques from Foley,[14] and moved through space while backlit by powerful theatrical lighting that cast their shadows on a large semi-transparent screen facing the audience. Audience members listened in on their own personal sets of headphones while watching the live actions of the performers. The performers' text was written in the second-person *you* voice, a technique that attempted to place the listener in the centre of the work by including them in the narrative action. I employed the headphones to physically and acoustically connect the performers with audience members and create a sense of enclosure so that the sounds would literally be around and within the heads of each audience member. In effect, I placed audience members in a situation where they were forced to decode the multiple sounds, sights and physical sensations and where a negotiation of the dissonance between

9. Ralf Beil, 'Fireworks for the Tympanum and the Cerebral Cortex: Noise, Sound, and Music in the Work of Janet Cardiff & George Bures Miller', in *Janet Cardiff and George Bures Miller: The Killing Machine and Other Stories, 1995–2007*, by Janet Cardiff, George Bures Miller, Ralf Beil and Bartomeu Mari (Ostfildern, Germany: Hatje Cantz, 2007), pp. 60–83 (p. 74).
10. Ibid., p. 74.
11. 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' (Barry Blesser and Linda-Ruth Salter, *Spaces Speak, Are You Listening? Experiencing Aural Architecture* [Cambridge, MA: MIT Press, 2007], p. 187).
12. See ibid.
13. It is worth acknowledging that this discussion of *Whisper* could be seen as problematic because I am its creator. However, I am not attempting to view the work from a distance or with an objective eye (if that is ever even possible); instead, I will write about it from the perspective of being its creator, of being intimately wrapped up in the work. I would also like to note that there are numerous artists working with headphone technologies in various contexts: theatrical, locative, virtual, etc. My goal in this article is not to catalogue all of them, nor is it to claim ownership of the concept, but merely to expound on an example that I had intimate knowledge of and to connect it to one or two exemplary examples from another artist.
14. 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. See Philip Rodrigues Singer, *The Art of Foley* (1995) <http://www.marblehead.net/foley/> [accessed 5 January 2007].

their senses was central to their ability to make it to the end of the show.

In order to create *Whisper* I researched how sound is received and processed by the brain so that I could manipulate the stimulus being sent to the audience, to create layered sensory effects that might sometimes trick the perceptive facilities of the audience/receiver. This tricking manifested itself most notably in the moments when sound was tuned into a single audio channel (which naturally leads the eye to look to the corresponding side of the stage) and the visual on that corresponding side was either completely obfuscated or incongruous with the sound being heard.

On reflection, I realised that what I was doing in creating these audio dissonances was directly related to the physical process that guides sound reception, a subject which bears exploring briefly here. 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', subtly changing the sounds entering each ear, which will later help the brain to determine the spatial relation of the source to the listener.[15] These modified sounds then 'enter the pinna ear canal 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.[16] Once sounds reach the inner ear they 'leave the physicist's world of vibration and enter the psychologist's world of information', making the essential leap into our nervous system where the brain processes the sounds.[17] As 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.[18]

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.[19] After leaving the cortex, sound travels into the cerebellum, where information from our 'vestibular system, the apparatus in the inner ear that signals information about our position in space' is added to the sonic data.[20]

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 tell us that our ability to make meaning, to understand a sound, to balance ourselves and understand our place in space is 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 do. 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.[21] During most of the twentieth century, however, few people had any use for headphones even if they could afford them,

15. Jens Blauert, 'Hearing of Music in Three Spatial Dimensions', in *Systemic Musicology*, ed. by Bram Gätjen Wolfgang Auhagen, and Klaus Wolfgang Niemöller (Cologne: University of Cologne, 1995), pp. 103–12 (p. 103). See also Robert Jourdain, *Music, the Brain and Ecstasy: How Music Captures Our Imagination* (New York: William Morrow, 1997), p. 21; and Stern, Brown, and Wang, 'Binaural Sound Localization.'
16. Blauert, 'Hearing of Music in Three Spatial Dimensions', p. 104.
17. Jourdain, *Music, the Brain and Ecstasy*, p. 12.
18. Ibid., p. 28.
19. See ibid., p. 53.
20. Laurence Garey, entry for 'brain' (2001) <http://www.oxfordreference.com/views/ENTRY.html?subview=Main&entry=t128.e143> [accessed 19 December 2007] (Para 10 of 14).
21. See BeyerDynamic, 'History' <http://northern-america.beyerdynamic.com/cms/History.116.0.html?&L=1> [accessed 6 January 2008].

because there were few outlets with which to use them. Headphones found their *raison d'être* for the masses when Brazilian Andreas Pavel invented the first portable music device (the Walkman) in the 1970s, suddenly providing the average person with a reason to connect physically and privately with the realm of recorded sound. The question is 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. 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.'[22] This is because headphones as physical objects placed upon our ears must be dealt with by our auditory system in order to function properly. 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, as Akeroyd argues, 'when sounds are presented over headphones, the sounds are usually perceived as being within the head.'[23] What at first might have seemed foreign (a set of headphones) becomes assimilated by the auditory system as a set of mechanical ears, and in that assimilation the sound it produces comes closer, becomes a physical embodiment of sound, passing through the mechanics of an amplification system and literally into our brains. Further, while we are listening to music on headphones, the sounds of our external environment fall away, focusing the brain on the selected sounds played through the headphones. The ability of the headphones 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 is borne in mind. And further, if sound played over headphones is in a state of becoming part of the body, then what effect do headphones have on the nature of the sound itself?[24]

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. 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. 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.[25] When listening to a mono audio track, the level of spatial detail is relatively low. On the other hand, as Bartomeu Mari explains,

> [b]inaural and surround sound allow a physical experience of sound to be reconstructed in the listener's consciousness where it then takes on hyper realistic qualities. Like sculpture, it, too, takes on the features of volume, proportion, and physical presence.[26]

22. 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' (Sue Broadhurst, 'Digital Practices: An Aesthetic and Neuroesthetic Approach to Virtuality and Embodiment', *Performance Research*, 11 (2006), 137–47 (p. 138).
23. Michael A. Akeroyd, 'Binaural Hearing', <http://www.lifesci. sussex.ac.uk/ home/ Michael_ Akeroyd/ itd1.html> [accessed 19 December 2007] (Para 6 of 12).
24. For more on how technology impacts the way we think and how we relate to our bodies, see Celia Lury, *Prosthetic Culture: Photography, Memory and Identity* (London and New York: Routledge, 1998), especially the second chapter, which describes what Lury calls the 'experimental individual.' She says, '[E]very 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' (p. 13).
25. For more on the way the brain processes sound, see Blauert, 'Hearing of Music in Three Spatial Dimensions', and Jourdain, *Music, the Brain and Ecstasy*. For more on how binaural sound is processed by the brain, see Stern, Brown, and Wang, 'Binaural Sound Localization.' For more on the idea of spatial awareness, and aural architecture, see Blesser and Salter, *Spaces Speak*.
26. Bartomeu Mari, 'Janet Cardiff, George Bures Miller and Other Stories', in *Janet Cardiff and George Bures Miller*, pp. 12–35 (p. 14).

Taking his 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 so that they become 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 relation to sound so that the invisible particles of sound seem to bear the markings 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 them). In *Spaces Speak*, Barry Blesser eloquently describes the transposition of aural 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.'[27]

Whisper had many incarnations, but throughout its development there were several constants: the audience always wore headphones, the text was always written in the second-person *you* voice, the use of Foley was always key, and some of the specific sound effects found their way from the first workshop through to the final performance. The text, however, was completely rewritten several times and in the end it allowed for four primary modes of performance: firstly, present-tense narration that takes the *you* of the audience on a walk in search of a strange sound along the streets of an impressionistic city (with live sound effect creation); secondly, 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); thirdly, 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 fourthly pre-recorded text that is played while the performers stand still, under complete illumination (with no sound effects). Visually, *Whisper* evolved enormously in the creation process; in the work-in-progress the performers were seen behind a semi-transparent polyester fabric, while in the final version we use a white theatrical scrim (gauze) that can be made completely opaque or transparent, 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 and precise lighting design/cueing (see Image 1).[28] This rich visual layer creates a tension between the senses 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 don't* 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.

It could be possible to theorise 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 the sounds are only audible through the headphones, thereby destabilising any notion of *where* the performance was taking place.[29] If a casual observer were to enter the theatre after the performance had begun, they would witness a strange, largely silent scene. So, much like any performance, *Whisper* takes shape in the *combination* of the heard and the seen. Unlike most performance, however, the physicality of the headphones provides a material connection for audience members that allows them to indulge in the sensorium of the piece, and that further moves the performance into their heads. Not only are the headphones essential to the performance taking shape, what happens on the headphones is not simply the recitation of a narrative, but is also the creation of a live, immersive, stereo sound environment that has the characteristics of space. *Whisper* capitalises on the mechanics of hearing by using what has been called 'spatial hearing' which 'relies [. . .] on binaural cues like time-, level- and spectral differences between the left and right ear signals'.[30] 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 relo-

27. Blesser and Salter, *Spaces Speak*, p. 131.

28. The lighting design was by Rebecca M.K. Makus, a long-time collaborator of my company, Proto-type Theater.

29. In some venues audiences could hear the occasional sound without headphones, but the details of the text and sounds were very difficult to absorb.

30. Jeroen Breebaart, Jurgen Herre, Lars Villemoes, Craig Jin, Kristofer Kjorling, Jan Plogsties and Jeroen Koppens, 'Multi-Channel Goes Mobile: Mpeg Surround Binaural Rendering' (unpublished conference paper, *AES 29th International Conference*, Seoul, 2006), p. 2.

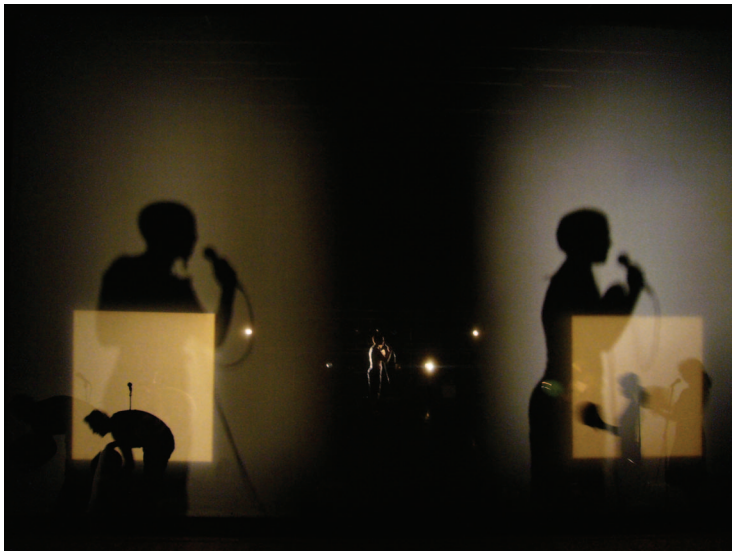

Image 1 *Whisper*. Photos: Brian C. Johnson, courtesy Proto-type Theater Limited.

cated into the acoustic shell of the brain and in the imagined space around the listener. To create the effect of sounds moving inside 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); 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 visual shadow play that often creates disjuncture to the sounds. As Paul Menard writes in his *Backstage* review of *Whisper*, '[u]ncannily, these anonymous performers are talking about you – literally – as they weave a surrealistic and circular tale in the second person [...] *Whisper* places you in the center of its disorienting narrative [...]'[31] 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 they imagine 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 encourages the construction of multiple potential narratives. 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. Ten minutes in, one of the performers (Nicki Hobday in its current touring cast) 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 stage left (SL) side of the stage

31. Paul Menard, 'Whisper', in *Backstage* <http://www.backstage.com/bso/esearch/article_ display.jsp?vnu_content_id=1003826873#> [accessed 11 July 2008] (Para 2 of 4).

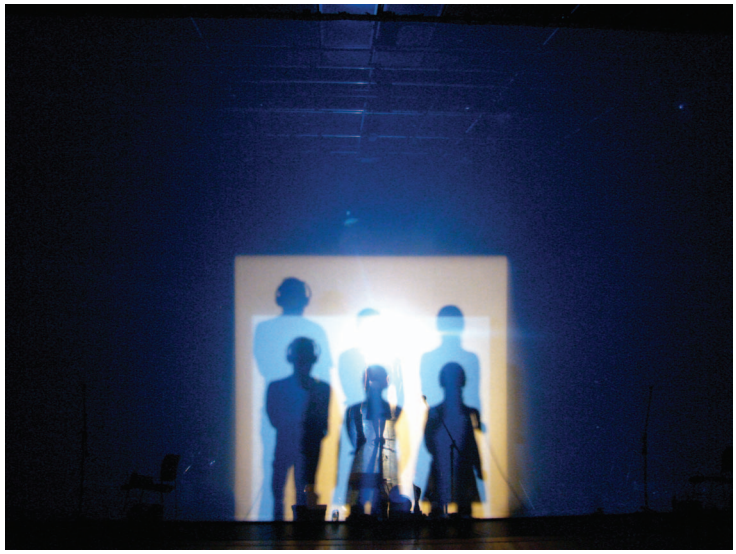

Image 1 Continued.

while an oversized shadow of an umbrella appears on the stage right (SR) side of the stage (see Image 1). Nicki also uses a wooden dowel 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. 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 carefully selected and promotes a remarkable number of narrative connections, leading the audience on a journey into 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. Anita Gates describes the experience of *Whisper* evocatively in the *New York Times*:

> There have been suicides in your neighborhood, even one in your building. And there's something strange about the spot on the sidewalk where the man who jumped from his apartment landed. A storm is brewing too. *And there are hushed voices in your head*, guiding you through your memories and accompanying you on your day.[32]

32. Anita Gates, 'The Voices in Your Head Will Not Be Your Own', in *New York Times*, 11 July 2008 <http://theater2.nytimes.com/2008/07/11/theater/reviews/11whis.html [accessed 11 July 2008] (para 1 of 7); emphasis added.

This sense of the voices being inside your head is *headspace* writ large.

The Physicality of Experience

It may be obvious to some readers that this accounting of *Whisper* is focused on a discussion of the mechanics that allow *Whisper* to take shape and the experience of watching/listening to it, and is not seeking to analyse moments as signifiers for some inherent meaning. Indeed, after making *Whisper* and attempting to articulate what it was I had made, I searched for an approach that would focus on the *experience* of making and watching *Whisper*. I was drawn to Lakoff and Johnson's 'philosophy in the flesh', 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.'[33] Unseating these tenets, Lakoff and Johnson draw on cognitive science, which tells us the following:

> The mind is inherently embodied.
> Thought is mostly unconscious.
> Abstract concepts are largely metaphorical.[34]

Going into further detail, Lakoff and Johnson note:

> The same neural and cognitive mechanisms that allow us to perceive and move around also create

33. George Lakoff and Mark Johnson, *Philosophy in the Flesh: The Embodied Mind and its Challenge to Western Thought* (New York: Basic Books, 1999), p. 3. 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 theorised perception as based on physical experience, embodiment and 'becoming.' For more on this, see Robin Nelson, 'Practice-as-Research and the Problem of Knowledge', *Performance Research*, 11 (2006), 105–16. A potential difference between phenomenology and cognitive science is that Lakoff and Johnson are still basing much of their arguments on the mechanics of the brain, although for them it is primarily in the unconscious, physical brain as opposed to the *cogito* of Descartes. Lakoff and Johnson state that the main difference between phenomenology and cognitive science is that cognitive science uses 'empirical evidence from recent cognitive neuroscience and embodied cognitive science' (Lakoff and Johnson, *Philosophy in the Flesh*, p. 97).
34. Lakoff and Johnson, *Philosophy in the Flesh*, p. 3.

> 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.[35]

With these assertions, Lakoff and Johnson are suggesting a radical shift in the way in which we understand human perception and experience. I believe cognitive science may well offer a significant alternative to the general set of theoretical tools commonly used to discuss and understand performance studies.[36] Unlike semiotics which suggest a viewer can *read* the world in terms of the signs and symbols that abound, and unlike 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, Lakoff and Johnson suggest that physical experience is at the centre of understanding and that metaphor is used as a means by which to process that experience.[37] What this means for the study and reflection of performance/theatre is that many of our assumptions about what it is people experience when they are experiencing a performance (as spectators or performers) may be incomplete.[38] 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 Sugiera says, 'in a context of communication all that is said, or any stimuli – gesture, gaze, movement, etc. – come with a presumption of relevance within the interaction.'[39] This suggestion that the act of communicating is contextual and not innately meaningful requires that any analysis of the theatrical event has to take its mechanics 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 set-up 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 do not *read* work (to misappropriate a term from semiotics) in a purely objective sense.

There is a great deal more at stake in investigating cognitive science's relevance to theatre and performance studies, but for the sake of this article we need only a small introduction to see that although the field of cognitive science is very young among the hard sciences (and complex), it has clear relevance to performance creation and analysis.[40] 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 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 erroneous exercise. Instead of searching for some inherent meaning in a work, the person analysing a work should be asking 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 to ask *what did it do?* In the context of my discussion of *Whisper* and the other works that I touch on in this article, this has led me to look not only at the materiality of the work (i.e. the technology) but also at how the technology creates an experience.

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

35. Ibid., p. 4.
36. Cognitive science may offer possibilities for creating performance as well, but in this case I was not actively developing *Whisper* with cognitive science in mind – I only came to it upon reflecting on the work.
37. See Lakoff and Johnson, *Philosophy in the Flesh.* This is a very simplistic description of both semiotics and Lacanian psychoanalysis necessitated by the brevity of this article. For more on semiotics, see Elaine Aston and George Savona, *Theatre as Sign-System: A Semiotics of Text and Performance* (New York: Routledge, 1991). For more on Lacan, see Kareen Ror Malone and Stephen R. Friedlander, *The Subject of Lacan: A Lacanian Reader for Psychologists* (Albany: State University of New York Press, 2000).
38. I will expand on these in greater detail in my forthcoming PhD thesis. There are not enough published writings that make the connection between cognitive science and modes of understanding performance. Two very good examples of employing cognitive science in this way are M.T. Crane, 'What Was Performance?', *Criticism*, 43 (2001), 169–87, and Malgorzata Sugiera, 'Theatricality and Cognitive Science: The Audience's Perception and Reception', *SubStance*, 98/99.31 (2002), 225–35.
39. Sugiera, 'Theatricality and Cognitive Science', p. 228.
40. For an excellent, if slightly dated overview of the multiple directions cognitive science is heading in, see F.J. Varela, E. Thompson, and E. Rosch, *The Embodied Mind: Cognitive Science and Human Experience* (Cambridge, MA: MIT Press, 1991).

opposition is Thomas Csordas, who has argued that Lakoff and Johnson's work does not go far enough in embracing embodiment.[41] Csordas, criticising 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 [. . .], 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, the objective raw material of representations rather than the seat of subjectivity and ground for intersubjectivity.[42]

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 towards 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 head. But in fact, Lakoff and Johnson articulate the mind-body relationship in terms that seem surprisingly in sync with Csordas when they say, 'In an embodied mind, it is conceivable that the same neural system engaged in *per*ception (or in bodily movement) plays a central role in *con*ception.'[43] 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 throws the baby out with the bathwater by dismissing the potential for cognitive science to help us understand how we make meaning out of the circuit of sensory inputs our body receives. However, 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 Tim Ingold 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.'[44] Indeed, the cross-cutting 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 receptive area of the audience and back again in a continuous circuit, much like Ingold's body-brain-world circuit. Put this way, cognitive science offers us an approach to articulating the ways in which the physical body (which includes the brain) makes meaning of its place in the world through a network of perceptual-conceptual faculties.

Lakoff and Johnson's work with cognitive science has provided me with a further point of departure for this article in their assertion that abstract thought is primarily metaphorical and that we primarily conceptualise 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', we are using the physical world to represent abstract concepts.[45] When we say we grasp an idea, we are equating the physical act of holding on to 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.[46] 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 eloquently argues in his essay in *The Perception of the Environment* about perception, 'Stop, Look and Listen.'[47] Csordas 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.'[48] But Lakoff and Johnson are constantly returning to the body, *not* abstracting the body into the mind. They assert that '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'.[49]

The notion that we *understand* our world through its physical dimension, as Lakoff and

41. See T. Csordas, 'Embodiment and Cultural Phenomenology', in *Perspectives on Embodiment: The Intersections of Nature and Culture*, ed. by Gail Weiss and Honi Fern Haber (London and New York: Routledge, 1999), pp. 143–62.
42. Ibid., pp. 150–1.
43. Lakoff and Johnson, *Philosophy in the Flesh*, pp. 37–8.
44. Tim Ingold, *The Perception of the Environment: Essays on Livelihood, Dwelling and Skill*, ed. by Tim Ingold (London and New York: Routledge, 2000), p. 244.
45. Lakoff and Johnson, *Philosophy in the Flesh*, p. 45.
46. See ibid. and George Lakoff and Mark Johnson, *Metaphors We Live By, Cultural Metaphors: Readings, Research Translations, and Commentary* (Chicago: University of Chicago Press, 2001).
47. Ingold, *The Perception of the Environment*, p. 285.
48. Thomas J. Csordas, *Embodiment and Experience: The Existential Ground of Culture and Self*. Cambridge Studies in Medical Anthropology (Cambridge: Cambridge University Press, 1994), p. 151.
49. Lakoff and Johnson, *Philosophy in the Flesh*, p. 78.

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 is more than signs but not inherently reducible to the usual psychoanalytic tropes. My investigation of *headspace* in this article benefits from the use of cognitive science as a frame 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 on what this might suggest for a broader theoretical facet of other performance works; cognitive science simply offers me the tools to do that. In order to fully articulate *headspace*, and to help solidify the connection between the physical process of making meaning in the world and the reception of performative material, I want to briefly broaden this article to another work that might be more explicitly physical than *Whisper*.

Sound in the City

The artist Janet Cardiff and her collaborator-partner George Bures Miller have been making sound walks for cities for over fifteen years that use a similar format to that of *The Telephone Call* as described in the introduction of this article (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).[50] Their first long form audio walk for a city is *The Missing Voice (Case Study B)*, which takes place in the Spitalfields area of London, centring on a journey from Whitechapel Library to Liverpool Street Station.[51] For the purposes of this article, 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.[52] 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 article. The incredibly high quality of her recordings is one of the main features that set her work apart from other audio walks; the sounds are incredibly lifelike 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.'[53] 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, per se), wandering in and out of the *present* of Cardiff's narrative and cinematic memory spaces which seem to come from the past.

I have done several of Cardiff's walks in other parts of the world, so when I discovered that she had a tour in London I immediately made arrangements. 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 rehabilitated, 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* in response to its location in a city keeps the piece dynamic and evolving, and highlights the many dissonances that

50. There are several very good resources available on the work of Cardiff and Miller, including Cardiff et al., *Janet Cardiff and George Bures Miller: The Killing Machine and Other Stories (1995–2007)*, and Janet Cardiff, George Bures Miller, Eckhard Schneider, Jorg Heiser and Matthias Lilienthal, *The Secret Hotel* (Cologne, Manchester, and New York: Distributed Art Publishers and Kunsthaus Bregenz, 2005).
51. Janet Cardiff, *The Missing Voice (Case Study B)* (London: Artangel, 1999).
52. See, for instance, D. Pinder, 'Ghostly Footsteps: Voices, Memories and Walks in the City', *ECUMENE*, 8 (2001); Sarah Boxer, 'Arts Abroad: An Artist Who Travels with You (on Tape, That Is)', *New York Times*, 8 August 2000 <http://query.nytimes.com/gst/fullpage.html?res=9C01E7DA103CF93BA3575BC0A9669C8B63> [accessed 9 November 2006]; and Janet Cardiff, *The Walk Book* (Vienna: Thyssen-Bornemisza Art Contemporary, 2005). It is also worth exploring the work of Graeme Miller and the English Company Blast Theory in relation to locative media. Specifically of interest is Blast Theory, *Uncle Roy All Around You* (Institute of Contemporary Arts, London 2003) and Graeme Miller, *Linked* (ArtsAdmin: London, 2003).
53. Cardiff, *The Walk Book*.

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.[54]

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-consciousness 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.[55]

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 who 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.'[56] It is never completely clear to me whether the woman he follows is the voice speaking to me over the headphones (Cardiff's) or someone from my past, someone fictional, someone real. Like *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 *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 destabilised any sense of the *present* while walking through Spitalfields (East London). 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 their 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

54. See Janet Cardiff and George Bures Miller, 'The Missing Voice' (n.d.) <http://www.cardiffmiller.com/artworks/walks/missing_voice.html> [accessed 1 January 2008] (para 19 of 19).

55. Ibid., para 1 of 19.

56. Ibid., para 8 of 19.

sensorium. This heightening of senses was apparently not unique to me, as one reviewer from the *New York Times* explains their own experience:

> 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.[57]

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 certain immersive sound works can create. Writing about Cardiff's sound works, the curator Ralf Beil puts it perfectly:

> 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.[58]

Ralf Beil's notion that Janet Cardiff's audio walks (like *Whisper*, I would assert) penetrate into the body brings me neatly back to the physicality of how we hear.

Listening

William Gaver describes two kinds of listening: *musical listening*, which he calls the type of listening when 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 about types of sounds or psychological approaches. Gaver goes on to say 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 is encoded in the sound. Similarly, the *place* where the vibration occurs is inscribed into the resulting sound (via acoustics, for instance).[59] In *Whisper* 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 to absorb the sounds, their context and their content. There is a coupling of active listening (with the spatiality and materiality inherent in the sounds) and the context in which the performances take place. Speaking about Cardiff's work, Mari says:

> [...] many 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 [...] 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 behavior.[60]

For me, this enclosure is *headspace*, and the marriage of experience and behavior is one of dissonance and disjuncture, which 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 third space of the head, regardless of whether the works require the listener to literally walk (as in Cardiff's work) or sit (in mine).

It is 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. One has only to look at Facebook, MySpace, Twitter and other social-networking sites to see that we are constructing the narratives of our lives via a series of sound bites, 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 any more? 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.

57. Boxer, 'Arts Abroad', para 19 of 19.
58. Beil, 'Fireworks for the Tympanum', p. 63.
59. See William W. Gaver, 'What in the World Do We Hear? An Ecological Approach to Event Perception', *Ecological Psychology*, 5 (1993), 1–29.
60. Mari, 'Janet Cardiff, George Bures Miller and Other Stories', pp. 33–34.