Plastic modes of listening: affordance in constructed sound environments

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PLASTIC MODES OF LISTENING:

AFFORDANCE IN CONSTRUCTED SOUND ENVIRONMENTS

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Contents of the portfolio on the accompanying DVDs

The DVD 1 work in any computer that has a DVD-drive installed and on DVD-players. For optimal use the listener should be able to listen to a system that enables separate channels of the digital 5.1 mixes. DVD 2 contains uncompressed audio files and can only be opened in a computer.

DVD 1:

- Case studies of constructed sound environments in 5.1 mixes

1. *Small objects and one large*
2. *Listening zones*
3. *Form and dramatic environments*
4. *Bla bla bla*
5. *Summerhouse, doors and the woods*
6. *Public spaces and one*
7. *Pathways of dreamy internal logic*

- Exhibition of *Small objects and one large*
- First exhibition one *of Listening zones*
- Second exhibition two of *Listening zones*
- Exhibition of first four case studies in Gallery P3

DVD 2:

DVD 2 accompanying the thesis contains the original uncompressed audio files of the seven constructed sound environments produced for this PhD project. On DVD 2 a listener can find each separate channel for the 5.1 mixes in uncompressed format. Each audio file is labelled with the speaker position for each channel.

Chapter 1.

1.1 Introduction

This thesis is part of a practice-based research conducted at CREAM at the University of Westminster, London, UK. The PhD project involves my practice in working as a maker of sound installations referred to in this thesis as 'constructed sound environments'. The practice has generated artefacts in the form of sound art installations that are part of the overall project. A DVD accompanying the written thesis contains my documentation of the practice. On the DVD the reader can find my sound environments presented in stereo, 5.1 mixes as well as field recordings from the exhibitions I made for this project. The material on the DVD provides for an approximate understanding of how different places and location/movement of the body changes the perception and creates the overall impression of my constructed sound environments.

In a broad sense my practice is placed in the field of sound art, and the thesis aims at understanding the perception of sound involved in my constructed sound environments. For the research to support this PhD project I have studied areas that are linked to sound art, such as psychoacoustics, acoustics and electroacoustic music composition strategies. Although these areas have their importance in understanding sound perception in a broader context, the focus of this PhD project has been to develop a taxonomy regarding the possible 'listening modes', as introduced by Pierre Schaeffer (1954), and further developed by Michel Chion (1994), within each of my constructed sound environments. My understanding of perception taking place in environments has its base in the ecological approach to visual perception as introduced by James J. Gibson (1986), and in the ways in which this approach can be extended into the area of sound perception. Focus in the thesis is upon that which can be afforded by a perceiver in a *constructed sound environment*. The goal of the thesis is to find a way to merge the theory about listening

modes and the ecological approach in order to create a new framework for analysing sound art environments.

1.2 Background

The basis for this PhD project was laid 15 year ago in 1994, when I was commissioned to make a sound installation at Läcko Castle in Sweden. In this 15th Century castle there is a clock tower situated above the entrance. I was commissioned by the director Leif Jonsson to construct a sound installation that dealt with the human relation to the concept of time. The installation included sounds that for me indicated time such as church bells, heartbeats and watches. I used three floors of the tower in an effort to try to fill the whole interior of the clock tower with sound. Due to the nature of the different speakers I used, I managed to get the sound to appear as if it was pouring down at the listener. The listener had to pass different rooms and corridors before entering the clock tower and by doing this the listener progressed from the present time outside the castle into several rooms from the 15th century, finally to enter a room where a sound installation with modern sound technology was placed. By using the whole clock tower, I worked with the physical space, speaker configuration and time; and so, by a combination of intuition and experimentation in sound and space, I had made my first constructed sound environment. A year later I was introduced to composers Per-Uno Pettersson and Zoltán Gaál as they were giving a lecture at the art gallery in Skövde, Sweden. They introduced me to various compositional strategies, involving treatment of recorded sound using computer software. This started my interest in using recorded sound material and the ways in which this could be treated and spatially distributed using various speaker setups. In 1995 I joined the organisation *New Music in Skaraborg* that arranged concerts and exhibitions of new music and new media art. In 2001 I created a sound installation that was part of the International Art Biennale in Gothenburg. The installation was placed on the wall of the theatre in Skövde. However, I came to the

realisation that, as people entered the building in which the theatre was located, they did so looking straight ahead. As soon as I started testing the installation with the sound being projected four meters above the ground, people started looking up at the building in trying to locate the new and unfamiliar sound that was appearing. I observed that people stopped and started to look at the whole building as they were hearing the sound being projected from four speakers placed on one wall in a straight line. The reaction of the people looking at the whole building made me realise that I was not only working with the surfaces close to the speakers, but a larger space than I had anticipated working with. This started an investigating how sound and space worked in forming an environment.

Since 2000 I have worked at the University of Skövde and, in the role of Programme Director for the study program of Media Arts, I was involved in restructuring the programme in order to make the relationship between sound and image become stronger within the courses. My interest as a lecturer has been sound in cinema, and the ways in which different listening modes and listening strategies function in cinema. My interest in sound environments has continued with the work I have done with students at the University of Skövde, Sweden, where we have tried to incorporate the use of gallery rooms as a part of the students' multimedia presentations. As for my own artistic endeavours, I am still interested in the ways in which sounds of different origins, and with different connotations, work together in forming a sound composition, and how these sound compositions function in different places and contexts to form new constructed sound environments.

1.3 Purpose and aim

The purpose and aim of this PhD project and this thesis is to gain knowledge on how to categorise the different affordance structures available in contemporary sound art practice. More specifically, I explore the affordances in what I call 'constructed sound

environments': the perceived environment of a man-made construction and organisation of sounds, utilising the listening frame made by using the speaker(s) in conjunction with the surrounding physical space.

The theoretical basis of this thesis is the ecological approach to perception as formulated by James J. Gibson (1977, 1986), where in order to perceive a given environment a human being must take action upon what is being afforded by objects and surrounding surfaces due to their structure.

In this thesis the inclusion of the concept of 'listening modes' (Schaeffer 1954, 1977, Chion 1994, 2007) is also central since it explains how we listen to and perceive sound.

For the explanation of the concept of Pierre Schaeffer's four listening modes I have used Leigh Landy's translation since an English reader is probably more familiar with the work of Landy then Schaeffer's work, that still as this thesis was written, was not translated from French.

> The four modes are: *écouter,* "listening to someone, to something; and through the intermediary of sound, aiming to identify the source, the event, the cause; it means treating sign of this source, this event"; *Ouïr,* "perceiving by ear, being struck by sounds, the crudest, most elementary level of perception; so we 'hear' passively, lots of things which we are not trying to listen to or understand"; *entendre*, "an intention to listen [*écouter*], choosing from what we hear [*Ouïr*] what particularly interest us, thus 'determining' what we hear"; and *comprendre* "grasping a meaning, values, by treating the sound as a sign, referring to this meaning through a language, a code (semantic hearing). (Landy, 2007, p. 81)

To get a more simple conclusion of the four modes of listening central to Schaeffer's work on sound perception I quote Michel Chion from his decoding of Schaeffer's theory of the musical object, *Traité des Objets Musicaux*. (Schaeffer, 1966)

> I perceived (*ouïr*) what you said despite myself, although I did not listen (*écouter*) at the door, but I didn't comprehend (*comprendre*) what I heard (*entendre*). (Chion, 2009, p. 20)

Chion has created even more simplified taxonomy regarding the way we perceive sound and has come up with three modes of listening that are: causal listening, semantic listening and reduced listening. Chion refer to the listening modes as: 'Causal listening, the most common, consist of listening to a sound in order to gather information about its cause (or source).' (Chion.1994, p. 25). 'I call semantic listening that which refers to a code or language to interpret a message: spoken language, of course, as well as Morse and such codes'. (Chion, 1994. p. 28). 'Reduced listening takes the sound - verbal, played on an instrument, noises, or whatever – as itself the object to be observed instead as a vehicle for something else.' (Chion,1994. p. 29)

In relation to the listening modes Chion (1994) has also coined the phrase *zones of audition*, in regards to how a listener in an environment not only is able to localize and pinpoint a sound and its source, but also listens to a wider field that incorporates the surrounding area of a sound source. The notion of zones of audition has informed the strategy behind the construction of sound environments for this PhD project.

In addition to the concept of affordance and listening modes, the idea of being what we might call an 'aural architect' working with aural clues in the usage of physical space, comes from Blesser and Salter (Blesser & Salter, 2007); finally, Brandon LaBelle's advocacy of a holistic and musical approach to the understanding of works of

sound art (LaBelle, 2006), completes the theoretical and methodological foundation for this thesis. The individual elements of the methodology will be explored in more detail in section 1.7, below.

1.4 Thesis structure

The structure of the written thesis will be outlined in this section. Whilst reading the written argument, the reader is strongly recommended to access in parallel the reference material in the form of audio examples on the accompanying DVD 1; reference to the DVD is made frequently throughout the text.

The thesis is divided into three major chapters.

Chapter 1 includes a literature review and a theoretical framework based upon contemporary sound art and connected areas that have a strong connection with sound art such as, electroacoustic music, acousmatic music, and *musique concrète*. Chapter 1 further contains a presentation of the problems of contemporary sound art theories in coming to terms with what defines sound art, and the ways in which this problem is evident in and reflected by the terminology used for describing sound perception. Chapter 1 concludes with a summary of the methodology concerning the creation of my constructed sound environments and the ways of analysing the perception within these constructed sound environments based on affordance and listening modes.

Chapter 2 contains my artistic reflections based on my strategies of sound organisation, and on the strategy behind the design of my constructed sound environments. Seven different constructed sound environments created for the PhD project serve as case studies for the possible listening affordances available. The study is divided into two parts. Part one includes the first four sound compositions and their usage of space in creating constructed sound environments. Part two consists of three sound compositions made

with the outcome of part one in mind in regards to sound design, structure of the compositions and spatial distribution.

Chapter 3 contains a conclusion about the sound art practice and the theoretical outcome based on: listening modes, affordances and zones of audition in constrained enclosed physical rooms, and how to frame the listening experience with speakers.

1.5 Context and literature overview.

In this section the PhD project is contextualised and a literature overview is presented in order to map the interdisciplinary approaches used by me in discussing constructed sound environments. The discussion held in this chapter revolves around sound art as a term, and what it can be said to represent to us today – and to this PhD project specifically.

1.5.1 Sound art practice

'Sound art' has become the umbrella term under which a variety of works can be found. Sound art can be an audio-only work, such as Bruce Nauman's (2000) piece for the turbine hall at Tate Modern, where an audience was moving between eleven pairs of speakers situated along the vast turbine hall. Sound art can also be used to describe Bill Fontana's sound installations, where a dialog between sound outside a gallery space and the sound presented within a gallery space is created, making a perceiver reflect upon extrinsic and intrinsic aspects of the artwork. Similarly, Chris Watsons's soundscape compositions such as *Weather Report* (Watson, 2003), where Watson uses untreated recorded environments containing the sounds of wildlife and nature, also can be said to be sound art; and interactive installations such as Kaffe Matthews's *sonic bed* (2005) whereby a perceiver's body, through the vibrations created by sounds, becomes part of the experience of the sound, could also be said to belong to sound art. These few examples may differ from each other in terms of ideology and artistic expressions, but yet there seems to be a set of core values, which enables all the above examples to be grouped together under the same umbrella term.

The term 'sound art' within this PhD thesis is an art form that creates an augmented listening process and an enhanced perception of environments made of sounds.

Alan Licht (2009) describes the term 'sound art' as a concept that is most passable when describing works not intended as music.

> As a term, ‘sound art’ is mainly of value in crediting site- or object-specific works that are not intended as music *per se*. Much like rock and roll, a purist view of sound art becomes very narrow, and much of what is called or categorised as sound art can be just as easily viewed as a hyphenated fusion of sound art with an experimental musical style.’ (Licht, 2009, p. 9)

The line ‘works that are not intended as music *per se*’ (Licht, 2009, p.9) is problematic since it divides sounds into either musical or non-musical sounds, and the question arises as to whether such a binary definition of sound art based on sounds that have either musical or non-musical features is necessary, or even useful. But perhaps this rigidity is symptomatic of an anglophone tradition, as opposed to a francophone or germanophone trope. Certainly, Licht’s division of the perception of sound art installations into musical and non-musical sounds creates a problem that Engström and Stjärna (2009) have detected when tackling the German vs. English school on sound art: ‘The expression “sound as an aesthetic category” is emblematic for the English literature on sound art, and so is also the tendency to speak about a division between music and sounds.’ (Engström & Stjärna, 2009, p.13). Engström and Stjärna (2009) show that the basis for the German school of understanding sound art has a different origin from the English school on sound art, in that the German school has always included the perception of time and space as the vital core of understanding a sound installation, and that the ‘musical’/‘non-musical’ debate never has constituted a problem within the German sound art research tradition. They continue:

> The integration of the aural and visual is, however, one of the main themes in the German texts. Motte-Haber claims in several texts that the core of the sound installation is the investigation of both time and space, through ear and eye, which in turn is the foundation of

> our perception of time and space; a perspective that also hints at the author's background in perception psychology, which is one of the roots of the German synaesthetic approach to the genre. (Engström & Stjärna, 2009, p.13)

What is evident in the work of Engström and Stjärna is that there is a polarity in understanding sounds as either non-musical or musical, as Licht (2009) stated, but I would argue that sound art can be approached from the angle that there is an equal place for both these opposing terms in any proper understanding of what sound art is, or can be. In my own practice I combine sounds that have either a predominantly documentary feel to them, with abstract musical sounds that cannot be instantly recognised as being part of a sound producing object or a sound environment. According to Leigh Landy (2006), the part that defines a work of sound art is not what it contains in terms of sound material, but rather, the context in which it is presented.

> Sound art: This term is used in a variety of manners, but I can say that the key concept behind sound art is that it refers to works of sound organisation that are normally not conceived for concert performance. They can be found in galleries, museums, in public spaces, on the radio or wherever, but they are normally not presented as musical works. (Landy, 2006, p 3.)

Landy (2006) addresses the idea that the context and location in which a piece of sound art is situated creates the overall impression of a sound art environment, in a way that recalls Licht (2009). For my own practice it has been important to recognise how different places and spaces shift and change the perception of my work. Since Landy (2006) is keen on establishing a new term to describe works that are more closely connected to sonic works, he offers the term 'sound-based music', and in doing so stresses the musical

qualities within the concept of sonic arts: ‘I believe that the definition of Sonic Art needs to be used with a term that includes the word *music* [my emphasis] and, because of this, I have come up with a new term, *Sound-based Music,* as it is clear.” (Landy, 2006, p. 5)

Landy’s (2006) attempt in creating the concept of sound-based music seems to work unless traditional music is included within this concept. Are not the recordings of Beatles ‘sound-based music’, for example? Could not the work of Hip Hop group Public Enemy (1988) on, for example, their record *It Takes A Nation Of Millions To Hold Us Back*, with its extensive use of sampling, be said to be ‘sound-based music’? Landy’s (2006) term does not answer these questions, nor does the term ‘sound-based music’ include the concept of environments, that is a part of sound art with regards to installation practice, where an audience, rather than sitting in a static mode experiencing music, will move around and create their own point of audition. Landy (2006) does discuss various types of sound-based art work that could be included in his term ‘sound-based music’, but the term nevertheless feels like an attempt on Landy’s part to force disciplines together that do not necessarily need to be grouped together. Landy’s argument seems to be the inheritor of the different approaches towards the idea of organisation of sounds, as used by composers John Cage and Edgard Varèse:

> Let’s deal with a specific case, an interactive sound installation in a public space. People, who are willing, come into the installation area and ‘play it’. What one hears is organised sound. But is it also *music* [my emphasis again]? According to Varèse, possibly not; according to Cage, absolutely. (Landy, 2006, p. 3)

Why the question of organised sound being music or not needs to be revisited today is unclear. Could it not be that both these arguments are true? A sound installation in a public space can be at

one time perceived as music, and at other times a non-musical sound composition. My background in cinema studies has long played a part in forming my own perception of sound installations, so that I perceive both musical and non-musical layers of sound at the same time, and I incorporate different sound layers for a possible perceptual movement between these two states of mind in my own practice. Neuhaus (2000) has commented upon the musical aspects within sound art, and he points towards the idea that anything that is hard to understand as being music is being labelled as sound art.

> When faced with musical conservatism at the beginning of the last century, the composer Edgard Varèse responded by proposing to broaden the definition of music to include all organised [*sic*] sound. John Cage went further and included silence. Now even in the aftermath of the timid 'forever Mozart decades' in music, our response surely cannot be to put our heads in the sand and call what is essentially new music something else – 'Sound Art'. (Neuhaus, 2000, p. 1)

Here one thing is clear. There is a strong link between the works of Edgard Varèse and John Cage in the 1950´s with contemporary sound art, but also a misconception in that the link automatically creates the perception of all sound art as being music, or that music should be the primary focus when talking about sound art. As Kahn (1999) shows below, there is a heritage involved from the modernist period where music served as a vehicle for understanding art as an autonomous expression:

> Another reason that music was not compelled to radicalise [*sic*] its representational means relative to the other arts was the privileged position that music itself held among the arts. Music was valued as a

> model for modernist ambitions toward self-containment, self-reflexivity, and unmediated communication. Its abstracted character was thought to have already achieved what the other arts were attempting. (Kahn, 1999, p. 105.)

Since works of sound art can be perceived as containing the same sort of sounds and compositional structures that was used by the modernist composers, it is easy to make the assumption that sound art is a natural development of modernist ideas and composing strategies, and that sound art in general is predicated upon the creation of autonomous work of art, with no connection to the outside world. The origin of the debates about self-contained sound works can be traced to the work done by *Groupe de Recherche de Musique Concrète* (GRMC) that was formed by composers Pierre Schaeffer and Pierre Henry together with engineer Jacques Poullin in 1951. As Gayou (2007) shows, Schaeffer predicted how the new sound works that Schaeffer wanted to belong to the field of music, should be understood.

> For Schaeffer, the creation of the Groupe de Researches de Musique Concrète in1951 meant the coming of autonomy of musique concrète within the frame of radiophonic art, of which he announced would come to its end given the rise of television. (Gayou, 2007, p. 206)

In 1957 Pierre Schaeffer felt that his original idea was not present in GRMC, and that the research did not contain his ideas. As Gayou (2007) discuss the creation of the new organisation called *Groupe de Recherches Musicales* (GRM) that Pierre Schaeffer became the director in 1958 for was partly based upon a growing jealousy from Schaeffer upon the success of composer Pierre Henry and Philippe Arthuys. Schaeffer also felt that the GRMC was more about composing avant-garde music than doing research about the

perception of sounds and how they functioned as building blocks of the new music he was aiming for.

The basis for incorporating sound that could be understood as containing an encoded meaning and a relation to the external world, and thus that had to be changed before they could be used within a musical context because of this encoding, was born within the realm of GRM. GRM's members, as discussed by Daniel Teruggi (2007), current director of GRM since 1997, recognised dislocated sounds musical potential.

> …the need for tools that will permit sound manipulation and modification, which the objective of producing sounds that will be perceived primarily as forms and structure and less as anecdotes or language references. Instrumental sounds can be combined; however, *concrète* sounds have to be modelled before being combined. (Teruggi, 2007, p. 214)

Teruggi argues that the work within GRM from 1958 and onwards was an attempt for the composers within the group to use encoded dislocated sounds, then forcing them to fit within a musical context in order to achieve reduced listening, within an acousmatic environment. A listening to the early work by composer and theorist Pierre Schaeffer such as *Etude aux Chemins de Fer* (Schaeffer, 2000) from 1948 makes it hard to understand how this piece could be considered self-contained. The clear references to trains and the sounds they produce, opens up a lot of imagined places and memories in a listener, due to the fact that the sounds, albeit being cut up, and looped, bring with them encoded material that together forms a syntactic whole that needs to be decoded.

> *Musique concrète* gradually evolved from an art of making music to an art of listening to sounds. At a time when the whole world can be destroyed by the pressing of a button, everyday things are as important

> as ‘works of art’. To unveil the sound organization of sonic *objets trouvés* is to turn listening into an Art. To be able to listen to any sound whatsoever for the sake of the analogic, causal and conventional relations this sound engenders, and to be able to switch — anarchically? — from one relationship to another, is an exercise that prepares one not only for creating new musics but also for making the experience of sounds, images and life in unexpected and more meaningful ways. (Palombini, 2001)

Douglas Kahn (2006) finds the term ‘sound art’ deeply problematic, since he thinks the term reduces the understanding of artwork using sound and makes such understanding a much too simple affair with regards to perception:

> Most artists using sound use many other materials, phenomena, conceptual and sensory modes as well, even when there is only sound. In this respect alone, sound tends to narrow down the sphere of understanding rather than suggest that there is in fact a more comprehensive approach being enacted. Instead, art not using sound should be called deaf art, silent art, mute art or, worst of all, mime art (the art of mimes harassing the public). (Kahn, 2006, p. 2)

Kahn’s (2006) comments show that the use of sound often includes a discussion about sound’s value and incorporation within other art-forms, which underlines the fact that sound can be used to expand the experience in terms of emotional response and complex perceptual involvement on the part of a listener. D'Escriva (2007) suggest that incorporation of music as just one component in making sound compositions makes musical and non-musical sounds equal in terms of ranking them as expressive tools for composing with sounds.

> Rather than proclaiming, as Fischinger, Cage and Varèse did, that all sounds are or can be music, the new school of thought should be that music is another component of sound composition. Young sound artists working for visual media are equally at ease nowadays with slicing music loops as layering the sounds of explosions onto a soundscape, all the while syncing to picture. (D'Escrivian, 2007, p. 71)

As D'Escriva (2007) makes clear, there is no need today to make the distinction between musical sounds or non-musical sounds. The work by younger artists combining visuals and different kinds of soundscapes does not contain the validation of the two kinds of sounds. They are treated with the same notion of belonging to a soundscape, and that is all that matters. D'Escriva (2009) also discusses the work undertaken by sound designers working in film, and how their work transcends the barrier between music and sound.

> Music has gradually been subsumed into the soundtrack as another element of the film sound world and sound design is often on an equal footing with it. Sound designers are increasingly entrusted with complex non-diegetic tasks that were formerly only performed by film music, thus exploring the more psychological dimensions of sound. A fair evaluation of the work of sound artists in film is still largely virgin territory, especially regarding its differentiation from musical practice. (D'Escriva, 2009, p. 72)

D'Escriva shows that in film the distinction between music and non-musical sounds is not a clear one, and that both types of sounds are treated as being carriers of elements that have an effect upon the listener that can be evaluated from a psychological perspective. The impact upon the listening process in film is exemplified here by

Whittington (2007) who discusses the ways by which sound in cinema changed the relationship between the image and sound in film. ‘By adding a spatial component to design, film sound challenged the traditional image sound hierarchy.’ (Whittington, 2007, p. 125). As Whittington (2007) suggests, there used to be a hierarchy where the image was king. Today this hegemony has been challenged due to the development in cinema sound, in terms not only of volume and frequency dynamics achievable by contemporary recording equipment and playback technology, but also of the ways in which sound can fill and move around within a cinema theatre.

> The symbiosis reconfigured the cinematic experience through aggressively creative and conceptual aesthetic application. The compact layers of the sound track were no longer confined to mono presentation, but rather are deployed as sound fields within the theatre environment— left, centre, right, and surround. The combination of technology and genre formulated the film experience into spectacle by offering sonic movement, localisation [*sic*], separation, and new relations between filmgoers and the film’s diegesis.’ (Whittington, 2007, p.125)

It may seem that cinema is a different kind of expression from sound art, but since much of the work, like this PhD project, is based upon the reflection of our everyday sound experience, it is important to remember that technological developments in sound distribution, especially in film sound and spatial distribution in the cinema theatre, do play a large role in forming our memory and knowledge and understanding of sound. Since I have a theoretical background that is grounded in cinema studies, the practice for this PhD project is based upon the perception of sound in the cinema theatre. The field of audition that makes up for the perceptual framework in the placement of speakers in a cinema theatre, aims at constraining the

movement of an audience, at the same time as the sound material in films can urge for action taken by a listener.

Chris Cutler (2000) has argued that technology changes not only the perception of a listener, but also that technology is changing the art music paradigm as a whole:

> On the one hand it offers control of musical parameters beyond even the wildest dreams of the most radical mid-twentieth century composer; on the other it terminally threatens the deepest roots of the inherited art music paradigm, replacing notation with the direct transcription of performances and rendering the clear distinction between performance and composition null. (Cutler, 2000, p. 89)

Thus, the replacement of notation and the removal of any borders between performance and composition have a significant effect upon the work being produced. Cutler's (2000) comments can be seen as reflecting the effect of work done by GRM in order to incorporate recorded sound directly onto tape, and even though group members wanted to place their work within the music paradigm, their ideals continue today within the realm of sound art, where barriers between different types of expressions as well as compositional techniques are blurred.

Brandon LaBelle (2006) has approached sound art from the perspective that the organisation of sound is made through musical understanding: that is to say, the material is not to be heard as randomly thrown together sounds, but it follows an intentional structure. LaBelle's (2006) emphasis on the musical understanding should be seen here from the perspective of a listener rather than that of a composer. In his introduction to his book *Background noise perspectives on sound art* (2006) LaBelle presents the performance *Dancing in Peckham* by conceptual artist Gillian Wearing (1994) as an example of perception based on the oscillating between the self

and the world outside oneself; in LaBelle's presentation, Wearing's (1994) performance constitutes a base for further understanding and exploration of sound art as an oscillation between different modes of perception.

LaBelle (2006) defines this oscillation between different modes of perception as: 'making apparent the negotiations of inner and outer, as intensities of dialogue, or abrasions and marks left to be read through fantasies of possibility.' (LaBelle 2006, Introduction). LaBelle (2006) makes it clear that this oscillation between modes of perception leaves a listener with several possible ways of understanding a sound installation. In LaBelle's (2006) writing a holistic approach is apparent where there is no apparent single route to understanding a sound art installation, but rather, a fluctuation between different states of mind; thus, for LaBelle, the perception of sound art installations is a combination of several perceptual building blocks, and not only based on hearing and listening alone, 'for listening may gather in the total situation of not only sound but its context, synthesising all this into an aesthetic project.' (LaBelle, 2006, p. 13)

LaBelle (2006) aims to understand sound in sound art installation, not as single units ready to be analysed but as something broader that must be apperceive as a whole. A syntactic pattern is then perceived directly, rather than a semantically approach where small parts are analysed in order to understand the greater whole.

> The art object, like the musical composition, is not so much a series of signs in need of interpretation but an organised event that aims to open out on to the field of meaning by inviting speculation, curiosity of perception, and the simplicity of ordinary materials to carry the imagination. (LaBelle, 2006, p. 59)

In Labelle's (2006) writing he expresses what he thinks is the interesting use of sounds in sound art installations. Labelle

describes how dislocated sounds play with our pre-knowledge and experience of sounds, and how the action we make in everyday life, affects our behaviour and perception when entering a sound installation.

The experience of a listener when entering a sound installation is a complex experience, since the variation of different listener's background and his/hers everyday sound experience can vary. As Barry Truax shows, our experience of everyday sound environments, or 'soundscapes' as Truax describes them, is based on man-made environments, where a lot of sounds are included that are the result of human interaction and creation.

> Electroacoustic music analysis as informed by soundscape concepts would seem to apply best to works that range from 'realistic' to 'abstracted', and less so for works that tend towards abstraction either in sound or syntax. However, even with more abstract works where sounds have little resemblance to the real world or to its syntactical structures, those works may still be listened to 'as if' they were soundscapes, i.e. at the level of metaphor. Also keep in mind that the soundscape of the real world is not static and that it increasingly includes electronic additions (both as sounds and gestures) that listeners become familiar with in everyday life. (Truax, 2008, p. 106)

Truax (2008) reminds us that the real world is now a non-static sound experience, where even manufactured electronic sounds have become part of everyday life, and that this sonic leaching creates a blurring of borders between what can be defined as realistic sounds and abstract sounds. An exposure to 'electronic additions' as Truax calls them, builds our understanding of the sound environment we encounter on a daily basis.

Freed from the orchestra as the dominant means of producing and projecting music into space, the ‘orchestra of speakers’ became an increasingly important feature within *musique concrète* in the middle of the last century. It also freed the listener to form his/her own perception of the piece irrespective of the composer’s intention, as Wishart confirms:

> It is therefore easy to dismiss it by linking it with somewhat cruder and cultural circumscribed procedures of associationism (programme music) and mimicry which exist as a somewhat marginal aspect of the central vocal and instrumental tradition of Western art music. This, however, would be foolish. Not only does the control and composition of landscape open up large new areas of artistic exploration and expression, in the sphere of electroacoustic music it will enter the listener’s perception of a work regardless of the composer’s indifference to it. (Wishart, 1996, p. 136)

For Wishart, then, the perception of a piece of electroacoustic music can contain information that a perceiver may listen to regardless if this was the intention of the composer. Working with an electroacoustic composition, using sound material that is either abstract or concrete presents the opportunity for a listener to perceive it as music or a non-musical sound composition, and a collection of sounds that has unforeseeable references for the listener on a personal level.

When entering a sound installation our perception acts in the manner, in which it should act in our everyday life, but we are not fully trained at using our spatial ability and recognising acoustic cues because, in our daily, mundane interactions with such sounds, we simply ‘shut off’ our listening. Therefore, as Dyrssen (2007)

suggests below, we cannot understand sound art as being more complex than sounds in a box:

> Sound art today seems to continue to live with the preconception of the autonomous object placed within an enclosed space. Works are placed in spaces as if they were isolated from each other and cut off from all other contexts. We neglect the spatial-temporal preconditions of the room – the acoustics, the physical restrictions, the interaction between the visual and acoustical dimensions, the narrative codes, and finely tuned social rules regulating the place in question, the situation. (Dyrssen, 2007, p. 26)

The 'situation', that Dyrssen (2007) describes as the spatial-temporal conditions that are being neglected in the understanding of sound art, is further discussed by Bayle (2007) as a difference between 'internal space' and 'external space', where external space is similar to Dryssen's (2007) 'situation', - a locus where uncontrollable, unpredictable side effects occur that are not part of the internal space of the work itself:

> The 'internal space' is formed within the work itself, made of reflections of the sonic contours, of the movement of entities, presenting [*sic*] itself to the hearing as a sensation of composed volume. To this we contrast 'external space', with completely different effects, no longer concerned with the work but with the configuration of the space wherein it is heard, with its particular peculiarities (often undesirable or from time to time exploited). (Bayle, 2007, p. 243)

As presented earlier in chapter 1., there is a tendency to define the sound material within sound art as either belonging to musical or non-musical sounds. Perhaps this is rather futile. A much more suitable approach would be to incorporate all possible listening

modes before deciding if and what kind of listening mode is dominant within a constructed sound environment.

As early as 1913 painter and composer Luigi Russolo in his manifesto, *the art of noises*, suggested a new kind of music based on the impression of a new futuristic world containing new and exciting sounds. Russolo classified sounds by their sonic characteristics, and not by where they came from. This classification is important since it is the first example of separating sounds due to how they are perceived in themselves, rather than perceiving the source from whence they come, and thus creating a taxonomy where a clear separation between the different perceptual appearances are apparent. As Lomarbdi (2006) claims, this formalisation of sounds or as Luigi Russolo (1913) suggested, noises, creates the premises to organise sounds into a composition. Without the formalisation and classification towards taxonomy of sounds, the actual organisation is not possible.

> Russolo had conceived of a new, 'Futurist' world of sound bound to the utopia of the metropolis and the new acoustic reality created by the process of urbanisation, which inspired him to imagine a music constructed from everyday sounds, all the possible types of noise that could be formalised in a compositional structure. (Lombardi, 2006, p. 4)

As Lombardi (2006) further suggests, there lies within Russolo's (1913) thoughts a possibility to organise even the most disparate sounds within the new-found possibilities that Russolo's taxonomy created: 'It was a music with a solid foundation, exalted by the concept of controlling and combining the most improbable and disparate sources of sound.' (Lombardi, 2006, p. 4). The valid outcome of Russolo's (1913) work was also the advent of possible control over the sounds desired for a musical composition. The control of sound was the goal for composer Edgard Varèse who, as

early as 1938, was arguing for the development of musical instruments that could be built and realised for his ideas about a new music. His ideas began to be realised more fully after his death, and now, of course, his vision is part of everyday soundscape.

In 1958 Varèse realised his new musical ideas in the Philips studio and later in the same year his piece, *Poème Electronique*, was played over 425 speakers within the Philips Pavilion at the Brussels world fair.

The control of sounds that Russolo envisaged was different from the approach that composer John Cage chose in working with sound. Cage included the term ‘experimental’ in his writing and in commenting upon his own work, and he explicitly avoided rules or a pre-defined taxonomy of sound for composing. Cage used the notion of experiment both as a practice method, in exploring various compositional techniques, and as a theoretical, analytical tool. The input of Cage in the 1950s shows that, although there was a climate amongst composers contemporary with him to embrace modernist ideas, there also existed tendencies to work in an almost postmodern, fragmented approach in terms of sounds being used. Cage mentioned in an address to the convention of the Musical Teachers National Association in Chicago 1957, (2006) that by the time of his lecture he had rejected the term ‘experimental’ in favour of being a listener.

> Now, on the other hand, times have changed; music has changed; and I no longer object to the word ‘experimental'. I use it in fact to describe all the music that especially interests me and to which I am devoted, whether someone else wrote it or I myself did. What happened is that I have become a listener and the music has become something to hear. (Cage, 2006, p. 7)

Hence, by this time, Cage (2006) had shifted the ‘experimental’ emphasis from the composer to the listener, and for the composer himself to listen to what has been made and start thinking about defining different listening strategies, and how the sound material at hand informs these strategies. Cage realised that sounds could either be informing the listener of where they came from and their original settings, or they could be used as building material being moulded by a composer to fit his/her style of expression, as Cage (Cage 2006, p. 83) exemplified by commenting upon Edgard Varèse’s composition *Déserts* (Varèse, 1954), ‘for in *Déserts* [Varèse] attempts to make tape sound like the orchestra and vice versa, showing again a lack of interest in the natural differences of sounds, preferring o give them all his unifying signature.’ (Cage, 2006, p. 83). Cage’s comment can be read as critique of Varèse’s unwillingness to recognise sounds inherit quality that could have lead to an exploration into intrinsic and extrinsic relationships of sounds in Varèse’s work, but Cage also shows that as early as 1954 composers could mould their sound, regardless of the sound’s original source, into something new that fitted his/her style of expression. In my own work I often find myself in a conflicting situation where a decision to mould a sound to fit my taste and style may destroy the inherent message of the sound.

Cage’s experiment with new technology was predecessor to the process GRM started in the 50s, in regards to using technology for the purpose of recording and composing with sound directly onto a medium. ‘It was the experiments of the late ’20s and early ’30s, and arguably, the feedback between film and radio sound techniques that would set the scene for Schaeffer’s early work. In fact, why did Cage not mention the radio in his Credo?” (D'Escriva, Imaginary listening, 2007, p. 5)

D'Escriva (2007) shows Cage was not interested in including live performance into his techniques, and that radio at this time was a medium primarily made for live performances.

> This merits a moment of reflection. Was it because radio was, at the time, mainly a live performance medium? His eventual interest in radio was more as a sound source, as exemplified in Imaginary Landscape no.4 (1939), than a means for diffusing works, perhaps with the later exception of the 1982 radio play "Marcel Duchamp, James Joyce, Erik Satie: An Alphabet". (D'Escriva, Imaginary listening, 2007, p. 5)

D'Escriva points to the fact that John Cage used film in order to capture and experiment with sound, since the medium of film offered the possibility to work with the sort of varied palette of sounds that we are used to working with today, using computers and software. Later, in the 1960s, Swedish pioneer in electroacoustic music Rune Lindblad (Lindblad, 1991) worked in a more direct manner with film as he used to paint graphical structures directly on the optical track on a filmstrip, in order to create sounds of an electronic nature, which can be heard on his piece, optica 2, from 1960. (Lindblad, 1991)

> I would argue that Cage was attracted to film because it was a recording medium. It promised to summon an infinite variety of sounds that could be registered on its magnetic tape format, and it was more developed than reel to reel machines of the time (the earliest being available since the beginning of the 30s). Although constrained to work for visuals, film sound promised to liberate the imagination. (D'Escriva, 2007, p. 5)

D'Escriva's (2007) argument that Cage was attracted to film due to it being a recording medium is interesting, since film as a medium has undergone a dramatic change in sound recording and playback fidelity over the last forty years. An increasing dynamic range in terms of frequency and volume means that we can reproduce reality in a more accurate way as well as exaggerate reality if we so wish.

> He described music as an ‘ideal malleable matter’ and explored the idea that its passage from the realm of the senses to that of the emotions in the perception of sound reappears, mirrorfashion, in the association that sound forms with image. (Gayou, 2007, p. 206)

Gayou points towards the idea Cage had about the shifting from the senses to the emotions in regards to sound perception, and by doing that links Cage with Gibson’s idea that perception is not based upon our senses, but what kind of action we take in regards to our emotional response (Gibson J. J., 1986). As discussed earlier Cage moved from an experimental compositional phase to that of a listener, and in this process he addressed his own action taken towards the sounds he was using in his work. This action taken upon sound perception by Cage mirrors Gibson´s ecological approach to perception that involves action taken by humans as we encounter a sound environment and is further discussed in section 1.5.4.

If John Cage’s approach towards composing has influenced possible ways of understanding the organisation of sounds as music, there is also the possibility as Droumeva (2005) shows, that we forget our relationship with everyday listening and that there is now a possibility to include everyday listening together with the musical aspect of understanding organisation of sounds. Cage’s work came at a time where modernism was at its height. But in combination with the work undertaken by Pierre Schaffer and Pierre Henry at GRMC in the ’50s, Cage’s influence meant that there were several composers moving away from modernism and its rules. Attinello is particularly useful here:

> Cage’s influence, especially around his 1958 Darmstadt lectures, would seem to be part of the instigation of this anti-serialist move, but it is evident that his style and ideas were not simply duplicated by

> his European colleagues. Starting around the time of Cage's visit in 1958, Schnebel, Kagel and Bussotti, among others, wrote compositions that can be seen to represent attacks on serialism and even on modernism itself. (Attinello, 2007, p. 31)

Cage influence can be said to linger on today within the field of acousmatic music, where the idea of dislocated or disembodied sounds is often used as a method of enhancing the listening experience. Although the listening experience can be perceived as being rewarding in regards to the listeners ability to recognise certain sounds from his/hers everyday sound experience, there is a problematic side-effect of ignoring completely the abstract qualities of sounds in a acousmatic composing tradition, as McKinnin (2007) suggests:

> This pushes acousmatics towards adopting an aesthetic of referentiality, partly because it is a more cognitively 'natural' option than is abstraction, partly because it is hermeneutically richer than the facile fact that technology is the actual referent in much acousmatic music, and because culturally it offers access to a tradition, a history, in the form of realism. (McKinnon, 2007, p. 4)

McKinnon (2007) claims that realism offers a much 'safer' option than going down the abstract route, at least from a listeners perspective since his/her background can contribute to the understanding as well as the appreciation of an acousmatic piece. To include both abstract sound elements and the notion about sound being realistic, in an acousmatic composition is however possible. The field of sound art and acousmatic composition could be connected to the German school of Klang Kunst in a more adoptable way since abstract sounds/musical elements as well as realistic sound elements could be part in one sound environment.

‘Cage’s multimedia performances not only allow but require the mobility of the audience witnessing simultaneous performances of independent musical, theatrical, and visual works.’ (Trochimczyk, 2001, p. 50). To be able to control the mobility of an audience due to the nature of an artwork would be to understand fully what is being afforded in an artwork. In a constructed sound environment it would mean that the sounds together with the surrounding space would create a listening mode that requires the listener to move. As the sound is heard throughout the movement of body and head there are several things that a listener takes into account as Kim shows below.

> My imagining is inevitable, and in fact, the piece encourages it and the sound-images that result. Yet the experience is disconcerting, for while I know that, in listening to the work, I both perceive and imagine, it is difficult to determine where my perceiving of the piece ends and my imagining of it begins; I move between the two domains freely and immediately.(Kim, 2010, p. 48)

According to Kim (Kim 2010), a listener can reduce his/hers listening down to what Denis Smalley described in 1986 (Smalley, 1986) as ‘spectromorphological aspects’ alone: that is, listening to the mechanics and logistics of how a sound during its progress shifts in frequencies and transforms from one timbre to another.

> As the composer manipulates certain sounds, or injects new ones, the collection signifying place is changed and distorted, leaving listeners reconsidering what they hear. Interestingly, listeners, once in doubt as to the identity of a sound or a collection of sounds, often shift their attention to its more spectromorphological aspects, in part because they want to discover more about what they are hearing,

> but also, and more importantly, because the piece encourages them to do so. (Kim, 2010, p. 44)

Kim's comment (Kim 2010) is particularly germane to my own experience, in that it has helped me recognise how I shift my attention as I record and compose with sounds. At any point in time as composer or listener, the most interesting aspect of a sound can reside in what it says about the place it comes from or what it means semantically to me, and this interest can fluctuate rapidly and unpredictably for me as a listener just as it can be exploited by me as a composer. Therefore it is important as a composer/listener to investigate the relationship between everyday listening and listening to a sound art installation.

1.5.2 Sound art and everyday listening

As music is part of our everyday soundscape in the form of music in shops, pubs and in our homes, it is not a stretch to suggest that in a constructed sound environment there must be a perceptual basis where music has been relegated in status to that of merely one sound element among many, and no longer in its privileged position at the top of a hierarchical sound structure. Musical elements can be part of the overall perception of a constructed environment or be perceived a separated from the 'realistic sounds' within a constructed sound environment, since as Chion (Chion, 2007) suggests below, we have grown accustomed to superimposed sound structures in our everyday life.

> Everything today tends on the contrary to separate the sounds from one another: their dispersion across several tracks, their precision, the difference in contrast and the gulfs of silence between them, etc. Apart from that, we no longer believe in a rhythmic unity of creation. We live in a world in which the rhythms overlay one another without blending, in the same way that music heard on a car stereo is superimposed on the rhythms of the passing world but does not become confounded with it. (Chion, 2007, p. 153)

As Barry Truax (2008) has noticed in recent work, the sound environment in everyday life has changed from when he started his research into noise pollution in the 70's. Truax has noticed that there is a shift in understanding different environments, from being discrete and distinct from one another, to becoming a mix of several environments at once, where reality and virtual-reality no longer are separated but merged in everyday life.

> Today, such 'aberration' is increasingly the norm. I have described one aspect of this trend as the creation

> of surrogate environments through the use of background music, radio, television and recordings. Foreground information comes as often as not from national and international media sources, rather than from one's neighbourhood, perhaps even more readily in most cases. So-called 'virtual reality' is increasingly becoming an aspect of 'normal reality' and one wonders whether the younger generation is capable of distinguishing the difference, or even if they care to. (Truax, 2008, p. 104)

Truax's passage above is reminiscent of Murray R. Schafer's term schizophonia (Schafer, The soundscape: our sonic environment and the tuning of the world, 1977,1994) that Schafer coined to describe similar conditions in the 70´s sound environments to what Truax describes when he discusses 'aberration' in today's sound environments.

> I coined the word schizophonia in *The new soundscape* intending it to be a nervous word. Related to schizophrenia, I wanted it to convey the same sense of aberration and drama. Indeed, the overkill of hifi- (Schafer, The new soundscape: a handbook for the modern music teatcher, 1974)gadgetry not only contributes generously to the lo-fi problem, but it creates a synthetic soundscape in which natural sounds are becoming increasingly un-natural while machine made substitutes are providing the operative signals directing modern life. (Schafer, The soundscape: our sonic environment and the tuning of the world, 1977,1994, p. 91)

In Schafer's use of the word schizophonia there is still an oscillation between the natural soundscape and the synthetic soundscape,

whereas Truax use aberration to describe a sound environment that has been overtaken by a ‘virtual reality’ that forms a global understanding of sound environments. As Barry Truax (2008) discuss in analysing his own work the simulated soundscape he created contains a global understanding based upon shared sound experiences around our world.

> Moreover, through listening to a simulated soundscape in this manner, the listener may perceive it differently in the real world when it is next encountered. By combining a very specific environment with an experience analogously shared by many people in industrialised countries, this piece shows the unique blend of local and global that soundscape composition can achieve. It also shows that soundscape composition can deal with urban soundscapes and the totality of soundscape experience, not just natural soundscapes. (Truax, 2008, p.105)

Murray S. Schafer (1977,1994) also has an interest in the taxonomy of soundscapes, defining two basic types: hi-fi and lo-fi. He defines hi-fi as ‘one possessing a favourable signal-to-noise ratio. The hi-fi soundscape is one in which discrete sounds can be heard clearly because of the low ambient noise level.’ (Schafer, 1977, 1994, p. 43). This statement by Schafer is to be understood in the context of this thesis as what we might call the ‘best’ way to hear and perceive sounds, due to the clarity of sounds being heard in an environment. Schafer gives as an example the countryside, that he feel is one of the places where the hi-fi soundscape is present, but Schafer mentions that even a large city (Paris in his example) can posses a hi-fi soundscape in the evening when the ambient noise level becomes weaker (Schafer, 1977,1994, p. 61). As I understand Schafer, the importance of hi-fi listening resides in certain acoustic conditions, such as low level ambience noise, which in combination with the clarity of spatially located sounds creates an environment

where humans are fully tuned towards a natural listening condition. The clear perception of distance between a perceiver and the sound objects available in any given hi-fi environment is then optimal in a natural listening condition. It is easy to perceive all single sounds being apparent in a sound environment.

In addition to places where clear or unclear distribution of spatial sounds, such as cities, country side or nature, the impact of mediated sound environments cannot be ignored. For the most part people today spend a lot of time listening to environments where sound is being reproduced using digital equipment, speakers and headphones. People listen to music on their mp3 players or mobile phones. People interact with their computers and game consoles and in doing so they experience constructed sound environments. In cinema the greatest technological progress has been the development of surround sound, and the added dynamic range in frequency reproduction due to recording equipment and speakers. The reference to our daily sound experience today includes constructed mediated sound environments such as the cinema where the spatial distribution of sound element is used in an enhancing way. This is exemplified by the remark by Douglas Kahn (1997) in his take on John Cage's famous dictum, 'let sounds be themselves':

> I take his slogan to *let sounds be themselves* very literally; I merely refuse to accept how Cage reduces sounds to conform to his idea of selfhood. When he hears individual affect or social situation as a simplification, I hear their complexity. When he hears music everywhere, other phenomena go unheard. When he celebrates noise, he also promulgates noise abatement. When he speaks of silence, he also speaks of silencing. (Kahn, 1997, p. 557)

Kahn's (1997) reflection underlines the paradoxical complexity of listening and the unpredictability of what an individual person chooses to listen to depend on his/hers background, musical training and social/cultural experiences.

Ambrose Field (2000) discuss in *Music, Electronic Media and Culture* the task of representing reality and how the reality is included in the use of sounds by electroacoustic composers.

> Today, many electroacoustic composers use sounds recorded from the real world as the raw materials for their pieces exploiting some of the undefined and ambiguous characteristics that these sounds often exhibit. Electroacoustic music is uniquely powerful in this respect – reality can be directly alluded to, represented or subverted by the composer. The representation of reality is now a compositional parameter that can be found at the heart of many contemporary electroacoustic approaches, be they acousmatic, soundscape/ecological, or even *musique concrète*. There is no longer any need for composers or listeners to ignore the extramusical connotations of electroacoustic sounds. (Field, 2000, p. 37)

The 'representation of reality' that Field (2000) advocates is not an easy task to undertake. The question being asked is one of ascertaining what 'reality' means today, and especially of unravelling the mechanisms by which a listener determines the extent to which some sounds are a reflection of a reality. As Hellström (2006) has discussed, the mediated world we live in today offers a reality for many people in the form of merging sound environments, and it seems impossible to say what makes for a generic sonic 'reality' upon which we all can agree. The aspect of reality is also a changing one due to the ever changing sound environments that develop around us on a daily basis, which is

exemplified by Harley's (2008) analysis of John Cage's (1953) work *Williams Mix.* Although Harley argues that *Williams Mix* is far from resembling any natural soundscapes we encounter on a daily basis, the question I ask is; are we not hearing as complex natural soundscapes as this piece offers in for example large metropolises were a blending of different sound layers is heard? The abrupt start and ending in *Williams Mix* is what makes this piece seem so dense, and the feeling of cut-outs from tapes makes the collage, the compositional technique apparent to a listener. This is what makes the Williams Mix seem un-natural, and not merely the number and density of sounds present simultaneously:

> Perhaps most (in) famously, John Cage utilises [*sic*] short fragments of real-world recordings to create an extremely dense sonic collage in his Williams Mix (1953). In this piece, the overwhelming rate and degree of sonic information (heard in random order on eight tracks) presented to the listener takes this work a great distance from even the most complex natural soundscape. (Harley, 2008, p. 1)

The difference between Cage's approach towards using sound and Varèse's approach is further discussed by Demers (2009) as he compares the effect of using silence in the works of Cage, in the works by Chartier and Cascone: 'Chartier's (Andersson, 2008) silence is not the same as the pregnant silences in Cage's music, full of ambient, neglected sound, but is rather completely blank, empty space. Cascone views microsound processes as methods of 'deferring' or deflecting meaning." (Demers, 2009, p 44)

Total silence is something unnatural in everyday life. A 'blank empty space', as Demers describes Chartier's silence, is never obtained other than in environments designed by humans with the help of technology, such as in the cinema theatre where a near-silent environment can be obtained. Silence can be very terrifying since

our brain has no way of understanding the surrounding world in terms of spatial sound markers. The terrifying effect of perceiving a relatively silent space can be obtained in the subdued rooms in cinema theatres and is often used in horror movies as a frightening element. An example of silence can be experienced in the movie *200*1 by Stanley Kubrick (Kubrick, 1968), where an astronaut is talking a space-walk, and where the only sounds that are heard are the sound of air rushing into his helmet and his own breathing. The almost complete silence around the astronaut makes us come closer to the astronaut and experience his loneliness. That is what I think silence does: it makes us focus upon ourselves since the distance between ourselves and other sound sources is lost.

> The public, and in many cases an interactive contact with the environmental surroundings. From a music-philosophic perspective, the genre is linked to John Cage's (1995) idea that sound and silence as material and indeterminacy as composition method, are to be regarded as equal with traditional materials and methods of composing, and in which all sounds are possible carrier of musical meaning. (Hellström, Nilsson, Becker, & Lundén, 2008, p. 2)

Hellström, Nilsson, Becker, and Lundén (2008) show here once more the heritage of John Cage, in the sense that we can always listen for a musical meaning regardless of the sounds we hear, and that there is no need to create an hierarchy in the classification of sounds. The problem lies in trying to *force* a musical understanding upon a perceiver as being the only solution capable of unlocking a sound's inner qualities. Droumeva (2005) points towards our ability to use certain modes of listening that help us mentally to process sounds:

> Before immersive audio, there is immersive sound. Before embedded auditory displays in surrogate

> environments, there are naturally embedded sounds in the acoustic environment … There are certain modes of listening that operate in a natural acoustic environment and provide us with information about our surroundings while we employ a complex set of skills to interpret these signals. (Droumeva, 2005, p. 1)

Much of the above discussion of sound art as a creative category has been the relationship between different approaches towards listening to a work of art. Developing the focus upon listening more explicitly, John Drever (2002) has approached the idea of working with sound from a soundscape study approach, where the interaction and dialogue between the work of art, the artist and subjects of the artists study is highlighted. Drever (2002) places himself within the field of ethnography, and his approach is to involve people living in the area that he investigates in the process of creating soundscape compositions. Drever's approach allow for a deeper connection with the soundscape that the inhabitants encounter on a daily basis, and the inhabitants own involvement enhance their understanding of the sound work being created.

> A contemporary ethnographic approach to soundscape composition may require that the composer displace authorship of the work, engaging in a collaborative process, facilitating the local inhabitants to speak for themselves in 'an interplay of voices, of positioned utterances'. The final work should be made available to those that it explores, and their responses should be acknowledged and heard, activating a dialogue rather than a one-way communication. (Drever, 2002, p. 25)

Sound recordist and composer Chris Watson uses layers of sounds based on his work of recording wildlife and sound environments over the world. He has an interest in finding the sounds we ignore or fail to hear in our everyday life, and thus his recordings contains

elements of surprise even though the single sound events are natural and untreated. Especially in Chris Watson's recording, (Gibson J. J., 1977)Weather Report (Watson, Weather report, 2003), the collage of sounds from different locations form both a recognisable sound environment and also a journey driven by narrative structures that enhance the listening experience due to an augmented experience of recorded reality. The narrative journey apparent in Chris Watson's Weather report (Watson, Weather report, 2003), seems to connect to our sound experience in everyday life, and as Chambers (2004) argues, the nomadic tendency in our contemporary society creates a global syntax where an understanding of sound environments are shared over the globe:

> As part of the equipment of modern nomadism it contributes to the prosthetic extension of mobile bodies caught up in a decentred diffusion of languages, experiences, identities, idiolects and histories that are distributed in a tendentially global syntax. (Chambers, 2004, p. 100)

This 'modern nomadism' has further implications for the relationship between personal experience and perception of sound, and patterns that a listener seeks in order to create and experience of sound that can be said the be shared by people in general.

Clearly, then, the very rebarbative fuzziness of everyday sound experience militates against watertight taxonomies of sound perception, as Forrester (2000) confirms:

> We only have to think of our everyday experience of sound to see why there are major difficulties in developing a psychological theory of sound imagery. Consider how we might explain our experience of sound and associated imagery processes when we are listening to music through headphones, particularly headphones where there is no experience of pressure

> on our ears. Although we know the source of the music is external to our bodies, our phenomenal experience is of music playing in our heads, sounds and images intermeshed with thoughts, reflections and associated responses to the music. (Forrester, 2000, p. 36.)

As Forrester shows, the inner and outer production of the sounds heard through a pair of headphones includes a multitude of responses to the music being heard. Either a listener is focused upon what is being heard on the headphones, or the listener perceiver the music and the surroundings outside the headphones as one sound environment. As this condition is common in our world today this forms an everyday experience of sound that plays a part when entering a constructed sound environment. The constructed sound environment does not have to be about inner and outer experiences since a listener probably is used to ignore these boundaries due to everyday experience of listening to music on a pair of headphones, where the surrounding sound environment leaks into the music and creates a soundscape based both on the music and the sounds from the surrounding environment:

> What is inside and what is outside becomes unclear, an observation which should remind us that to listen is not the same thing as to hear in a passive sense. We can then ask, how are we to conceive of sound as event? (Forrester, 2000, p. 36.)

As to the question of the extent to which a listener forms any meaning from everyday sound environments, Forrester directs the reader towards the way children learn language for evidence:

> We continue to find it difficult to remember that children learn language as accountable sound performance, and only later learn that these noises are described as words, sentences and all other such

> constructs which derive from the invention of writing.
> (Forrester, 2000. p. 40.)

The point here is that we all may be children in relationship to the noisy world we inhabit. We still do not possess the language needed fully to understand and explain what (and, indeed, how) sound means to us in our daily life, and yet we hear the world around us constantly, without reflection upon what is being communicated. A constructed sound environment creates an opportunity to hear sounds clearly since the distraction in the form overwhelming noises numbing our sense are not present. For the PhD project the constructed sound environments were made to enable an active listening where a listener could hear meaningful structures.

1.5.3 Changing environments and interaction with space

Space and spatiality are factors often mentioned and discussed in connection with sound art. In my use of speakers I have explored how the spatial distribution of sound together with space forms an environment were reflecting surfaces creates a wider field of listening than just the sound coming from a speaker.

Michel Chion has argued that, due to the nature of sounds and their potential for significant levels of modulation by the reflections and reverberation in the room in which they are experienced, any holistic theory of the epistemology of sound should consider explicitly what Chion terms ‘places of audition’ or ‘zones of audition’ (1994, p. 91). Sound art is concerned not merely with the type and nature of sounds presented and their belonging to either a non-musical or a musical paradigm, but also with the experience of the listener when projected sound is encountered in a particular environment. Sound art takes into account our cognitive patterns as well as our ability to take direct action based upon spatial localisation of reflective surfaces and objects in sound environments. The perception of a constructed sound environment is guided by bodily movement and positioning inside a space were sound is distributed, as Kendall confirms:

> The understanding we form of auditory events as events is forged in the multimodal, embodied experience of objects and actions. These events have a typical timescale conditioned by the acoustic behaviour of objects and the speed of physical movement. But just as we must continually make sense of bodily experience that extends beyond the timeframe of individual sensorimotor actions, so must we continually make sense of ongoing auditory experience. (Kendall, 2010, p. 68)

Composer Natasha Barrett (2007) has investigated the importance of the consideration of space for a contemporary composer, and her written thesis reflects on the reasons why space is so exciting for her; by doing so, Barrett relates to LaBelle's (2006) argument advocating the creative force in using dislocated found sounds:

> When our real-time visual perception is not part of the listening experience, the sound's visual source no longer serves as a spatial reference point. For the composer it provides the freedom to manipulate the location of the sound within a space, the space itself, and the relationships between objects and spaces. (Barrett, 2007, p. 31)

According to Barrett (2007) the re-construction of space functions together with memory, imagination and creativity. Barrett's comments about space show that there is a possibility that a distortion of what is perceived by a listener as being a 'real' sound environment might engage that listener more than an a attempt faithfully to create a reproduction of reality. As Norman (2000) has showed in her analysis of Paul Lansky's *Things she carried* (Lansky, 1997), the thing that 'lures us in' in a work of art is not the recognisable and familiar, but the unfamiliar and surprising that make a perceiver interested.

> Lansky's presentation of *trompe l'oreille* hearing (as opposed to *trompe l'oreille* things) is encouraged by its lack of '3-D' reality. Fixed spatial boundaries – and by implication a fixed flow of time – are the absent dimension. Just as in *trompe l'oeil* painting it is the obviously 'unreal' surface that provides the lure, here it is the removal of the real acoustic space and its replacement with something that doesn't 'make sense' in real terms that both 'spaces us out' and lures us in. (Norman, 2000, p. 221)

In my own practice I recognise the element of trying to ‘lure’ a listener into hearing sounds that ‘do not make sense’ as Norman (2000) puts it, in order to make the constructed sound environment more interesting, more compelling. Juxtaposition of sounds not normally heard together, or movements of sounds through space in an un-natural way, enhances the feel of a distorted reality. Even the usage of amplification of sounds, similar to that obtaining in Chris Watson’s recordings of insects and sound inside waves upon a beach that we cannot hear or ignore in our daily life, can bring forth a sense of unfamiliarity, and a sense of surprise. The amplification of faint sounds also disrupts our normal relationship to the spatial localisation of sound sources; and the form of what we might call ‘macro-sounds’ – only audible through the usage of microphones – gives rise to new spatial structures upon which a perceiver must act as part of the listening process.

Sound artist Robin Minard (1995) has recognised that spatial structures in a sound installation have a direct influence on the perception of the sound material. ‘The other important concept related to sound installation is that of a non-narrative musical expression. Guidelines within this mode of expression place emphasis on acoustic and psychoacoustic principles rather than on traditional musical concepts.’ (Minard, 1995, p. 75)

Minard is an example how a deliberate use of space for a sound installation for its very construct changes the emphasis on what is being perceived. The precise nature of the ways in which Minard (1995) *consciously* uses acoustic and psychoacoustic principles remains less clear, however, since a further deepening of the understanding of these fields is not present in his own writing. Minard continues: ‘Musical parameters such as register, timbre and rhythm take on new meanings as work is guided by the influence of sound elements on spatial perception rather than on the listener’s interpretation of a musical narrative or a particular musical syntax.’ (Minard, 1995, p. 75)

This statement by Minard (1995) indicates that the listener looses familiar interpretations and starts to listen to the installation's unique qualities with regards to spatial expression. Minard concludes: 'The overall approach to this non-narrative method of working with sound is founded on the basic notions that sound has a direct influence upon our perceptions of space and that we are integrally affected by the sounds which surround us.' (Minard, 1995, p. 75)

Minard's (1995) thinking about sound and spatial distribution leads to the conclusion that the sound environment created by the combination of space, speaker setup and sound distribution together forms a unique interpretation for each realisation of a sound installation. Schulz (2003) has commented upon the work of Robin Minard thus: 'To master the complexity of sound in space, Minard has limited himself to a few basic installation types which has [*sic*] resulted from his experiments with specific technical materials.' (Schulz, 2003. p. 32). This has given Minard the opportunity to use his work as a tool for comparing different location settings for his sound installations. 'Even with the same audio components and the same material structure, in varying contexts, the resulting works are different, because the basic musical materials are perceived differently in the context of different spaces.' (Schulz, 2003. p. 32).

The spatial element forms the context for a sound installation, and according to Ouzounian (2006) it is important to analyse the 'spatial form' of a sound in order fully to understand a sound installation.

> In contrast to traditional musical practices that emphasise [*sic*] temporal aspects of sound, sound installation highlights the relationship of sound to spatial forms, whether these are physical forms, social forms, imaginary spaces or otherwise. Sound installation thus necessitates analytical tools for

> dealing with sound that also deal primarily with spatial forms. (Ouzounian, 2006, p. 3)

Ouzounian's (2006) recognition of the temporal aspects of sounds links her to Cox (2009) as he tries to confine sound art within an acousmatic tradition. Cox (2009) argues that the distribution of sounds in an installation enhances the acousmatic listening conditions. 'Sound art, I have argued, turns fully toward this virtual dimension of sound and makes it the subject of its inquiry. As such, it broadens the domain of the audible and discloses a genuine metaphysics of sound.' (Cox, 2009).

Cox's (2009) and Minard's (Minard 1995) argumentation in my view could lead to the conclusion that each sound installation is autonomous, and that a perceiver is building a relation to every individual sound installation regardless of information in the sounds and narrative and musical structures created amongst them.

Blesser and Salter (2007) argue that the use of 'spatial differences' can help separate layers of sounds which otherwise could have been perceived as belonging to each other.

> Spatial differences between sound sources that result in temporal differences at the ears augment the aurally perceived segregation of musical elements. Like differences in time, pitch, timbre, and attack, differences in spatial location are yet another means to enhance this segregation. In other words, similar but not identical sounds belong to separate musical layers when they are also spatially separated. Disparate locations de-emphasise [*sic*] fusion. (Blesser & Salter, 2007, p 169.)

Using spatial separation in a sound installation as Blesser and Salter's (2007) argument, suggests, opens up a sound installation so that the sounds lose their connection to each other, and this

process creates zones of audio rather than one overall immersive field of audio. A composition made in a small confined space with several speakers, therefore, sounds radically different if the speaker channels are spread out and separated spatially with greater distance between them.

In *Spaces Speak, Are You Listening? : Experiencing Aural Architecture* (Blesser & Salter, 2007), Blesser and Salter develop an argument that our experience of architecture is actually linked to an auditory perspective. The authors claim that it is genetic inheritance that makes auditory perception of architecture possible; thus, the brain deals not only with direct sounds from a source, but also with the reflecting surfaces within an architectural space in order to form the overall auditory impression of a sonic phenomenon.

> Our auditory cortex converts these physical attributes into perceptual cues, which we then use to synthesise an experience of the external world. On the one hand, we can simply hear the echo as an additional sound (sonic perception) in the same way that we hear the original hand clap (sonic event). On the other hand, we can interpret the echo as a wall (passive acoustic object). The echo is the aural means by which we become aware of the wall and its properties, such as size, location, and surface materials. The wall becomes audible, or rather, the wall has an audible manifestation even though it is not itself the original source of sound energy. (Blesser & Salter, 2007 p. 2)

In my work as it has developed this aspect of Blesser and Salter's (2007) theory – the 'audibility of a wall' – has become more and more important: my initial impetus was – and still is – to explore and include the physical gallery room as part of the overall experience as an extension of the composition and construction of a sound environment. As Blesser & Salter (2007) remind us: 'The composite

of numerous surfaces, objects, and geometries in a complicated environment creates an aural architecture.' (Blesser & Salter, 2007, p.2)

The term 'aural architecture' here refers directly back to the collaboration between composer Iannis Xenakis, architect Le Corbusier and composer Edgard Varèse, and their work on the Philips Pavilion at the Brussels World's Fair in 1958. The work revolved around Varèse's musical piece *Poème Electronique* (Varèse, 1958), and functioned as the contextualisation of space in regards to musical structure together with the construct of architectural space. According to Mattis (Mattis, 2006) Xenakis and Le Corbusier worked on the architecture in order to make the architecture follow the hyper parabolic structures evident in the structure of Varèses music. The space incorporated the use of approximately 400 speakers that were triggered by relays in order to make the music travel around the Philips Pavilion in which the speakers were situated. As Mattis (Mattis, 2006) has showed people visiting the Philips Pavilion felt that they were immersed by the music and the sound space created by the speakers.

> I know from experience about the spectromorphologies created by frogs, rivers, cicadas, birds and cars, and how they behave, but it is not so much that they act in an already existing space. Rather, they produce space through their action. These spaces did not exist before the source-causes created them. Source-causes produce space. (Smalley, 2007, p. 38)

Smalley's (2007) comment upon space being created by sound causing object is interesting since it implies that sound perception rather then visual perception, is what truly creates a 3-dimensioal perception of the environment we live in. The sounds confirm that a listener is situated in a space that the listener can feel immersed in.

According to McGregor (2007), spatiality also plays a significant role in separating activities due to the function connected to different buildings and rooms.

> We expect different activities in domestic buildings to commercial buildings. This pattern is repeated within houses, where bathrooms are for one type of activity and kitchens for another, and on a larger scale in cities, in residential to industrial zoning. Activity becomes something that is spatially separated. (McGregor, 2007, p. 541)

McGregor's (2007) remark about activity is to be read as our ability to relate to specific spatially conditions, and has informed the practice of this PhD as the possibility to recognise several different spaces and places within my constructed sound environments, due to the fact that as a listener there is underlying patters that has been learned as to how separate different places and spaces, even if they are merged in one constructed sound environment.

Thus, as Lennox, Myatt, and Vaughan (1999) conclude: 'We have proposed true 3-D as a "space" which is not the classical physical space but an informational environment which we term *perceptual space*. In our auditory *perceptual space* we have a unique class of information about the "what" and 'where" which we call *ambient labelling* information. (Lennox, Myatt, & Vaughan, 1999 p. 8)

By making the above statement Lennox, Myatt and Vaughn (1999) avoid including geometrical space as the dominant idea in discussing the perception of space. Instead they focus upon the environment as a holder of information, and link the environment with Gibson's term, 'affordance', which will be discussed in section 1.5.4, below. By referring to 3-D space as being an 'informational environment' the authors unlock any preconceptions a listener might have when encountering a new environment. Analysing an environment from Lennox, Myatt, and Vaughan's (1999) perspective

enables the creation of a taxonomy of specific sounds, their meaning and value based, at least in part, on their spatial configuration in 3-D space. As Myatt has stated (Myatt, 1998) the geometrical system of Euclidian space cannot be used in the decoding of a sound environment, especially if the sound environment is augmented by complex and abstract sound trajectories.

> It seems quite likely that we do not have any perceptual mechanisms which enable us to hear very complex, abstract sound trajectories and certainly not if they are presented to us without context or frames-of-reference in the audio domain. This implies that it may not be appropriate to describe sound locations using a Euclidean geometric space if they are intended to be perceived by a system that cannot interpret the parameters of Euclidean space. (Myatt, 1998, p. 91)

This navigation of or our bodies is not solely a conscious decision, but also part of our genetic inheritance as noted by Blesser & Salter (2007):

> The native ability of human beings to sense space by listening is rarely recognised; indeed, some people think such an ability is unique to bats and dolphins. But sensing spatial attributes does not require special skills – all human beings do it: a rudimentary spatial ability is a hardwired part of our genetic inheritance. (Blesser & Salter, 2007, p. 1)

This ‘rudimentary spatial ability’ is not accessible at all times in our contemporary world, however. Noise pollution in our daily environment interferes with our spatial ability and we lose our sense of space. It is therefore important to recognise that a constructed sound environment such as a sound installation can provide the perfect listening conditions, not only to hear sounds clearly, but to

be able to make the sounds work to the benefit of spatial ability. The spatial ability is linked with the learned patterns each ecological niche provides.

> Learning to interpret physical clues left by an animal is similar to learning to aurally visualise [*sic*] a space by listening to auditory cues. The method for learning both tasks, repeatedly studying numerous examples, is similar. Had you grown up in an aural 'tribe,' you would have become an expert at recognising [*sic*] acoustic cues, and interpreting their relationship to those spatial 'animals' that created them. As an adolescent eager to learn new skills from aural 'elders,' you would have been taken through thousands of spaces in the 'forest' of soundscape niches. Many years of such training would have refined your auditory spatial awareness to a high art form. Because each ecological niche offers unique patterns, your ability to learn to recognise [*sic*] those important patterns would have contributed to your survival and to your tribe's survival. (Blesser & Salter, 2007, p 320)

Although we can survive in the world today even if our learned patterns are endure interference from sound pollution, there is however a disruption occurring when our ears are bombarded with noises at an unbearable level. The recognisable acoustic cues Blesser & Salter (2007) refer to above are not present in many of our everyday sound environments, but in a *constructed* sound environment these acoustic cues can be augmented and our perceptual system be (re-)trained to function more naturally and more fully than is possible in our daily life.

1.5.4 Ecological approach: towards constructed sound environments

In the creation of the constructed sound environments made for this PhD, the perception of the sound material if divided into musical/abstract or non-musical/realistic poles, in terms of what was being heard, listened to and decoded, became to complex. I needed a term that included rather than excluded possible listening modes. In order to map the possibilities of listening to the installations as environments, a look beyond musical/non-musical sound debates and the incorporation of the concept of the 'ecological approach', as presented by James J. Gibson in *The Ecological Approach to Visual Perception* (1986), was necessary. Although Gibson's ideas primarily were based on the visual perception of environments and human behaviour within them, Gibson stated that his theory could be extended to all our senses including hearing, and specifically for this PhD project the inclusion of the active process that is listening. Although space is considered one of the important aspects of electroacoustic music and sound art installations, it is useful to remember that Gibson himself regarded geometrical space as a pure abstraction (Gibson, 1986, introduction). Instead, a focus upon the ways in which we perceive objects in our environment, and also the mechanisms by which objects can be defined in terms of size, structure, surface and the distance they have to a perceiver (Gibson, 1986, p 16.), is the basis for the ecological approach. Gibson (1986) introduced the term 'affordance' and explains it thus:

> The *affordances* of the environment are what it offers the animal, what it *provides* or *furnishes*, either for good or ill. The verb *to afford* is found in the dictionary, but the noun *affordance* is not. I made it up. I mean by it something that refers to both the environment and the animal in a way no existing term does. It implies the complementary of the animal and the environment. (Gibson, 1986, p. 127)

Although it has its basis in visual perception, the term ‘affordance’ is used in this thesis purely in relation to sound. Since my work is realised in the combination of sound, speaker setups, enclosed rooms and the movement of a listener’s body, the term can be used to map the perception of all of these elements and to explore the ways by which they form a constructed sound environment. Gibson (1986) claims there are no new environments, but all the steps we have taken to construct the environments surrounding us have been made on the basis of affordance and that constructed environments are just a modification of the natural environment:

> This is not a new environment – an artificial environment distinct from the natural environment – but the same old environment modified by man. It is a mistake to separate the natural from the artificial as there where two environments; artefacts have to be manufactured from natural substances. (Gibson, 1986, p. 130)

Chion (1994) has stated that a recorded sound can be perceived as either having a clear connection to an original source that caused it (causal listening), or if the sound is unfamiliar or even abstract, the perception is based on an imagined source. Chion’s remark regarding a listener’s ability to perceive a sound being caused by an imagined source could lead to the conclusion that there is a perceptual oscillation between ‘real’ sounds and ‘virtual’ sounds in an environment. If the concept of affordance from Gibson’s perspective (Gibson 1986) is applied to a sound environment, a sound in this regard is *never* a virtual sound. It is simply a sound that has a relation to how the affordance functions in relation to any given environment.

Gibson (1986) makes a distinction between perception and our senses, and according to Gibson it is clear they are not the same. Senses such as hearing, are passive and perception for Gibson is

based on the fact that as beings we take action in an environment, and for this PhD project in involves the very act of listening. Action-based perception is presented by Gibson (Gibson, 1986) as affordance. Gibson's distinction between senses and perception is very useful for the context of this thesis, since it helps define perception within a constructed sound environment, and clarifies what can be regarded as stimuli for the senses to communicate with our brain: 'Any substance, any surface, any layout has some affordance for benefit or injury to someone. Physics may be value-free, but ecology is not.' (Gibson,1986. p. 140). For this PhD project the idea of ecology containing value and furthermore a base for understanding our perception of the world part from how it physically behaves is important. Music and sound affects a perceiver emotional and that guides the choices made actively as a perceiver is adapting to the environment.

Using the ecological approach as a means by which to understand musical meaning and emotional response is the approach taken by Eric Clarke (2005). Clarke expands the ecological approach to incorporate musical perception and the relationship between listening and our emotions:

> The ecological approach towards perception offers an alternative view that gives a coherent account of directness of listener's perceptual responses to a variety of environmental attributes, ranging from the spatial location and physical source of musical sounds, to their structural function and cultural and ideological value. (Clarke, 2005, p. 47)

Clarke offers a link between three factors that he sees as crucial in understanding how perception works according to an ecological approach: 'There are three factors, however that make the theory both more realistic and more interesting: the relationship between perception and action; adaptation; and perceptual learning.' (Clarke,

2005, p. 19). Clarke uses these factors in analysing and attempting to understand what is being afforded in music and how one might respond emotionally to what is being afforded within a musical composition. Clarke (Clarke, 2005) claims that music that contains a certain understandable structure, such as rock music, pop music or classical music, must work accordingly to that structure, so that a perceiver should understand the progress, and that a perceiver gets a reward in fulfilling the progress, to a level commensurate with a listener's perceptual learning. The idea that adaption is an action-driven process makes Clarke's argument more pertinent to this project in that, thereby, the inclusion of a listeners memory is not something that has to be processed, but as a process that is taking place instantly. In this PhD project the adaption to an environment in relationship to memories and a possible affordance has been important since adaption as a term is linked to direct action, and that the shows that the perception of a constructed sound environment is based on what is primarily taking place in the present time. By introducing different kinds of sound elements with different listening modes attributed to them, an adaption on the part of the listener is crucial in seeking meaning and structure within the constructed sound environment. Emotional response is then part of the active process that governs the affordance in a sound environment. Kendall confirms this:

> Emotions are part of our cognitive engagement with the world, an intrinsic component of meaning and understanding. Our ongoing projection of outcomes affects us whether the context is the contingencies of everyday life or the evolution of an electroacoustic work. Certainly we are aware of the differences between artistic and practical outcomes, but listening, even artistic listening, gives rise to meaning as a direct manifestation of this everyday cognitive process of

> finding meaning in the world around us. (Kendall, 2010, p. 65)

By understanding the different elements that combine to create the overall impression of a constructed sound environment, an affordance is created that is based on what Mathews points towards in his 1993 book, *Ecological Self*, where perception of the surrounding environment is created from a set of parameters that are not really connected naturally, but the individual listener's mind is trying to create order and structure in the world.

> Individualism, or, as I shall call it, substance pluralism, is a metaphysical archetype, an archetypal representation of the basic structure of the world. It portrays the world as a set of discrete, logically and ontologically autonomous substances. Its rival is the archetype which represents the world as a single universal substance –substance monism. (Mathews, 1993, p. 8)

'Substance pluralism', as Mathews coins it, explains why we seek to collect the sound we hear in the world and to try to make an understandable structure from it. Substance pluralism also points towards the difficulties in specifying what defines everyday events, since every new environment encountered is based on different small elements, which together creates a unique syntax off what is being afforded and thus guides our action. Luke Windsor has commented in Emmerson (Emmerson, 2000, p. 18) regarding the ecological approach and its use in understanding acousmatic music:

> Given that most acousmatic pieces eschew more familiar 'musical' events such as discrete pitch structures, relatively hierarchical or periodic rhythmic structures and familiar instrumental sources, more often than not the only familiar structures available to

> the listener, are those that specify everyday events. (Windsor, in Emmerson, 2000, p. 19)

As I have underlined in section 1.5.1, above, Engström and Stjärna (2009) has showed that the blame for the binary rigidity of this particular blind alley can be laid at the door of an anglophone academic tradition, and, following Engström and Stjärna's take on the 'English school' about sound art, the tendency of dividing sound art in either musical or sound-based work becomes evident. Windsor's (2000) argument however is that the listening experience is neither solely a musical experience, nor solely a question of the intrinsic nature of sounds; it is somewhere between these two poles. In a sound art installation the inclusion of a recognisably real place as a component for contextualising is not only sound which engenders musical listening or everyday event listening. In that sense, Windsor is much closer in his thinking about Gibsonian perceptual ecology to the sound art works by Christina Kubisch, with their focus upon *Klangkunst* (the incorporation of space and time rather than musical elements) than, for example, Trevor Wishart – the composer that Windsor uses as an example with which to corroborate his argument

Windsor recognises the co-evolution of organisms and their surrounding environments. Based on this notion, action is needed to understand an environment:

> In summary, events can be described in terms of their adaptive significance to an organism and are the result of the co-evolution of the perceptual systems of organism and an environment. Within such a perspective, an event's 'meaning' is determined directly, not by mental processes or representation: an event produces structured information that affords further perception or action. (Windsor, 2000, p. 12)

As sound is an event rather than an object, the above statement can be adapted to be used when describing sounds' possibilities for affordance. Reed (1996) puts forward that we are supposed to learn patterns on order to act in an environment. This links him with Clarke (2005) in that what is being afforded in an environment is not based solely on the structures within that given environment, but that perception is also based on the set of 'rules' that every person has embedded in them based on sequences of activities.

> Once again, the human environment is so structured that, while children can act in their own ways and on their own schedules, they are expected to learn to follow the proper pattern. Just as the human differentiation of places gives us a convenient way to think about the layout of our locale, so the differentiation of phases and times gives us a convenient way to think about sequences of activities. (Reed, 1996, p. 144.)

Reed also shows that sequences of activities are what being afforded due to learning processes when perceiving an environment. Reed's case in combination with Clarke's (2005) three factors that abide the affordance in musical perception, explains why there is a sense of reward when a musical structure is followed by a set of 'rules' learned by a perceiver. Reed's argument also shows that as human beings the structural recognition; i.e. e. affordance of an environment is learned early on in life through activity, and so the adaption to an environment is based on early childhood rules given by grownups.

As Stroll proposes (1988), the understanding of Gibson's ecological approach to visual perception lies within the ways in which one looks at objects.

> Or to put his position somewhat differently, we can say that he is arguing that we see surfaces directly and in

> so doing we see the objects that have those surfaces directly. It is the occluding edges, the layouts, the textures of surfaces, and the way they reflect or absorb light that allow for a direct apprehension of depth, solidity, roundness, and other perspectival [*sic*] features. (Stroll, 1988, p. 137)

This view can be compared to the perception involved in listening to an environment where we hear objects that have the same 'perspectival' features. We hear the texture of surfaces, and can make a direct apprehension of depth, solidity and roundness of the sounds we are listening to. The difference between the visual and the sonic domain is that sound has duration, so that the 'features' can change over time, and thus sonic events are not as easily understood as visual objects that possess certain static features as Stroll (1988) discusses above. Shamma (2008) has addressed the unique perspectives of 'auditory objects' in comparing the difference between visual perception and auditory perception.

> The neural underpinnings of attention, feature selection, object binding, and other perceptual and cognitive phenomena have been the focus of research in the visual system. However, addressing these phenomena in the context of auditory perception promotes unique perspectives that stem from the temporal nature of sensory signals in animal communication, human speech, and music. For instance, in auditory perception research, 'auditory objects' are almost never thought of as static images, but instead as 'streams' that build up over time to form a particular speaker's voice in a crowd or the music of an orchestra's string section. (Shamma, 2008, p. 1141)

Incorporation of the apprehension of perspectival features it into sound environments means that a perceiver would then hear and

listen to specific sound events in regards to their surfaces, textures and reflections. By doing that a perceiver is listening for the object that caused the sound rather than the sound itself. If, instead, the focus is upon the fact that sound is temporal and has duration and a progression, a perceiver is then entering a mode of an acousmatic listening condition, as described by Hellström (2006) – an acousmatic listening mode that is the result of the commercialised and mediated world we live in:

> Nowadays, it is hardly possible [*sic*] to find non-commercial public spaces. In these environments we are exposed to all types of sounding artefacts: jingles from public loudspeakers, signals from mobiles, computers, technical installations, white goods, toys etcetera, as well as music and muzak – or sound perfume – directed towards consumption. Since we very often lack of visual contact with these sounds, I will claim that the sounds of the shopping culture together embodies a kind of *acousmatic environment*. (Hellström, 2006, p. 6)

The claim here by Hellström (2006) is significant since it indicates that the world from whence I collect my sounds is already in a state of acousmatic listening mode and therefore the recording process is not a matter of dislocating the sounds from a visual source, since this is already happened before recording has taken place. Hellström (2006) continues by presenting a further problem within an acousmatic environment:

> So the acousmatic environment – the sounding products and activities as an ensemble – constitutes a new type of infrastructure, which is problematic for different reasons. The major reason is that we do not have any natural connection to most of the sounds in that they are not directed to our personal activities; the

> sounds are associated to individual use in a collective space. (Hellström, 2006, p. 7)

Here, Hellström (2006) is addressing is the same notion apparent in many sound installations. Very often a listener do not have any familiar ways of understanding what he or her hear in a sound installation, nor have we any familiar learned patterns of understanding how and if sounds fit together in a meaningful way in a sound installation. Hellström does not include any explanation as to what the 'personal activities' he describes might include. The acousmatic condition in our everyday life, as presented by Hellström (2006), is actually the same condition that Chion discusses (2009) whilst dissecting the work of Pierre Schaeffer's work about the sound object (Schaeffer, 1954):

> The acousmatic situation changes the way we hear. By isolating the sound from the "audiovisual complex" to which it initially belonged, it creates favourable conditions for *reduced listening* which concentrates on the sound for its own sake, as *sound object*, independently of its causes or its meaning (although reduced listening can also take place, but with greater difficulty, in a direct listening situation). (Chion, 2009, p. 11)

By combining the ideas of Hellström (2006) and Chion (2009), it can be concluded that everyday sound experience includes an acousmatic condition that enables an experience of reduced listening. A perceiver 'concentrates on the sound for its own sake', which is the same way a listener might listen specifically to a tone produced by a traditional instrument, instead of categorise the sound as coming from an instrument.

As Francisco López (1997) concurs below in the context of his own practice, my work is also my personal artistic 'take' on the sound material I use. For me this involves oscillating between letting my

recorded sounds be heard as a representation of an object or an environment, and using an abstract, musical approach in the creation of my constructed sound environments.

> Although I am quite aware of the obvious relationships between all the properties of a real environment, I think is an essential feature of the human condition to artistically deal with any aspect(s) of this reality. I believe that what is under question here is the extent of artistic freedom with regards to other aspects of our understanding of reality. There can only be a documentary or communicative reason to keep the cause-object relationship in the work with soundscapes, never an artistic / musical one. (López, 1997)

Since I, too, compose using recorded sounds and recorded environments it would be easy to understand my work as being a comment on the sound phenomena I encounter on a daily basis. I do believe however, contrary to Lópes, that keeping a cause-object relationship in a constructed sound environment is not constraining a listener, but enables a listener to recognise familiar sound environments as well as perceiving new sound environments within an artistic context. As López (1997) shows there are more aspects in regards to creating sound art than documenting and reproducing a sound event: sound art also speaks to our sensibility to perceive sound as being building blocks belonging to an art form, that can be both self-referential and containing documented references to a sonic reality.

> A musical composition (no matter whether based on soundscapes or not) must be a free action in the sense of not having to refuse any extraction of elements from reality and also in the sense of having the full right to

> be self-referential, not being subjected to a pragmatic goal such as a supposed, unjustified re-integration of the listener with the environment. (López, 1997)

López (1997) addresses the conflict between the sounds as being representative of a specific environment as well as representing an artistic goal through the use of self-referential sounds. The artistic goal can be to give to an audience the chance to build a new understanding of the sounds and therefore, as Harrison has stated (1999), to transport them to new places and situations:

> Generally speaking, works exhibiting architectonic structure and space are not well suited to diffusion, whilst those displaying organic structure and space require it. My personal plea is for composers to immerse themselves in the essentially new ways of musical thinking which Schaeffer offered us fifty years ago, and to explore the qualities of unique sound objects themselves for appropriate and organic models of musical structuring. When elaborated through the process of composition into the realm of performance practice, it has the power to transport us –quite literally, at the speed of sound –into other places, other situations and even, because of its interactions with our personal memories and histories, other times. Ultimately, therefore, it can reach deep into the most fascinating space of all: our imagination. (Harrison, 1999)

The fact that imagination plays a large role in our perception of music and sounds is the key to understanding the complex relationships that form when experiencing a sound environment, where different sound components fight for our attention. This complex relationship is based on the way we perceive sounds from

the location of our bodies relative to what we hear, and the distance between ourselves, and the sources of these sounds. Here Johnson (Johnson M. , 1987) describes, in similar fashion to Gibson (Gibson, 1986), our perception as being based on distances between ourselves and the objects that surround us.

> The fact of our physical embodiment gives a very definite character to our perceptual experience. Our world radiates out from *our bodies* as perceptual centres from which we see, hear, touch, taste, and smell our world. Our perceptual space defines a domain of macroscopic objects that reside at varying distances from us. (Johnson, 1987, p. 124)

Johnson goes on to describe how we scan the world, in a similar fashion to how I perceive the affordance created within my constructed sound environments.

> From our central vantage point we can focus our attention on one object or perceptual field after another as we scan our world. What is ‘figure’ or ‘foreground’ at one moment may become ‘background’ at another, as we move perceptually through our world. (Johnson, 1987, p. 124)

The movement between background and foreground has been a key concern for me as I was constructing sound environments for this PhD project. The aim was to create constructed sound environments were the perception shifted from background to foreground sounds, both virtually within the sound field created by speakers, but also through the relationship between speakers and physical exhibition space.

> At a certain distance from this perceptual centre [*sic*] our world ‘fades off’ into a perceptual horizon which no longer present us with discrete objects. We may move

> in one direction towards the horizon, thus opening up new perceptual territory, but this only establishes new horizons presently beyond our grasp. (Johnson, 1987, p. 124)

Johnson present a possibility, in the quote above, for the world to be ungraspable since it fades off into unknown territories. For this PhD project the perceptual horizon based on vision, is not a phenomena that happens since the borders for the constructed sound environments are the distance between a listener and the speakers, as well as the constrained rooms used for the exhibitions made for this project. There is however the possibility to get the sense of the world ‘fading off’ in relation to the sounds within the constructed sound environments, since they can be perceived as disappearing far into the background.

1.6 Problem

As described in this chapter there is a tendency to divide the perception of sound art into either a musical/abstract or non-musical/realistic experience. My argument is that this diving is un-necessary. Both the musical/abstract and non-musical/realistic experience can be included, by combining the ecological approach to perception, and the idea of listening modes within a constructed sound environment. The thesis is that both these poles of perception take place and form the experience of a constructed sound environment.

The research questions have been:

How does listening modes and direct action in the form of affordance work in constructed sound environments?

How does the perception of space inform my design choices made for the constructed sound environments?

1.7 Methodology

The basis for the analysis for the written part of this PhD project has been a qualitative approach where the mapping of theories regarding sound art, everyday listening, space and the ecological approach to perception, has been the goal. Especially the focus and analysis of listening modes and affordance, is grounded in my role as a composer and creator of the practice that is part of this PhD project. The qualitative analysis enables a reflective method were the mapping of different listening modes and affordances informed the strategies taken in the creation of the practice.

The practiced-based part of this thesis involved creating multichannel sound installations, referred to throughout the thesis as constructed sound environments. The aim was to create case studies from the constructed sound environments in order make a comparative analysis between them, in regards to possible listening modes and possible affordance.

The number of channels for the constructed sound environments has varied between five to eight, depending on the different exhibition spaces that were used during the PhD project.

The study of the practice is divided in the thesis into two parts. The first part deals with four case studies that each had different approaches regarding the kind of sounds that was used.

The four case studies are:

Small objects and one large; primary focus was to use sounds with a clear source, a clear causal identification based on sounding objects.

Listening zones; primary focus was to use recorded environments.

Form and dramatic environments; primary focus was to use un-recognisable sounds (abstract) in conjunction with recorded environments.

Bla bla bla; primary focus was to use fragments of voices and mouth produced sounds in regards to semantic listening.

For the first part of the practice a reflexive method was used to compare the outcome of the exhibitions made for the PhD project. The aim was to investigate through the practice how physical space changed the possible affordance of the constructed environments. Especially the notion about zones of audition was explored in order to exemplify the different kinds of affordance that were the result of merging physical space with the constructed environments.

The second part of the practice is the result of the findings from the comparative analysis made of the first four constructed environments. The aim was to create three case studies, using five channels of sound.

The three case studies for the second part are:

Summerhouse and the woods; primary focus was to use sounds recorded within a small area that had a personal meaning to me as a composer.

Public spaces and one; primary focus was to use two public spaces where sounds are shared by people interacting in an environment.

Pathways of internal dreamy logic; focus was upon the blending of different environments, ranging from a personal sphere to public spheres. The aim was to create a mental journey based upon affordance created by the simulation of different zones of audition.

Chapter 2. Creating sound environments

This chapter is based on my own practice of creating constructed sound environments for my PhD project, and on my experiences in constructing sound environments in the past. I aim to show in this chapter how the combination of architecture, rooms and multichannel speaker setups, creates constructed sound environments that contain different listening affordance possibilities.

The constructed sound environments that were the result of this PhD project are referred to as follows (and they can be found on the accompanying DVD):

1. Small objects and one large

2. Listening zones

3. Form and dramatic environments

4. Bla bla bla

5. Summerhouse, doors and the woods

6. Public spaces and one

7. Pathways of dreamy internal logic

The chapter is divided in two parts. The first part explains and analyse the first four constructed sound environments I produced for this PhD project from 2005 to 2009. The first part contains a discussion about the constructed environments as they are listened to in a small space, and then a comparative discussion is held when all four were placed within a large space. The second part is based upon the final three constructed sound environments that were produced from 2009 to 2010,where the results from the first four environments serves as a base for the strategy in constructing the final three environments.

My perception of my own work is something that is connected to my childhood. As a child, I can remember having difficulties sleeping, due to the fact that the television set downstairs was on, and the sound from various television shows and dramas was leaking out from the living room and being amplified by the staircase outside my bedroom. At around the age of eight, I sometimes did find myself listening to strange situations emanating from below and trying to imagine what took place. This turned out to be a surreal experience, since the sound being disconnected from the moving image managed to create images and emotions inside me that were not in any way similar to what actually took place on the small television-screen (verified on those rare occasions when I managed to stay up, way past my bedtime). This created a sense of a ghostly presence engendered through the fragmented sounds and the feelings they induced. Building on this experience has been part of my work. I am striving to know the inner workings of sounds and how they are perceived by me as an artist and a composer, and how this artificial construct and the moulded sound through speakers and acoustic space work together to form a sound environment. Over the years working with constructed sound environments I have been intrigued particularly by the polarity in listening to either recognisable sounds or un-recognisable sounds. The un-recognisable sounds have always been a way for me to incorporate the element of perceptual surprise.

2.1 Case studies part one

The first part of this chapter is describing my practice and contains the first four out of totally seven constructed sound environments produced between 2005 and 2009.

2.1.1 *Small objects and one large*

Produced: 2005

Length: 21 minutes, 58 seconds.

On the accompanying DVD the reader can listen to *Small objects and one large* on the track with the same title as above.

In the constructed sound environment, *Small objects and one large*, recorded sounds from old physical objects, found in the town museum of Skövde was used. They sounds were recorded as to exclude any reverberation, and the result was a series of very 'dry' sounds. The timbre of the sounds throughout *Small objects and one* large were kept, and mixed with processed sounds in order to create juxtaposition between recognisable sounds and abstract sounds. In the beginning of *Small objects and one large* there are sounds that can be perceived as having a recognisable source such as a truck engine, sounds of telephone bells and the sounds of knives. *Small objects and one large* ends with a rhythmical pattern where the sound of the truck engine is heard, and hence, this creates a link to the beginning. Musical sounds and timbres were created from the recorded objects in order to retain at least some of the original timbre and texture of the recorded objects. The piece was made to explore sounds that came from small objects how the creation of a constructed sound environment could be made from small building blocks instead of using pre-recorded environments.

At 0:00 – 0:23 the piece starts with the recorded sound of a truck engine. The sound, although it is recorded form a large engine, is perceived as small in size. The perceived sound thus appears much smaller than the actual physical sounding object that produced it. At

first I thought this was a failure, but I decided to include it nevertheless, because the contrast between the perceived small size and the actual physical size intrigued me. At 0:23 – 0:27, as the engines is moving faster, the pitch of the sound rises and produces a musical gesture that leads to the sound from a bell belonging to an old telephone. The sound from the telephone contains both the bell sound, as well as the sound of a spring clapping against wood that produces a rhythmical sound. At 0:25 – 1:07, as the rhythmical sound produced by the telephone bell fades away, the sound of an old scale enters. The squeaking noises as the scale is lifted are heard, followed by the sound of the scale dropping. At 0:44 - 1:12 the modulated and manipulated sounds of the scale are transformed into a background sound that creates a musical backdrop for the dry sounds of the scale. At 1:07 – 1:38, in contrast to the musical sounds being perceived as coming from the background, a sound of an old razor sharpener is introduced that contains high frequencies that expand the overall dynamic tension between the lower frequencies heard from the background sound and the foreground sound from the razor sharpener. At 1:28 – 1:48, the sound of hands against an old wooden bowl is heard, where the emphasis is not upon the sounding object but upon the material it is made of and the skin touching it. A wooden bowl is not produced for sound-creating purposes, but the affordance comes from understanding the material being stroked. At 1:48 - 3:27, as a contrast to the organic sound of skin against wood, sine wave sounds, glitch sounds and rhythmic patterns are introduced to create an oscillation between recognisable, recorded sounds and abstract manufactured sounds. At 2:35 - 3:46 noise drones pulse slowly, like ocean waves. At 3:41 - 4:44 the drones make more of a hissing sound. At 4:08 - 6:22 there is an introduction of orchestral sounds gliding in pitch in order to present a disturbing element in contrast to the concrete sounds of the small objects. At 5:58 - 7:47 there is a return of razor sharpener, transformed, but still keeping the sound close to the original recoding in order to make it possible for a listener to recognise the

sound as being part of the beginning of the structure. The sounds are placed in the foreground in order to create a contrast to the orchestral sounds that are placed in the background. At 7:27 - 9:54 an introduction of oscillator-modulated sounds are heard that, even though they are based upon small recorded concrete sound objects, have no connection with a recognisable sound source due to their clearly electronic-sounding character. The sound moves between the foreground and the background as a result of adding reverb to certain parts of the sound as it progresses, and in doing so is a prolonging of the part before them in terms of contrasting the foreground sounds and the background sounds. At 9:11, mechanical clatter made from the recorded sounds creates a similar relationship as birds singing in nature. At 10:18, bell sounds are heard. At 10:19, a rhythmical pattern constructed from various sounds emerge that sounds like birds singing to each other: although they have the character of constructed mechanical sounding objects, they resemble sounds from nature. At 15.39, after a long period of dry fragmented sounds creating rhythmical patterns in a dialog between each other, there is an introduction of a hissing drone sound that changes the tempo and the appearance of the environment. At 16.16 the orchestral sounds from the 4:08 are reintroduced, but mixed at a lower volume then before; this places the orchestral sounds further in the background, in contrast to the hissing drones placed in the foreground. At 17:34 a high pitch noise is introduced that has a metallic character; at 18:10 the metallic noise is starting to slowly drop in pitch. At 18:49, distorted sounds are introduced, as the metallic noise is moving further into the background. At 19:45, a rhythm made from the sound of an old projector is heard that creates a more coherent pattern then the pattern made of the distorted sounds that preceded it. At 21:00, the sound of the truck engine from the beginning is re-introduced in the form of a rhythmical pattern, and this connects the end with the beginning in order to enable a looped listening mode.

2.1.2 Outcome of *Small objects and one large*

The first constructed sound environment created for the PhD project afforded a listening that focused primarily upon causal listening. As the sound material was introduced in the beginning, with a clear connection to recorded sounding objects, the base for the listening focus was to determine what had caused the sound, its original source. The second affordance was listening for the material of the sounding objects. Material such as wood, metal and skin could be heard, and so the listening was reduced to listening to the material of the recorded sounding objects. The perceived distance between the different sounds was explored throughout the progress of the constructed sound environment. Added artificial reverb created a movement between foreground and background, but also the different sizes of the objects was investigated. The incorporation of the abstract sounds that contained no information as to their original source was for me a way to move between concrete sounds to abstract sounds, since I thought this juxtaposition of sounds would create an oscillation, a mental journey between different listening modes. However, as the constructed sound environment was finished I did not think this worked as I had intended. As I was composing I thought the abstract sounds fitted neatly and logically as a musical ingredient, but as a vehicle for enhancing the listening experience I thought it interrupted too bluntly the causal listening mode. Instead of providing a gentle oscillation between different listening modes, I found that it became a sharp step, a clear disjuncture between different listening modes.

2.2.1 *Listening zones*

Produced: 2006

Length: 21 minutes, 39 seconds.

On the accompanying DVD the reader can listen to *Listening zones* on the track with the same title as above.

In *listening Zones* I wanted to explore recorded environments and create sounds from the recorded environments as well as keep them untreated. In *Small objects and one large* I felt that, even though they fitted logically into the compositions, the processed and transformed sounds were too separated perceptually from the original recordings of sounding objects. The idea behind *Small objects and one large* was to build an environment from the ground up by using small sounds as building blocks in a constructed environment. The result, however, resulted in the perceiver listening to each sound separately instead of recognising the totality and combination of sound as a whole environment.

In *Small objects and one large*, the perceived environments were the result of constructed environments built from the sound objects recorded from old physical objects, but in *Listening zones* I used recorded material from my journeys to and from London. In the beginning of *Listening Zones* there are sounds recorded from a train journey in London. Recognisable are the sounds from the train against the rail, as well as sounds from the inside of the train carriage. The abstract sounds are all derived from the sound material from the recorded train journey. At 0:34, al tone dominant sound is moving up and down in pitch, as well as the entrance of a voice, presents an affordance where the listening mode is dominated by the affordance of decoding the message from the voice in a semantic manner. The musical gestures in the voice follow the more abstract sound material. At 0:57 there is the sound of train against rail; at 1:21 there is a processed voice saying the words ‘dominating ideas’, in order to enforce the encoded material

and the semantic listening mode being afforded in the form of a voice. At 1:56 a swelling sound is heard that ends with the word ‘be’, while at 2:00 a piano enters into the environment, recalling the opposition of inside and outside from the train journey. The piano is out of tune and has been neglected for a long time, so that the sound emanating from it includes a mixture of musical and non-musical elements, and the piano has gone from a music-producing instrument to an object producing all kinds of non-pitched sounds. The piano used to create these sounds was almost a naturally prepared piano that, over time, had been changed due to the micro-climatic conditions prevailing where it was standing. At 2:40, a drone sound comes in that is changing the tempo of the environment. At 3:25 a short melody made from train sounds morphs into breathing noises. At 3:38 a high-pitched sound that falls in frequency and, through that transformation, becomes the sound from a train within a carriage. At 3:58 a pad sound is introduced in the background. At 4:02 the sound of a gas burner is introduced as to mix three disparate sound environments, consisting of one environment from within a train, one musical listening environment and one environment from a domestic home environment. At 4:25 a bang signals the end of this mix of three environments, and a new environment is introduced based on a recording within a pub in London where the sounds of people talking are heard. At 5:00 a sound is heard that, to me, sounds like mechanical animal sounds. At 5:07, alarm sounds are heard that rises and fall in pitch. Digital sound artefacts appear as clicking noises and glitches. At 5:56 a rhythmical pattern based on the word ‘be’ is included to give to a listener something recognisable to decode. At 6:02, the sound of children playing at a school yard is transformed into an abstract sound and back again to the original recorded sound event, to move the perception from a recognisable sound event to an abstract sound element and back to a recognisable sound event. At 6:23 a drone sound is heard. At 6:31, there is a recorded voice that has been treated to simulate an old dusty vinyl recording, and at the

same time the sound of mechanical animals is heard, but this time within a room. At 7:09, the pad sounds return. At 8:03, a loop of a train announcement is heard, that is perceived as constantly moving upwards in pitch. At 8:57, a dense and dynamic sound with high, distorted frequencies is heard. At 11:30, sounds made from a recording of a coffee machine are heard. At 12:08 sounds from a door opening are heard together with the sound from a code lock beeping that turns into choir sounds made from the beeping of this lock, with the coffee machine plus hums from a voice. At 15:10 a tractor enters the environment, containing the same type of squeaking sounds as the abstract processed sounds in the composition. The affordance changes now from a reduced listening condition to an acousmatic one, in order to give a listener something recognisable to hold on to after long periods of abstract sound with focus upon musical patterns and gestures. In this passage the sounds of my daughter playing outside is heard and at one point she is yelling, 'Mamma, Mamma'. At 16:25, there are slow pads and distorted sounds together with the sound of a tractor. At 17:10, the piece becomes calmer, moving between abstract, although complex, sound structures due to invariants in the frequencies. At 18:29 a bang from a temporary ceiling flapping in strong wind on the courtyard of Läcko castle interrupts the texture. At 18:57 faint sounds from both train and rail are heard, and also the sound of rain within the room created within the courtyard of Läcko castle. At 20:00 the recorded voice saying 'dominating ideas' returns, plus the sound from a train station. The sounds from the station have more reverb added to them than the original recording in order to enhance the feeling of emptiness of the environment. The return of the Announcer from the beginning returns and creates a mental connection with the opening of the environment, and hence a sense of the overarching structure of the work.

2.2.2 Outcome of *Listening zones*

In *Listening zones*, the focus changed from the small building blocks of *Small objects and one* large to a process of listening to environments consisting of several sound events. Effort was put into the construction in order to balance the use of transformed sounds and composed structure within these sounds, with the structures that could be heard in the recordings of concrete environments left untreated. The use of different kinds of voices in *Listening zones* became important for the last three constructed sound environments. There needs to be a balance between what we might call the ‘scripted’ and ‘un-scripted’ voices in my environments. The scripted voices tend to stand out in the mix, and as a result everything else becomes a backdrop to what is spoken. The use of voices taken from a recorded environment needs to be included to create the sense of eavesdropping, listening in to conversations and dramas being played out in everyday mundane life. Acoustically and semantically, these voices offer a relation to the world outside the constructed sound environment, as well as creating a sense of messages that need to be decoded in present time within the constructed sound environment.

2.3.1 *Form and dramatic environments*

Produced: 2007

Length: 20 minutes, 17 seconds.

On the accompanying DVD the reader can listen to *Form and dramatic movements* on the track with the same title as above.

In *Form and dramatic environments* I continued to explore the sounds of recorded environments. The beginning of the piece is based on a recording of the train station of London City Airport. The recorded environment contains a hum generated by air vents above the ceiling of the station, that created a pitched tone, and this hum is heard together with the sound coming from the waiting passengers, such as cabin bags being drawn on the platform, people talking and coughing. The recorded environment in itself contained various listening modes being afforded by the different sounds heard in the train station. For example, the hum can be listened to as being a musical element in the form of a drone sound; similarly, the sounds from the passengers can be listened to as offering referential sound material from a specific place. I mixed the sound of the station together with a sound from which I also constructed a rhythmic pattern. To this sound I simulated the reverb in the station so that both the recorded environment and the new sound was appearing as coming from the same place. As the recorded environment was fading away I lowered the reverb of the new sound in order to shift the appearance of this new sound. The result was that the shift from sound plus reverb to just the dry sound that created a sense of moving between a situation analogous with a change from diegetic to non-diegetic sound in cinema –this is the difference between sounds informing what is happening in the narrative plane (diegetic) and what is being informed by the sounds not within the narrative plane (non-diegetic). In the beginning of *Form and dramatic environments* at 0 – 0:33 there is an introduction of sounds from London City airport. The hum from the fans in the station creates a

steady tone that has a musical quality to it in the form of a constant drone. Voices of passengers moving across the platform, together with the sound of someone dragging a cabin bag, and other people coughing, creates a recognisable environment from a train station. Even though the material is left untreated as it was recorded, the environment contains the oscillation between recognisable sounds as well as abstract musical sounds in form of the sound from the fans.

At 0:34 there is an introduction of abstract musical sounds. To the abstract musical sound I put a cellar like reverb that resembles the reverb in the train station. Gradually the reverb is fading away to bring the abstract musical sound closer to the listener. The sounds from London City Airport are still there, but the dry abstract sounds create a foreground-background relationship, and the perceptual sound field is expanded. At 1:14 - 1:21, the rhythmic musical gesture present changes the mode into a musical listening mode, since the recognisable sounds from the station are no longer present. At 1:22 the abstract sound elements are still there, reintroducing the sounds of the station to create a span between the abstract sounds and the recognisable environment. At 1:32, lighter, high-pitched, drone-like sounds are introduced with the effect of expanding the dynamics in terms of frequencies. At 1:52 there are sounds that have the affordance of something being dragged across a hard surface, plus a humming sound. At 2:08 rhythmic ‘bottle sounds’ appear. At 2:28, faint pad sounds in the background are heard that expand the perceived distance, in contrast to the sounds that are perceived as coming from the foreground. At 3:12, more rhythmic patterns are introduced that are less abstract and contain more accessible patterns, recognisable from traditional music. Hissing sounds are heard and, once again, the mimesis of insects are created. At 3:27, the announcement on speakers within a carriage on a Docklands Light Railway train in London creates a sense of ‘being there’, and the voice introduces a possible semantic

listening mode, where an interpretation and decoding of what is being said can be afforded by a listener. At 4:08 – 4:37 there follows the introduction of less dense sounds – this sparser texture functions as a series of spatial sound markers to highlight the position of the speakers and to inform the listener of the artificial perceptual framework created by said speakers. At 4:37 – 5:01, sharp, simmering sounds plus a hum are heard – fragile sounds. At 5:01, there is an introduction of electric-sounding musical gestures that moves away from the recognisable sounds that preceded them, at 5:11 slowly fading and re-introducing the sounds from the train. Sounds and noises from inside the carriage are adding once again the sense of the original recorded environment, and at the same time this sense collaborates with short-term memory in order to create something recognisably from a perceiver's background, as well as something re-occurring from within the constructed sound environment. At 5:33 there are sounds that exhibit the character of rolling. At 5:40, further sounds give the impression of something dragging against the ground. At 5:46, an alarm sounds for the carriage doors within the train, adding further to the sense of being inside a railway carriage. At 5:52, a new announcement from within the carrier is introduced. At 6:09, the abstract sounds from the beginning return, together with sounds from the station. Electronic sounds from 5:01 re-appear with a higher pitch in order to create a listening mode where recognition is based on earlier parts in the piece, and not only upon previous sound memories based on a listener's lived experience. At 6:45 there is a re-introduction of the flanging sounds from 0:34 with a clearer, more focussed sense of pitch that moves towards the perception of notes with added delay and reverb effects. Once again a possible recognition from earlier parts of the piece is afforded. At 6:58 there are scraping sounds heard. At 7:04, female voices recorded in the tunnel at an underground station in London are heard. Reverb from that space is similar to the reverb of the flanging string-like sounds. Thus we experience the merging of a real environment with a manufactured

one. At 7:19 the abstract sounds from the beginning have been processed in order to sound like tremolo string-playing, adding a feeling of fear and uncertainty. At 8:27 the sounds of the station return again; at 8:54 there are sounds of the razor sharpener from my first piece; at 9:39, 'bottle sounds'; at 9:53, the sound of a motor sound; at10:34, distorted 'alarm sounds' which, by 11:28, transmute into 'railway sounds', thus creating an oscillating perception. Faint sounds of the station re-appear and, at 12:15, esoteric pad sounds.

At 12:57 a drooping sound heralds further looped sounds and crackling noises, with more glitch sounds at 14:19. A dozen seconds later, at 14:31, the mimetic qualities of the sounds evoke once again a sense of listening to insects. We hear sounds evoking electronic crickets, that are similar to real crickets but with a slight difference in timbre. For the remainder of the piece, at 15:14 there is a harmonic-rich drone; at 15:24, the animal sounds of mechanical birds; at 15:35, electronic sounds, reminiscent of the work done by Dehlia Derbyshire, Bruce Haack and ; at 16:30, more electronic, rhythmic sounds; at 17:10, looped pads, and, at 17:29, a bass drone. It all ends with a speaker from a First of May gathering at Trafalgar square in London, and the voice of the speaker has been filtered so it is almost impossible to hear what is being said.

2.3.2 Outcome of *Form and dramatic environments*

In this environment I created similarities in the spaces heard from both concrete environments as well as the abstract musical gestures created for this environment. In *Form and dramatic environments* I wanted to move back and forth between foreground and background, but also to make the environment shift in terms of textural density. The ending was created in order to make the environment become thinner, and to have a feel to it as if the space had disintegrated. The mimetic quality of the 'electronic crickets' was intriguing to me, since initially these sounds were thought of as random rhythmical patterns, but only later did I find perceptual similarities from nature in the way they behaved.

In *Form and dramatic environments* I discovered that repetition of sounds in my environments was a useful structural device since it gave a potential listener a chance to form memories of sounds as the environment progressed. The repetition of sounds enables an adaptation of learned patterns within the constructed sound environment, instead of the range of affordances being dependent solely on a listener's background and lived experience.

2.4.1 *Bla bla bla*

Produced: 2008

Lenght: 11 minutes, 50 seconds.

On the accompanying DVD the reader can listen to *Bla bla bla* on the track with the same title as above.

This environment was constructed from the voices from *Form and dramatic environments*, and in particular the voice of the opening speaker from Trafalgar Square and the First of May meeting. There are also human noises, such as panting and sighs incorporated, as the material for this environment. The idea was to create a piece where a large amount of abstract sound material was exposed in each of the speakers at the same time so that each speaker was containing sound material that demanded attention, but that the environment as a whole became much larger than previous environments due to the dialogue between the speakers and the sound material they were carrying. The environment, although large, is fragmented, and disparate tempos and sound material are being heard until the end of the work, where all the speakers are united by a rhythmic pattern; thus, the environment functions as an orchestra with musical patterns. The tempo in the ending part is slow at the outset, accelerates towards the end, and then it ends abruptly.

2.4.2 Outcome of *Bla bla bla*

The environment was an exploration of voice fragments creating abstract sounds. As the voice is a powerful tool to use in sound environments, since everything else gets placed mentally in the background when we hear a voice, I have always been careful in including voices. I do not want my other sounds to become a backdrop to what is being said. The focus upon the voice is due to what Chion (Chion, 1994) calls ‘vococentrism’, where we listen to a voice before we listen to anything else. Chion (Chion, 1994) also refers to ‘verbocentrism’, in which we privilege listening to the (semantic) meaning in what is being said. *Bla bla bla* was designed

to fit together with the ending of *Form and dramatic environments* that ended with a speaker from a First of May gathering in Trafalgar Square in London. The idea was to use fragments of that speech in *Bla ba bla*, together with other mouth- produced sounds, and thus to create an oscillation between concrete encoded sounds and abstract embodied sounds. The type of expression I was attempting to create was similar to that achieved by the 'Sanctus' from Michel Chion's *Requiem* (Chion, Requiem, 1972), where voices becoming more and more hysterical as the piece progresses are heard together with calm voices, that seem to be coming from within in a church. In my environment I wanted to engender a sense of chaos, from a foundation of fragments of voices from which to build new sounds, where the timbre from the original voices could be heard, and thus afford semantic listening, even though the voices are not saying anything that readily can be understood. In retrospect, I feel that I should have kept more sounds untreated, so that fragments of sentences or words could have been heard so that a semantic decoding would have been possible for a listener. The approach of having longer parts of untreated voices was used in *Pathways of internal logic*, and is discussed under section 2.6.3 further below.

2.5 Enclosed rooms and zones of audition part one

In this section I shall discuss the changes in affordances in the first four constructed sound environments produced for the PhD project, as they were moved from my small studio into larger physical gallery spaces.

By adding physical space as an artistic tool, the constructed sound environments are completed. It is in the meeting of sounds, their placement within the perceptual frame created by speakers, and the usage of physical space that a perceptual dynamic tension arises that is dependent upon the oscillation between different affordances in the whole of the constructed sound environment.

2.5.1 Exhibitions of *Small objects and one large*

The documentation regarding the exhibition can be found on the accompanying DVD under the track with the same title.

Since I made my first sound installation in 1994, I have been intrigued by the idea of encapsulating a sound installation within an enclosed room in order to create a relationship between the distance between a perceiver, the speakers (being sound objects), and the surrounding space. For this PhD project I started to experiment with mono sound layers designed for each speaker in my sound environment, instead of letting sound be heard through stereo, or in all the channels at the same time. I wanted to avoid to what I like to call ‘over-dramatic’ movements of sounds between the speakers. Gestural movements in a constructed sound environment can be linked to musical gestures and enhance the musical aspects of sounds, but this method also constrains the perception into listening to the gestures as unnecessary ornaments. Hence, my principal aim was to exploit the affordance created by each of the speakers and their individual acoustic sphere in regards to sound distribution and reflections from walls, floors and ceilings. I aimed at creating a relationship between the speakers in order to create a dialog between the sounds being projected. In this section I will use

the environments created for the PhD project in order to explain what they afford from a listener and what enclosed rooms and zones of audition can contribute to a changed perception of a constructed sound environment.

Chion (1994) talks about how a listener hears zones of audio instead of locating a specific sound as in point of audition.

> Consider a violinist playing in the centre [*sic*] of a large round room, her audience grouped in various places against the wall. Most of the listeners, even those standing at diametrical opposite points of the room, will hear roughly the same sound, with slight difference in reverberation. These differences, related to the acoustics of the space, are not sufficient to locate specific points of audition. (Chion, 1994, p. 91)

The situation described in the statement by Chion above exemplifies what happened in my exhibition. A potential listener was not able to pinpoint the exact location of a sound since the speakers were hidden, so instead a listening to the differences in the sounds were the result of the acoustics of the space.

Chion continue his reasoning about pin pointing a source as: ‘Every view of the violinist, on the other hand, can immediately situate the point from which she is being looked at.’ (Chion, 1994, p. 91). This statement of Chion informed my progression of my practice in regards of deciding to let the speakers be visible for a potential listener.

Chion continue his remarks about the listening condition described above as: ‘So it is not often possible to speak of point of audition in the sense of a precise position in space, but rather a place of audition, or even a zone of audition.’ (Chion, 1994, p. 91)

Chion’s discussion about zones of audition, shows that although we can locate a sound source; a speaker in my constructed sound

environments, in terms of distance from a perceiver, the perceiver is also keen on listening to a wider area than just locating and pinpointing one sound source.

My practice developed along the idea informed by Chion's phrase zones of audition. I wanted to give to a potential listener the possibility to locate a specific sound source; the speakers, as well as experience a wider field created by zones of audition.

In my constructed sound environments the 'surrounding area' of the speakers is defined as the combination of direct sound from the speaker, and the reflection of this direct sound back from the surfaces surrounding the speaker. The reflection from the surfaces then creates a new sound that is included in the perception in the zone of audition.

For *Small objects and one large* I used five channels of sounds. I was able to use the art gallery of Skövde. The art gallery is part of a building that was built in 1969 and was designed by architect Hans-Erland Heineman. The building contains an art museum, library, theatre and cinema. The art gallery is facing north and the architectural appearance within the gallery is quite stunning. As can be seen on the DVD, there are different areas in the art gallery separated by the architectural elements such as a staircase and a balcony. For the Skövde installation, I wanted to work once again with height, as I had done at Läcko Castle in 1994 and later in 2001, when I built a sound installation called *Fragments of S* outside the walls of the theatre in Skövde. For *Small objects and one large* I divided the art gallery as a container of four zones of audio. The sound appeared as in the clock tower of Läcko castle as mentioned in chapter 1, as being 'poured down' from the ceiling. In the far end of the art gallery there is a big window facing north. The window is placed five metres above the floor, and just below the window there was section that was large enough for hiding a speaker. The speaker was faced with its speaker cones pointing upwards, which

resulted in the sound being projected upwards towards the ceiling and filling the far end area of the art gallery.

In *Small objects and one large* I experimented with a small number of recorded sounds that were used to explore the changing of the zones of audition with regards to the ways in which the surrounding surfaces reflected the material from the speakers. The aim was to create a sound environment that changed its presence as a whole in regards to the progression, juxtaposition and transformation of each of the sound layers, but also that each zone of audition; i.e. the reflections of the sound layers from the surrounding area for each of the speakers, changed within the enclosed gallery space. In my small studio the five channels was carefully balanced and mixed in order to create a condition where a listener could perceive the environment as a whole and be immersed in sound, since the reflections of the surrounding surfaces was not interfering dramatically with the sound. I worked on the premise that I was composing electroacoustic music for spatial distribution in gallery space, but that approach changed during the process of the PhD project, and can be read about in section 3.1 below. The perception based on spatial ability was thus changed from the studio experience as being centred on one listeners attention, towards a situation where the listener had to actively seek the listening positions within the art gallery and share the environment with others. This created a wider sound field of listening.

The perceptual widening effect in creating zones of audio leads to the following:

The constraining in a 5.1 surround mix, contained within in a small room where speakers without any interfering reflections from the surrounding walls form a perceptual frame.

The zones of audio created several environments each of which has its own affordance in terms of listening to sounds and the reflection from surfaces.

Sounds are no longer bound to each other in a composition, but can be perceived both as being part of a whole composition and at the same time as creating their own zones of audio.

The environments created as a result of spatially distributing several sound layers in a room challenge our perception of sounds because of the loss of their natural, quotidian, sonic frame of experience because the adaption to patterns learned in order to function in everyday life is complicated in this environment, and the brain does not filter out sounds due to the augmented listening condition enhanced by spatial distributing of sounds in a sound art environment. As Blesser and Salter shows below, the usage of virtual spaces can manipulate how a perceiver maps cognitive space. I would argue that the same could happen when using a real physical space as part of a constructed sound environment. ‘The older definition of cognitive maps of space as the internal representation of an external world becomes fluid, plastic, and even more subjective. Aural architects of virtual spaces are manipulating their listeners’ cognitive maps.’ (Blesser & Salter, 2007 p. 166) The skewed reality that appears as a by-product of this manipulation is the result of mixed listening modes.

The Gibsonian approach does not answer the question that Blesser and Salter’s argument raises. What exactly is a listener’s cognitive map? If Gibson’s (1986) argument was that perception is direct due to the actions taking place by a being in any given environment, there cannot be any cognitive patterns to change if an ‘aural architect’ is creating ‘virtual space’ since this process would include relying on a more passive perception; something Gibson was strongly against. There is however the possibility that a cognitive process is taking place at the same time as a surrounding environment affords action taken part of a perceiver. This possibility is discussed in section 3.1 further below.

2.5.2 Exhibitions of *Listening zones*

Listening zones was first exhibited at the conference *Other Criteria: A symposium on practice led research* at the University of Skövde, Sweden on October 20-22, 2006. The result can be seen on the DVD as a filmed sound-walk on the track called *First exhibition of Listening Zones*. The space used for the exhibition was Skövde University's old TV-studio, where I had made previous tests of my constructed sound environments. As can be seen on the DVD, the speakers were placed facing various directions and at various heights, in order to explore possible afforded movements by walking and moving the head. A walk inside the space enabled me to perceive the constructed sound environment as a sonic sculpture that could be heard from the inside as well as the outside. The surrounding space did not contain any reflections that changed the sound of the constructed sound environment. In addition, it was possible to stand in several locations within the space and to listen to the environment more or less as if it were a stereo presentation, and for me this was a failure, since the space did not contribute to the overall impression, nor did it really create an affordance that involved moving and positioning yourself inside the space.

The outcome of the exhibition of *Listening zones* at the University of Skövde was in stark contrast to the outcome of the exhibition made for *Small objects and one large* at the art gallery in Skövde. In the art gallery the space afforded movement in order to allow the listener to listen to spatial and aural clues. The space worked together with the sounds to create a constructed sound environment where listening to architecture in the form of different audio zones were the reflecting surfaces creates several environments, that together formed a unified constructed sound environment. At the University of Skövde the space did not work together with the sounds in terms of creating different zones of audition since there were no audible reflections from of the surrounding surfaces. The space only worked as a constrained container, a box, as Dryssen

(2007) discussed, where the sounds were merely on display and did not interact with the space.

For the second exhibition of *Listening zones* I used the art museum in Skövde. The art museum consists of three floors that are connected through a staircase. In the middle of the museum there is an opening that runs through all the floors that enables a visitor to look up or down depending on which floor the visitor stands. My initial plan was to use the first floor of the art gallery, and place each of my speakers within the sections build for the display of the artwork in the art gallery. As I started to work I decided to use two floors of the gallery instead. The idea was the let a visitor/listener to be able to walk between the different floors and to be intrigued by the distant sounds coming from various positions in the art gallery.

The zones of audition that were created by the speakers and the reflecting walls could be explored by walking around the speakers. In one area the walls reflected the sound so that a listener could hear the sound as coming from the wall rather then the speaker that distributed the sound. This architectural feature should have been explored more extensively than was possible during the exhibition period. The result of having the speakers placed at great length between each other resulted in a sound environment that although the sound filled the whole of the art gallery, the ‘dialog’ between the sound layers in each of the speakers were lost. The only places were the whole of the sound environment could be heard was in the opening between the floors. Since there were no signs informing the visitor to seek that place that afforded a listening of the whole sound environment, it was probably lost as an option to listen to every afforded zone of audition as parts of a larger constructed sound environment.

2.5.3 Exhibition of the first four constructed sound environments together in one space

On the accompanying DVD the reader can find documentation of the exhibition on the track with the same title as above.

In January of 2009 I used the Gallery P3 in London as the basis for a large constructed sound environment. As can be seen on photos and video documentation on the DVD, Gallery P3 is a large space, which contains three floors and a staircase. The natural, ambient reverberation in the space lasts for about 5 seconds. For Gallery P3 I wanted to combine all my first four constructed sound environments together in order to create a long and varied sound environment. The Gallery P3 felt like a larger version of the art gallery in Skövde, where I produced my first constructed sound environment for the PhD project. For example, when I stood in the middle of the space, the sounds were reflecting off the concrete walls in a way similar to that noted in the art gallery in Skövde. As I had been to Gallery P3 on several occasions I had formulated what it afforded from me as a composer and producers of constructed sound environments.

I wanted to be able to fill the space of Gallery P3 with sounds in order to make use of what I defined as its breathtaking vastness. I also wanted to create eight separate zones of audition since I had detected that the walls in gallery P3 reflected the sounds very well. The natural reverb and differences in the reflections from the various walls could be part of creating an augmented listening condition were a listener could oscillate between listening to the space as a whole, pin-pointing a specific sound source; a speaker, as well as listening to different zones of audition created by specific sections within the gallery.

2.6 Case studies part 2

In creating the final three constructed sound environments for this PhD project, I used the experiences and outcomes from my exhibition practice from the first four constructed sound environments, and I decided to work within the format of surround mixes done in 5.1. I wanted to move from a situation where a listener had to physically move around in a space in order for him/her to explore the spatial characteristics, to a situation where the listening experience was created by a simulation of the listening experience enhanced by physical movement by perceiver in an enclosed space. I wanted, as Blesser and Salter (2007) suggested in the above quotation, to play with the notion of the external world becoming 'fluid, plastic and even more subjective'. The aim was to create the sensation of the surround mix moving into a representation of a recorded sound installation. The sense that my installations could be torn apart by using dramatic spatial separation in the gallery space was my aim in creating the new surround mixes. I also wanted to include the aspect of Mark Johnson's (1999) 'centre - periphery' theory in order to elaborate more upon the perceptual movement between foreground sounds and background sounds. Instead of letting the speaker channels becoming separate sounding objects as in my first four exhibitions, I wanted to use the speakers together as a vehicle for producing immersive constructed sound environments. The working method included creating a sense of being transported to different places; different environments throughout the progression of the constructed sound environment

As LaBelle (2007) has discovered sound can alter the architectural understanding of a physical space.

'Activating space through implementing and inserting auditory features shifts architectural understanding. Fusing listening with spatial narratives, audition with inhabitation, and the movements of time and body as dramas of discovery, sound installation heralds new forms of embodiment.'(LaBelle, 2007, p.167)

In my work I created a composed structure within my environments. The composed structure was designed in order to perceive the environments as one single unit, if standing in certain areas in a space where all speaker channels could be heard, and where the diffusion of the sounds was clear. In the exhibition of *Small objects and one large* this could be achieved at any point in the room, since the individual channels could be heard clearly. This had the effect that the environment was held together by the composition and that the space together with the speakers worked as one single environment.

The constructed environments presented in part one of this chapter were also presented in different physical locations, in order to incorporate enclosed space. The idea was to expand the perceptual audio field and to avoid being trapped within the static environment of a surround setup, which, although it contains an immersive field of audio, did not offer the freedom for a potential listener to experience the environment according to his/her wishes of exploration. After reflecting upon the four exhibitions made for this PhD project I came to the conclusion that although I thought the experimentation of different speaker setups was fuelling my creativity, and my own augmented perception and architectural understanding of space, the experience for a potential listener could be confusing. The confusion for a listener would be based upon the fact that the sounds when separated from each other due to the distance between the speakers, did not seem to belong to the same context. In order to make it easier of a potential listener to grasp the various sound environments perceived within my constructed sound environments I went back to the initial setup of five channels of sound. The mix done for the five channels is made to work in a home cinema environments as well as the exploration of physical space.

On a more personal note I felt that I had been ‘safe’ in the recordings I made. In the sound environments I encountered during

the first phase of the PhD project, I merely acted as a passive observer; nicking sound parts from environments wherein I did not actively took part. For the final three constructed sound environments I wanted to explore my personal surroundings and include sounds from my home, places with certain meaning to me, and the sounds of my family. I wanted to contrast the feeling of personal sounds with the notion of all the unwanted sounds I encounter on a daily basis, or as Wishart calls it below; the collision of the local and global.

> The collision of the local and the global, the 'everyday' and the artistically contrived, made possible with electroacoustic sound-manipulation and globalised communications networks, does not automatically make the task of communicating with an audience easier. That which is local and that which is global are, for our human experience, not quite the same thing, despite the attempt of the market economy to make everyplace into the same shopping mall. The struggle to relate these two in a sound composition is comparable to the more general problem of defining our own personal identity in a globalising world. (Wishart, 2008, p. 140)

2.6.1 *Summerhouse, doors and the woods*

Produced: 2009

Length: 17 minutes, 54 seconds.

On the accompanying DVD the reader can listen to *Summerhouse, doors and the woods* on the track with the same title as above.

Summerhouse, doors and the woods is based on recordings around my family's summerhouse. The area consists of a house and two side buildings, a small hill with trees on it, a small lake, a forest and a meadow. The composition was being created at the same time as I was making *Public spaces and one*, and this gave me the opportunity to compare the different approaches towards using different recorded environments with different affordances.

The recorded sound, being 'found', becomes more than a documentation of a specific event that occurred during a specific time in a specific place. Of course a feeling of 'being there' arise as one of the effects of hearing a found sound, but that is the effect of understanding the sound as a recording of a past event. The problem with a found sound is that it can be perceived both as being the result of something that happened in the past, or an event in its own right, in present time as it is played. Played over a set of speakers, a sound is not just a recorded sound; it is also a live event taking place here and now. The found sound then affords both a historical understanding of an event that has already passed as well as affordance of the sound being produced here and now. As an example of this phenomenon, let us consider the music being played on a set of earphones as one walks in a city. The music has been produced in the past, but it is being played in the listener's head now and, as such, is an event that has an affordance in conjunction with the environment being produced by the recording as well as the sounds being mixed from the noises in the city. The found sound also has its own duration and its own changes in terms of frequencies, and consequently the sound is not an event frozen in

time like a photographic snapshot. Each time the sound is played it is informing a listener of a sound event, taking place in present time.

In *Summerhouse, doors and the woods* the sounds present evoke in me the memories of the actual recording event, but for a listener it would be impossible to connect directly to my experience. The perception of the sounds evoke a sense of the place where the recording took place, but that is based on the listener's previous experiences of similar places, not the actual place where the sound was found.

The reverb present in a found sound helps in creating the sense that the sound was recorded at a specific place. This sense of another place can be avoided to a certain extent if the sound is recorded without any reverb being present. The dry sound is then like a string on a guitar, that has a function of creating a resonation within the body of the guitar: the dry sound can create sound waves that propagate through a room and create a reverb. A found sound can be either the sound of an object or the sound of an object that resonates within a specific place, a sound event based on reflections.

As Walter Ong has showed, the difference between sonic and the visual incorporates the idea that sound creates an immersive state of mind in the listener. 'Sight isolates, sound incorporates. Whereas sight situates the observer outside what he views, at a distance, sound pours into the hearer'. (Ong, 1982, p. 72). In my piece *Small objects and one large* as it was realised in the art gallery of Skövde, the projection of the sounds throughout the gallery room, created an immersive field of audition. In Ong's view sound *always* creates an immersive state of *mind*, and this can be enhanced spatially by connecting a speaker setup with the resonating surfaces surrounding the setup. *In Small objects and one large* the speaker setup became a larger variation of a home cinema setup, and these

forces combined with the reflecting surfaces to create an immersive state of listening.

Initially, there is the processed sound of footsteps on gravel, treated to become a steady note. At 0:30, the sound of the footsteps is more apparent, with a flanging sound attached to it, coming from the back speakers. At 1:20, a swelling sound based on footsteps, sounds like a fan in the front and back speakers. Sounds of hollering in woods are treated to morph into rhythmical musical sounds with glitches. At 2:56, the fan noise drops in pitch; at 03:30, an alarm sounds; at 4:16, initially unwanted wind noise is treated to provide a rhythmical pattern. At 5:10, a high-pitched noise from hollering sounds appears, while at 5:30 a cluster of notes is produced from the hollering sound. At 06:00 there is a more steady rhythmical pattern with a defined beat. After further cluster sounds at 6:34, at 6:50 the treated steps return as a loop. At 7:23, these steps become longer and longer, followed at 7:30 by the return of hollering sounds, this time with more bass. At 8:00, a faint rhythmical pattern in back speakers is perceived, until at 9:20 there is a near- silence before a melodic pattern intrudes. At 9:44, the sound of birds comes in plus the noise of clothes moving. At 10:14, my daughter's voice and the steps, this time untreated, are heard, followed by a faint loop of a door slamming synched with steps, and at 11:16 the synched sounds of cranes. Thus, there is the affordance of mechanical repetition together with the affordance of recorded recognisable sounds. Each mechanical loop creates a short memory that in turn affects the next listening to the loop. At 12:01 squeaking sounds emanate from the back speakers, followed at 12:48 by distorted cranes moving up in pitch. These are frozen at 13:03, with the rhythmical sounds of doors at 13:25, a little later. At 14:41, there is the aural marker of a swelling sound that ends with a door slamming shut, and then the sound from the beginning is returning with more bass. At 15:15 a low rumbling leads to pad sounds emerging from the steps at 15:25. Click noises in the

background create a dialogue between the speakers due to similarity in their appearance, with the dry click noises in the foreground; this places a listener in a dynamic field of listening due to a perceived large distance between the sounds, and the perception of sounds coming from outside the perceptual frame created by the speakers.

2.6.2 *Public spaces and one*

Produced: 2009

Length: 8 minutes,15 seconds.

On the accompanying DVD the reader can listen to *Public spaces and one* on the track with the same title as above.

Public spaces and one is based on the recorded environments inside the British Museum and outside the area of the Barbican. The sound from within the British Museum is captured from the square that has been roofed in and contains the old library. The environment was chosen due to the interesting acoustics that together with the people walking, talking and moving their bodies creates a large but soft sound that fills the enclosed room of the British Museum. I expected the sound being reflected from the glass roof and the hard material from the walls and floors to be harsh, but instead it comes across as being very gentle and pleasing to the ear. There is probably no place in this room within the British Museum that creates any amplifying due to standing waves. The size of the room and round shape of the room and the round library building in the middle helps in letting the reflections become soft.

The area around the Barbican creates interesting acoustic phenomena but in a different way from the room within the British Museum. The pathway leading out from the Barbican on the second floor across the waterfalls and ponds is full of amplified sound reflections coming from walls, floors and ceilings. The recording does not do justice to the experience when actually seeing the architecture and the ponds – the relationship between the visual impression and how to walk and position yourself as you take the pathway out from the barbican is lost. Thus, without these visual cues, what you actually experience is disorientation, since the acoustic positioning clues coming from the reflections are much stronger that they should be in order fully to understand your body's movement. The affordance of the area around the Barbican is

based on the fact that there is no sound pollution, so the sounds appear clear and separated. The effect of the affordance in this area is that it plays tricks with the listener's spatial ability, in that sounds are not located from their original source but, instead, the reflections *become* the source. When you try to look at the source you face a wall. The wall becomes the sound source, recalling Blesser and Salter's notion about the ways in which reflections from a wall become more then a passive sound element and 'the wall has an audible manifestation' (Blesser & Salter, 2007, p. 2)

In the beginning of the piece a vocoder-treated voice is heard saying, 'hello birds, hello trees'. The perceptual focus is upon decoding the message of the voice, although no sounds representing birds or trees can be heard. A vocoder pad based upon the voice is gradually mixed with sounds recorded at the British Museum in London, creating an environment where a blending of voice, music and sounds occurs and where the affordance is divided between the different layers of sound. A steady tone from within the British museum is heard. At 0:51 a swelling sound is building up until it ends with a bang. At 1:07 a rhythmical gesture built from the sound of an automatic door creates an opening for the next passage that is based upon the note from the beginning. A new bang is heard, followed by a sound that falls in pitch and creates a *ritardando*. At 1:38 a new swelling sound builds up as the sound before it is still falling in pitch. At 1:41 a new bang is perceived, with added sounds from voices within the British Museum that fall in pitch. 1:48 returns the listener to the environment of the British Museum. At 2:06 the voice saying 'hello birds, hello trees' returns and is panned in the front speakers in order to emulate movement within the British Museum. At 2:06 there are clonking sounds, recorded from the environment being looped, that gradually move into the front speakers. At 2:53 a sound resembling birds occurs, followed by the return of the voice. At 3:14 there are voices; at 3:40 a pad; at 3:55 a squeaking sound is heard.

At 4:11, there is a perception of ‘sounds from the subway’ – abstract sounds created from the sounds within the British Museum, perceived as coming from the background. At 6:57 the sound of steps on a staircase is heard. At 7:08 a metallic-sounding rhythmical pattern is heard, derived from sounds within the British Museum. The piece ends with a very low bass tone. All that is left from the initial recordings are the very low frequencies that are heard but never recognised in our everyday mundane reality.

2.6.3 *Pathways of dreamy internal logic*

Produced: 2009-10

Length: 50 minutes, 50 seconds.

On the accompanying DVD the reader can listen to *Pathways of dreamy internal* logic on the track with the same title as above.

> The ‘ghosts’ within sound and memory point to where I am currently propelling myself. I believe that buildings and spaces, like rechargeable batteries that can develop ‘memories’, retain a particular memory, a sense of time or place, of the stories that were these moments, storing them and redirecting them back into the public stream enables one to construct an archaeology of loss, pathos and missed connections, assembling a momentary forgotten past in our digital future. (Rimbaud, 2001, p. 69.)

The presence of a ‘ghost’ within sound and memories, as Robin Rimbaud (2001) describes his feeling towards his work, is similar to the philosophy with which I approached my last piece for this PhD project. I wanted to build upon a similar compositional approach I had developed for the other pieces of this project, but also to incorporate the idea of fading sound memories based on my childhood sound experiences, together with more recent memories of sounds from and in different environments which I have encountered during my journeys to London from Sweden. The piece is also dominated by the journey through different environments, each with its own affordance in terms of the perceived distance between the sound and a listener. I want my piece to create a personal listening zone afforded by dry sounds appearing to emanate directly from the speakers, and thus to emulate the intimate feeling and closeness to the sounds heard that are personal to me.

This piece was created in order to take the earliest sound memories from my childhood and make them the starting point for a new surround piece. I created a long piece that oscillates between recognisable sounds/sound environments and more abstract and whimsical sounds/sound environments. I composed the piece in order for the progression of the composition to have a feel of internal logic whilst at the same time offering the sense of hearing everyday sounds and sound environments.

The piece starts with the sound of paper from pages in a book being flicked. The sound of pages being flicked and the sound of fingers running over paper is one of the earliest sound memories from my childhood as my parents were reading bedtime stories. The sound of paper is located in the centre speaker to create a focus point for the listener. At 0:17 a voice comes in that reads the first part of the book, *Alice's Adventures in Wonderland*, by Lewis Carroll (1865). The source text was chosen in order to enhance the suggestive, whimsical feeling I wanted to create as part of the sound environment. At 0:27 the sound of flicking pages has been transformed into a sound that is bigger in size and contains more bass. The transformed sound of paper is moving between the speakers in order to exemplify the start of a dreamy state of mind, where sound starts to behave and sound differently from the way it would naturally from its real source. The moving sound also contains transient small bangs that mark the position of each speaker and that introduce the framing of the sound environment with regards to the speaker setup. At 0:43 a transient bang is heard together with a new surround sound that illustrates a dreamy state of mind. The narrator now speaks in a room, making the voice more distant from the listener. The voice of the narrator is starting to get fragmented, and transformed patterns move between the speakers mixed together with sounds placed in the background. I created the sense of a personal environment being mixed with more distant sounds in order to expand the listening environment based on the

perceptual movement between foreground and background sounds. The surround sound introduced at 0:43 contains small squeaking sounds that are metallic in their character. The surround sound also contains slower sounds that are falling in frequencies, and this combination creates a sense of soothing waves slowly moving downwards in order to enhance the sense of falling asleep. The sound is a transformation of a section originally heard at 6:10 in order to introduce the timbre of the sounds in a foreboding manner, and to illustrate the spiral composition in using sound elements that reoccurs throughout the piece. The surround sound is made with the intention of creating a sense of a journey, both mentally and physically. The sounds represent for me the sounds in Paddington station as I arrive in London. At 0:44 the transformed sound of a ventilation fan in my office is introduced, and this sound reoccurs at the end of the piece together with the original recording of the ventilation fan. I aimed at using sounds from my near surrounding as the basis for the dreamy state of mind that starts to develop in the beginning of the piece. At 1:41 I used a recording of me walking in snow further to enhance the feeling of moving and being on the start of a journey. The sound creates the feel of being in a cold environment and is deliberately used as a contrast to the falling sounds in the background; and thus the listener can experience two sound environments being present at the same time. The sound of me walking is panned from the back to the front so that a sense of moving in the speaker frame is created. At 3:50 a surround passage is introduced containing household objects, together with the sounds of my two daughters imitating animals and machines. Soon after this they are transformed into more abstract musical and rhythmical patterns. I created fragments of recognisable voice parts that capture the timbre of a voice. I also wanted the voice sound to reflect the transformed moving sounds of the narrator in the beginning of the piece where a focus upon the voices through vococentrism (Chion, 1994) is created, but where the perception of meaning of the words is fragmented and where the syntax is lost. At

7:30 a rhythmical pattern based on bangs of doors is heard and is transformed into a more electronic sound, making the transition from a recognisable sound to a more abstract sound nevertheless held together by the rhythmical pattern. At 9:40 the voices of my daughters come back in the form of a swelling sound. At 11:40 the voice of my youngest daughter returns in the right surround channel. As she is trying to mimic the sound of a crocodile she says the Swedish word for crocodile, and at the same time she realises that a crocodile does not sound like this, and she starts to laugh. At the same time, a loop created from the sound of a balloon bursting, that has been processed into an electronic sound can be heard, together with an electronic rhythmical patterns. These electronic rhythmical patters are based on the voices of my daughters. The voices of my daughters have been heavily processed, by using a vocoder. At 17:06, at the same time as the sound of a dishwasher, and the sound of me trying to get into my car, there is a distant sound heard from the right surround channel based on sound fragments from the British Museum. As the distant sound is panned to fill the front speakers, a processed variation of the paper sound that could be heard in the beginning of the piece is heard. At 19:06 the sound from the British Museum is now transformed into a noise that is falling in frequencies; once again, this represents the dream state of mind introduce in the first part of the piece. At 20:55 the part of the crocodile and the heavily treated voices of my daughters return, but this time in a simulated room much like the one I used in Gallery P3. The intimate sounds from my home are now transformed into reflections of walls, thus changing the perception from the dry sounds to the connection and distance between a perceiver and multiple sound sources. At 21:08, sounds from my office chair and the sounds of myself breathing and running my hands through my hair are heard in the front speakers as well as the surround speakers. They have been reversed and treated with reverb and the reversed again in order to create a sound where a room is getting smaller and disappears as the sounds progress. At 22:02 the reverb

disappears, and only the recorded sounds can be heard. At the same time a new room is presented by introducing a bar environment and the chatter of people. There is also a sound from a fountain in form of water drops hitting a surface, within this environment. At a distance a sound of a plane can be heard as it is passing by. At 23:30 the environment of Trafalgar Square is heard as the First of May demonstrations is taking place. The sound of *The Internationale* is heard in a distance and, even though it is an actual recording by me from the event at Trafalgar Square, this sound represents a lost time for me, as the tradition of these First of May demonstrations has all but disappeared in my hometown; but I still recall vividly that *The Internationale* used to be played by marching bands that could be heard passing my apartment early in the morning on May Day. At 24:38, as the *Internationale* is still being heard, I have placed a sound of a squeaking lorry toy. The sound is similar to the sounds of cranes being heard in *Summerhouse, doors and the woods*, and thus it forms a duality in its perception of a possible source. The squeaking sound is treated with a large reverb to emphasise its dreamy state. At 25:08 the listener hears the sounds from the underpass leading towards the tube station at South Kensington in London, as people are walking and talking. At 25:23 the processed sound of the narrator from the beginning returns, with a simulated room, in order once more to simulate an experience of a room taking over the perceptual focus. At 26:00 the sounds from inside a train leading to Arlanda airport are heard. Here, a sense of 'listening in' to other people's conversations is introduced by presenting sounds that are in the listener's foreground, albeit one shared with other people. At 26:08 a train can be heard arriving at the station in the town of Skövde, and the sounds from the train as it stands still together with all the sounds from the platform. At 30:30 the narrator comes back, but there is no coherence in what is being said due to the heavy processing and fragmented nature of the voice being heard. The narrator is in the foreground field, so the attention is towards hearing and listening to

the voice, but a semantic understanding is not possible because of the insoluble syntax of the voice after my treatments. At 31:48 there is a looped and processed sound from the British Museum with some abstract patterns derived from the sounds within the British Museum. At 33:45 there is a squeaking sound from the British Museum that has been looped and then slowly is transformed into an electronic pad sound. The pad sound is mixed through all speakers in order to create an immersive feeling when listening to the sound. The pad sound is then given greater reflection from a reverb in order to give it a more room-connected quality, and in the end it is transformed from a squeaking non-musical sound to a musical, tone-dominant sound, and finally back to a non-musical sound. This forces the cognitive pattern to change and the affordance to oscillate between different modes of listening. At 38:00 there is a sound of sucking in air into a mouth. The movement of the air is enhanced by using a backwards reverb that creates the sense of being sucked into a very personal sphere of listening, normally only heard by the person producing the sound. This personal listening sphere is the same as a voice over in cinema creates, where the voice sound as it does when we hear our self speaking as well as the internal resonance from our head and body. At 38:15 steps in snow are heard. The steps are being heard as moving from the back surround speakers towards the centre speaker. The movement seems un-natural since the pace of the steps does not match the actual distance between the back speakers and the centre speaker. This creates a duality where the documentary feel of the sound does not match any realistic movement of the given sound. At 39:31, the sound of steps in snow has been transformed into a sound that gives the impression of having been recorded inside a concrete pipe. To this sound is added a sound of steps in snow with heavy distortion, in order to transport a listener from a realistic recognisable sound to the sound of noise. The noise is then getting thinner in terms of number of frequencies and, in doing so, the sound of noise moves towards a

tone, and a more musical appearance. At 41:31 the musical noise is mixed with the sound from a fan in an office. The fan noise takes over and later, at 42:32, a processed variation containing sweeping sounds comes in. At 42:41 part of the beginning is returning, but this time placed within a simulated room, in order to give the effect of being in a larger place where the speakers are separated by a greater distance than they have in the 5.1 mix. At 43:53 the squeaking chair returns, this time treated with delay. The piece ends with mundane sounds recorded in my family's apartment.

2.7 Outcome of the final three constructed sound environments

The final three constructed sound environments that were constructed for the PhD project were based on a different approach regarding the method of recoding sounds from that employed for the first four environments. If the first four were based upon making recordings with whatever sounds I found interesting in terms of their behavioural properties, the final three constructed environments were based on recordings where the focus was upon finding sounds that were more personal to me, in addition to having sounds derived from a more public sphere. I wanted to explore the mundane sounds of my everyday reality to see what sounds were hiding in my surroundings, sounds that were perhaps too familiar to be noticed, as Benschop (Benschop 2007) suggests below, regarding the potential for new sound art to 'give back' to a listener what is hidden in our daily life:

> …not to what has been lost in time, but to what is maybe all too familiar: on the streets, in our offices, in our homes, on our television screens. (Benschop, 2007, p. 496)

In *Pathways of dream internal logic* I felt that the constructed sound environment needed to be longer then the rest of my sound environments. The idea was to give a potential listener time to get adjusted to the different moods and spaces that each section afforded. In my earlier work I moved perhaps to quickly between different sections, and juxtaposition of sounds that afforded a lot of things at the same time from a potential listener. In *Pathways of dream internal logic* I wanted to move between abstract environments and I felt that needed more time o get adjusted to recognisable, recorded environments that could give a listener a recognisable

Especially the usages of voices become different in the last constructed sound environments. I focused upon allowing the

recordings of voices to be heard untreated for a longer time, so that a sense of listening in, or eavesdropping could be achieved. I felt that the natural, un-scripted voice related to me to an everyday experience, where I overhear people talking, and involuntarily sharing pieces of their life. For me it produced the sense of a more intimate listening, than could be provided by a scripted narrator.

In the final three constructed sound environments I tried to balance the use of abstract and concrete sounds so that a smoother passage between them was obtained. I wanted to give a potential listener a chance to follow the progress between concrete sounds towards abstracts sounds so that the listener felt as moving between different environments. Much consideration was taken into creating different zones of audition within the 5.1 mix so that the experience oscillated between a sense of being fully immersed in the sound to listen to specific sectors within the 5.1 mix.

2.8 Enclosed rooms and zones of audition part two

If the first four constructed sound environments in the PhD project were the result of experimenting with different spaces and speaker configurations, the remaining three constructed sound environments became simpler in their appearance. For the final four constructed sound environments I worked with 5.1 surround mixes, in order to make further work and analysis more traceable and replicable.

I worked with eight channel systems as I created the exhibitions in the art museum in Skövde, in the space within University of Skövde, and in Gallery P3 in London. For the installation in Gallery P3 in particular, I wanted to have as many speakers as possible, at the same time I did not want clutter the space with speakers. With hindsight, five speakers could have been sufficient to fill the space with sound and create different listening zones.

Working with five speakers enables for a large number of people to have easy access to my work in their home environment, in order to create a deeper understanding of my pieces by repeated listening. Additionally, of course, a 5.1 mix can be used in comparative analysis of the effect of having different spaces incorporated in the constructed sound environment.

Chapter 3. Outcome and conclusion

The ecological approach to sound perception within my constructed sound environments has generated a number of conclusions and theoretical outcomes that will be discussed in this chapter. The chapter ends with a suggestion for further post-doctoral work based on the experiences made in this PhD project.

As this PhD project has progressed I have tried to find a balance between newly created abstract sound environments and recorded realistic sound environments. As I began my research the inclusion of newly-created sounds and sound environments seemed very important to me, as I thought that this would generate an interesting and dynamic mental journey between different perceptions. As I look back on the musical results of the research I begin to feel that, for the purpose of creating constructed sound environments, at least, the element of abstract sounds that are similar to electronic sounds is not necessary. If sounds are to be transformed it would be better to keep the timbre and the organic feel of the recordings I make. The notion of re-discovering sounds that are around us on a daily basis feels more urgent as this PhD project has come to an end.

3.1 Plastic modes of listening

The constructed sound environment contains the possibility of surprise, and of putting a listener in a state of being perceptually 'lost', since a large number of sounds based on different listening modes, and a similar range of spatial sound markers fight for attention. The sense of being lost is, however, not to be seen as a failure; rather, it is this very sense that makes a constructed sound environment semantically rich, cognitively challenging and emotionally interesting. The different affordances created simultaneously, and the augmented listening situation, demands the listener's attention; and the symbiosis of the surprising with the familiar creates a dynamic tension that is not a problem to be solved – it has to be enjoyed and explored.

In his text *The Poetics of the Open Work,* Umberto Eco (2004) tackles the indeterminacy evident in the work of Stockhausen and Cage, and he explores the relationship between this compositional philosophy and contemporary science and culture. Eco sees this indeterminacy not as the failure of contemporary society, but rather as a new possibility for expanding our perception and appreciation of works of art:

> It would be quite natural for us to think that this flight away from the old, the solid concept of necessity and the tendency towards the ambiguous and the indeterminate reflect a crisis of contemporary civilisation [*sic*]. Or, on the other hand, we might see these poetical systems, in harmony with modern science, as expressing the positive possibility of thought and action made available to an individual who is open to the continuous renewal of his life patterns and cognitive life patterns. (Eco, 2004, p. 171)

Through my practice I created sound environments that only have faint recognisable elements, referring to what is 'known' by a possible listener. These sound elements can be sounds that are recognisable from a listener's mundane everyday sound experience; the elements can also be musical patterns that contain a progression towards a resolution, a reward in delivering what is expected, a musical affordance, as Eric Clarke (Clarke, 2005) has shown. I do however leave it open for anyone to experience his/her own perception of my sound environments and the possible reward in following the musical affordance. What is important for me is to infuse a conscious awareness of the actual listening process into the construction of my sound environments. By incorporating 'known' material into more abstract patterns, movements and musical gestures I want to change the contextualisation that creates the base for action, based upon everyday sound perception, and to open up the possibility of a perceiver becoming an active listener.

As Drever comments upon his own work, even an ethnographic work can enhance a listener's perception of sound:

> Not only was the work a journey through space and place but also a journey through time. Ultimately, my goal as an artist in such works is to induce fantastic daydreams; disseminating a poetics of space, place and culture through the medium of sound. (Drever, 2001, p. 76)

What has become ever more important over the course and development of this PhD project is to rely on a perceiver's imagination and even fantasy about what is being heard. The constant re-evaluation of what is autonomous in the constructed sound environment, and of whether the surrounding space is part of the constructed sound environment or merely contains it, is the driving force in my continuing investigation in sound, listening modes and affordance.

The testing of the constructed sound environments in enclosed rooms provided the insight that a collision between an already balanced mix, in terms of spatially-distributed sounds in a controlled environment such as a studio, and the acoustic premises of an enclosed room could enhance the sense of perceptual surprise and of being lost. If the constructed sound environments would have been created for a specific place, then the experience would have been a more comfortable one, where the enclosed room would have produced one chamber of sounds rather than zones of audio that can be perceived as attention-grabbing units.

As discussed in chapter 1, our daily environment presents the conditions for acousmatic listening (Schaeffer, 2004) that, in turn, affects the affordance patterns when entering and hearing a constructed sound environment such as my own. In the constructed sound environment that has an acousmatic connotation, there is a

contradiction apparent in regards to what is being afforded, as exemplified by Luke Windsor (1995):

> The piece may afford an infinite number of interpretations, none of which exhaust or define its potential affordances. Nonetheless, the piece seems to demand an *attempt* to find an affordance structure. The listener perceives that some of the sounds specify events, or the manipulation or juxtaposition of sounds that *should* specify events but fail to do so. The aesthetic nature of the acousmatic piece lies in its position between the demands of everyday perception and its contradiction of the specificity which provides for a structured and relatively unambiguous relationship with the world. (Windsor L. W., 1995, p. 116)

The point of contact between my work and Windsor's argument is that recognisable sounds are not only a reference to a *recorded environment* – they *are* the environment. The difference in my work is that I introduce sounds that are not part of our everyday perception into such an environment. Windsor has purposely excluded the spatial ability and concentrated upon the relationship between everyday perception and the perception of acousmatic pieces as they are perceived from recordings. He therefore does not include the effect that different listening conditions have on the sounds in an acousmatic piece.

> Sound-art-music-soundscape makes it possible for us to play interactive games in more than one place at the same time. We can dramatise [*sic*] a place using sound, change the ambience using film, overlay one place with the sounds from another, and create multidepth fields of association. A little signal, or the tonal quality of a particular instant in time, can trigger a

> whole set of memories and association. We read the various soundscapes of reality, involve them in new discursive games in order to understand, redefine and shape the space/room in which we exist, constantly making agreements and choices. (Dyrssen, 2007 p. 24)

As Dyrssen (2007) suggests, the dramatization of a place can involve a new discursive game, and the dramatization relies on agreements and choices by what is being afforded by a sound environment, In other words, a sound environment constructed for and in a specific place alters that place's expression, both on an aesthetic level as well as an perceptual level. The choices include what sound to listen to, where they come from, what they mean, and how they relate to the specific place chosen for a constructed sound environment. The choices also include whether or not memories and learned cognitive patterns should be included in decoding a sound environment with regards to what it affords from a perceiver. Dryssen's argument also implies that the listening process is an active process decided upon by a perceiver, not a passive registration of sonic stimuli that is processed by the brain. My own interest lies in creating an interesting discourse in my sound environments that builds upon the listener's ability actively to decide what to hear and listen to, in terms of what is being afforded.

The direct action taken within a constructed sound environment is ameliorated by the following conditions:

The speakers, if visible, create visual sound objects that can be perceived as having density, volume, material, surface and structure.

The speaker placement also affords the visual measurement of distance to a perceiver who is able to place him/herself at a distance between him/her and the speaker. As Gibson has stated the visual perception in this condition creates a point of observation where a

perception of the environment as a whole is not possible. ‘Whenever a point of observation is occupied by a human, about half of the surrounding world is revealed to the eyes and the remainder is concealed by the head.’ (Gibson J. J., 1986, p. 112) The perceiver in order to grasp the whole of the environment have to move his/hers head in order to fully grasp what is afforded around him or her. ‘The head turns, and whatever was in back of the head at one time will be in front of the head at another and vice versa.’ (Gibson J. J., 1986, p. 112). Gibson labels the things we cannot se but wants to explore as ambient information. ’The purpose of vision, I shall argue, is to be aware of the surroundings, the ambient environment, not merely of the field in front of our eyes. The ambient information is always available to any observer who turns his/her head. Visual perception is panoramic and, over time, the panorama is registered.’ (Gibson J. J., 1986, p. 112). When it comes to the perception of my constructed environments when exhibited in a physical space, where the speaker placement affords seeking out zones of audition, the registration of the ‘panorama’ takes place both visual and through the act of listening. A perceiver seeks the cause of the sound (the speaker); the sound object, and moves his/her head and body in order to both see and listen to the sound object. At the same time as the ‘panorama’ is scanned the listener can hear his/hers surroundings in the form of the sound radiating throughout the phsycial space. The fact that sound can be heard all-around a perceiver, means that the surrounding sound can never be labelled ‘ambient’. Sound is always present and thus the surrounding environment is always heard and listened to in an active way in order to seek what specific affordances the environment provides.

If affordance can be described as the direct action taking place within any given environment, then affordance is based upon the perception of an environment being autonomous. If parameters such as long-term memory and references to external places and events part from the constructed sound environments are to be

considered, the ecological approach does not fully incorporate all the relationships created with sound and memories, since it does not include cognitive patterns as models for understanding an environment.

> Western industrialised nations today form a more or less homogenous culture dominated by European and North American ‘art music’ and Anglo-American popular music. Through the phonograph record, radio, and television, the same music is to a great extent scattered across the entire world. Each hearing person who listens to the radio, watches TV, goes to the movies, goes dancing, eats in restaurants, goes to supermarkets, participates in parties, has built up, has been forced (in order to be able to handle her or his perception of sound) – to build up an appreciable competence in almost every living space. (Stockfelt, 2004, p. 88)

Stockfelt’s (2004) remark show that each hearing person has built up an appreciable competence about the sounds in every living space is an example of the degree to which we inhabit and understand every environment we encounter. In my sound environments, however, I present several environments concurrently, or several environments consecutively, forcing listeners to change their listening modes due to changed conditions. As Forrester (2000) points out, there is also a fight for our attention in our everyday sound experience, a fight of attention I also have recognised in my own constructed sound environments, between what can be said to be perceived as ‘internal’ and ‘external’ sound experiences:

> In one sense we might say that we feel more detached from the visual world. Sound experience is always a

> sensuous experience at one level, an interdependent time/space geography of constant and continuous dynamic events. Even in circumstances where you might imagine the experience of complete silence, a moment's reflection highlights the nature of such a fantasy. Consider for example that if you were sitting in a sensory deprivation chamber, at the very least you would nevertheless hear the sound of your own blood flowing through your veins and the beating of your heart. Auditory experience is a special sensory key to interiority, and, as noted earlier, when listening to sound through earphones one quickly realises that the borders between the 'external' and the 'internal' are as much determined by language and discourse as they are by phenomenal experience. (Forrester, 2000, p. 38)

In my work I have utilised the experience that Forrester describes as the borders between the external and the internal in combination with the centre-peripheral theory by Mark Johnson (1999) where all sounds are to be heard within the radiation from a perceivers body.

The crucial aspect of this research is the conclusion that are several perceptual processes taking place at once.

Sound art can be described as a plastic art form, but if affordance theory is applied to sound art, the perception of a constructed sound environment must be plastic as well; it would afford plastic modes of listening. As this PhD project started, I described my work as an art form that afforded oscillation between different listening modes; but as my research has progressed I am more convinced that it is not merely an oscillating process that takes place, but a number of perceptual processes taking place at the same time.

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