

LISTENERS AND IMAGINATION:
A QUATERNARY FRAMEWORK FOR ELECTROACOUSTIC MUSIC LISTENING AND
ACOUSMATIC REASONING

By

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A DISSERTATION PRESENTED TO THE GRADUATE SCHOOL
OF THE UNIVERSITY OF FLORIDA IN PARTIAL FULFILLMENT
OF THE REQUIREMENTS FOR THE DEGREE OF
DOCTOR OF PHILOSOPHY

UNIVERSITY OF FLORIDA

2008

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ACKNOWLEDGMENTS

I thank Dr. Paul Koonce for his guidance. His compositions and those of many other electroacoustic composers have helped me greatly with this dissertation. I also thank Professor Celeste Roberge for offering valuable input during the early stage of the dissertation. Furthermore, I am much obliged to Dr. Paul Richards and Dr. David Z. Kushner for their advice and input during my doctoral study and for my dissertation. I am grateful to my parents and parents-in-law for their prayers and support. And finally: love you, Sung Eun.

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Abstract of Dissertation Presented to the Graduate School
of the University of Florida in Partial Fulfillment of the
Requirements for the Degree of Doctor of Philosophy

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August 2008

Chair: Paul Koonce
Major: Music

With its use of everyday sounds, electroacoustic music encourages listeners to engage in listening not only to sound, but also for sound, that is, for what it references. This dissertation proposes the use of acousmatic reasoning within a quaternary framework as a way to navigate the many implied shifts between spectromorphological and semiotic listening in electroacoustic music.

The dissertation begins with an examination of the dis-embodiment and dis-placedness of recorded sound and source-place decoupling. Recognizing these issues in recorded sound and their effect on electroacoustic music listening, the dissertation introduces a quaternary framework based on Body, Place, Non-body, and Non-place. Successive chapters examine the relation between listening and imagination, sound-images, and the negation of sound-images followed by the proposal of acousmatic reasoning as the primary process at work in the quaternary framework. Further investigation is made of the two listening modes of acousmatic reasoning, the semiotic and spectromorphological listening modes, and three types of inferential abduction—overcoded, undercoded, and creative abduction—used by listeners in acousmatic reasoning to move between the two listening modes. Finally, the dissertation observes and

discusses the implications of acousmatic reasoning within the proposed quaternary framework by conducting an analytical listening of *The Flywheel Dream* by Paul Koonce.

Welcome to Hasla, a five-channel electroacoustic composition, is included with this dissertation. The original version of the piece in five channels is presented on DVD, and the stereo reduction of the piece is presented on CD.

CHAPTER 1 PROLOGUE

Any act of interpretation is a dialectic between openness and form, initiative on the part of the interpreter and contextual pressure.

—Umberto Eco, *The Limitations of Interpretation*

A car! Did you hear it? Wait, there is more: a pack of ‘drowsy’ and elongated sounds, moving about left to right and right to left, ups and downs, far and close; cars, again, or perhaps, car-like sounds (at this point, I may be wrong); whistling; the siren gracefully sweeping about; engines turning on and off, honking back and forth; children laughing and running; people chatting; and laconic instrumental sounds. Am I on the street? No, I shouldn't be on the street. *There is no street like that save in one's imagination.*

While listening to the electroacoustic composition *Walkabout* by Paul Koonce, whenever one hears a hint of recognizable sounds in a recognizable place, one clings onto them. They are anchors in this fantastic world; without them, one quickly loses track of where anything is, and more, where one is. The piece presents the listener with this world, or rather, the listener conjures up this world with her imagination using sounds that are or are not identifiable. These sounds give rise to, amongst other things, a street—that is, they function as accretive layers of a *semiotic-scape* we might call a street.

But this street is *not* a street; and that is the whole point. Listening to *Walkabout* is to be confused between what is and what is not; what is fantastic and what is mundane; what is familiar and what is strange; although I can recognize causality behind sounds that I hear, this causality seems to be divorced from reality. But somehow, they make sense to me. How is it possible?

This possibility of making-sense of sounds in electroacoustic music is what this dissertation is about. Examining this possibility means examining how listeners listen to

electroacoustic music, which in turn leads to observing how listeners use inference, a process of reasoning based on evidence acquired not only by listening, but also by imagining.

Therefore, this dissertation considers electroacoustic music listening as a two-sided process. On the one hand, it affords listeners unlimited freedom in exercising their imagination. On the other hand, it involves their processes of reason, which delimit, while at the same time, realize or materialize, their imagining. Furthermore, this two-sided process requires a ground (a map, if you will) on which their reasoning processes can function. Katharine Norman writes:

We might chart a world of listening. But, as someone once said to me (and I'm sure you've met this audience member in one guise or another), 'Do you really call that stuff you're doing "music"?'. Well, of course, that depends on how you listen. Here's my suggestion: do not subscribe blindly to schools of thought; follow your ears and intuition. But don't confuse this with lack of rigour. The charts we draw, read and follow through attention to both our own and others' listening relationship to the world can be dynamic and flexible, and can accommodate various shifts of orientation. But they are not an abdication from making music, since they still require thought, commitment—and active intent. Making music from listening, through the medium of recorded sound, is a composed listening that takes some work from both map-maker and map-reader. It helps to have directions of some kind, if you want to go further than halfway there and back again. (Norman 2004: 71-2)

The ground or map that this dissertation proposes is one of these charts listeners may draw and follow. It is *a* representation of how listeners engage in electroacoustic music, how they relate their listening to everyday experience, and how they imagine. Indeed, it is my map as it bears my reading of this music; but it is a map constructed of concepts that are ubiquitous in listening—that is, the map proposed in this dissertation shares many of its properties with those that will be drawn by others. The map proposed here will not help listeners locate themselves, but rather remind them where they have been and where they are going. It is a map of a journey, of a process, of a becoming.

To construct this map of becoming requires that we identify and examine the interlocking of its primary properties and processes; to this end, the chapters have been organized in the following way. Chapter 2 begins with an examination of recorded sounds, their dis-embodiment

and dis-placedness, and the decoupling of source and place, which electroacoustic music draws upon. Later in this chapter I propose a quaternary framework with four poles: Body, Place, Non-body, and Non-place; the poles are identified and explained through several relevant electroacoustic compositions.

Chapter 3 discusses imagining as a phenomenological probe employed by listeners in electroacoustic listening. Arguing that imagining is the practical method that listeners use in electroacoustic music listening, I examine in detail the processes of imagining, and furthermore, discuss what and how we imagine. This discussion leads to the observation that sound-images are the products of imagination.

Chapter 4 proposes body and place as sound-images and surveys the properties of these two important poles in the proposed framework. Furthermore, in this chapter, I investigate three types of negation processes in sound-images and discuss these processes based on musical examples.

Chapter 5 discusses the two modes of electroacoustic music listening: the semiotic and the spectromorphological, and proposes acousmatic reasoning, with its interworking of these modes, as a process of listening within the proposed quaternary framework. The proposal of acousmatic reasoning is followed by a close examination of its inference processes based on abduction as well as syntactically relevant properties (SRPs)—that is, properties of sound-images, identified by listeners, that are closely related to the processes of acousmatic reasoning.

Having proposed and discussed all the key issues, terms, and processes involving acousmatic reasoning within the proposed quaternary framework, I set out an analytical listening exercise using *The Flywheel Dream* by Paul Koonce in Chapter 6 to show how acousmatic reasoning and the proposed framework actually work in electroacoustic music listening. Chapter

7 concludes the dissertation by revisiting some of the key issues in previous chapters, discussing the limitations of the proposed framework, and proposing future studies.

CHAPTER 2

INTRODUCTION TO A QUATERNARY FRAMEWORK FOR LISTENING TO ELECTROACOUSTIC MUSIC

“From now on, I’ll describe the cities to you,” the Khan had said, “in your journeys you will see if they exist.” But the cities visited by Marco Polo were always different from those thought of by the emperor. “And yet I have constructed in my mind a model city from which all possible cities can be deducted,” Kublai said. “It contains everything corresponding to the norm and calculates the most probable combinations.”

“I have also thought of a model city from which I deduce all the others,” Marco answered. “It is a city made only of exceptions, exclusions, incongruities, contradictions. If such a city is the most improbable, by reducing the number of abnormal elements, we increase the probability that the city really exists. So I have only to subtract exceptions from my model, and in whatever direction I proceed, I will arrive at one of the cities which, always as an exception, exist. But I cannot force my operation beyond a certain limit: I would achieve cities too probable to be real.”

—Italo Calvino, *Invisible Cities*

Integration of Source and Place in Sound

Listening to music is strongly conditioned by what can be called ‘presence’: the presence of instruments and performers, the presence of audience, or the presence of places such as concert halls, churches, or chambers in which music is played. Imagine, for example, that we are listening to Bach’s *Suite No. 4 in E-flat for Unaccompanied Cello*; as we listen, imagining the performance, we sense the presence of the performer and the way the performer’s body movements and gestures connect with the sound we hear.

While less evident, we might also imagine a place in which this music was played. We might assume it to have been a small hall, suited for a solo performance, but not a large concert hall. By contrast, the first movement of Mahler’s *Symphony No. 5 in C-sharp minor*, for example, sounds as if it could not exist in anything other than a large concert hall.

Making music has long been an act of integrating various musical and related or supportive activities. When making music, we typically sing or play instruments while listening to the sounds that come from them. We create symbols and codes to mediate and/or prescribe the

sounds we wish to hear and the actions with instruments needed to make them. More preparatory activities exist as well, such as the making of the instruments or the creation of places in which to play and listen to them. As a quick survey of the scholarship on the history of music attests, the integration of performance, instruments, and space have long been and remain central to the tradition of music making (Blaukopf 1992; Forsyth 1985; Geiringer 1978; Muecke & Zach 2007; Sachs 1940; Thompson 2002). It is, therefore, no wonder that our experience of music is bound up with the various activities with which music is habitually intertwined: going to a concert; watching performers on the stage; listening to them sing or play; and being a part of an audience community are all part of our routine as listeners.

Just as our experience of music is tied with these various activities that condition how we listen to music, our experience of sound in general is also conditioned by the circumstances that determine and frame *what we hear* (a sound's source) and *where we hear it* (the place in which it sounds and reverberates). Source and place are central to our listening experience, as music listening reveals. For example, in listening to the Bach cello suite, we would, barring intervening media, expect to be in the presence of both cello and cellist, experiencing both the performer's physical movements and the sounds they create, if not more, the sounds they become. Examining music's representation in visual art, Leppert writes:

The body *sounds*: it is audible; it hears. Sound constitutes the atmosphere supporting and confirming life on and in the terrain of the body. The ether of aurality is vital; it is constitutive of noise, language, and music. The body is a sight and a sound (and more, but these two are my concerns); the body is sighted and hears; the body sees and makes audible. Indeed, throughout much of Western music history, a virtual homology existed between these two human senses, producing mutual semantic mediation, though this is not the case today given the plethora of possibilities for separating sound from the sight of its production via electronic technologies. Thus historically musicians were hidden from view—in late medieval mystery plays, Italian Renaissance pastorals, Elizabethan masques, and finally Wagnerian music dramas at Bayreuth—to achieve particular effects (magic and mystery) by the socially abnormal rupture of sound from sight. For much of Western

history, at the most fundamental levels of human perception, the sound *is* the sight, and the sight *is* the sound (Leppert 1993: xix-xx. Emphasis is original.).¹

As Leppert argues, the synthesis of hearing the sound and seeing the source as it is made governs our experience of sound, and therefore, of music, at the most fundamental level.

Furthermore, western music history shows us how places such as churches, concert halls, and chambers in aristocratic society influenced the process of music listening. These places, each of which is unique in both its acoustic characteristics and social function, shaped the type of music played, the audience, and the way people listened. Dart writes:

Even a superficial study shows that early composers were very aware of the effect on their music of the surroundings in which it was to be performed, and that they deliberately shaped their music accordingly. Musical acoustics may be roughly divided into “resonant,” “room,” and “outdoor.” Plainsong is resonant music; so is the harmonic style of Léonin...and Pérotin.... Pérotin’s music, in fact, is perfectly adapted to the acoustics of the highly resonant cathedral (Notre Dame, Paris) for which it was written. The intricate sophisticated rhythms and harmonies of the fourteenth-century *ars nova*...are room-music; pieces written in the broader style of the fifteenth century...are resonant music. Gabrieli’s music for brass consort is resonant, written for the Cathedral of St. Mark’s; music for brass consort by Hassler or Matthew Locke is open-air music, using quite a different style from the same composers’ music for stringed instruments, designed to be played indoors. Purcell distinguished in style between the music he wrote for Westminster Abbey and the music he wrote for the Chapel Royal; both styles differ from that of his theatre music, written for performance in completely “dead” surroundings. The forms used by Mozart and Haydn in their chamber and orchestral music are identical; but the details of style (counterpoint, ornamentation, rhythm, the layout of chords and the rate at which harmonies change) will vary according to whether they are writing room-music, concert music or street music (Dart 1954: 56-7).

Likewise, Forsyth claims that the music of the Classical period, whose textures change more rapidly than those in Romantic era music, could be heard better in the smaller, overcrowded concert rooms of the time, such as the Holywell Music Room, Oxford, the Hanover Square Rooms in London, or the Altes Gewandhaus in Leipzig that offered acoustic clarity and intimacy as a result of their short reverberation times. On the other hand, he continues, some of

¹ From now on, all italics in quotes in this dissertation are found in the original.

the music of the Romantic period is “best heard in a relatively reverberant hall, such as the Concertgebouw, Amsterdam, and the Musikvereinssaal, Vienna” because “the blending effect of reverberance is like the brush strokes in an Impressionist painting,” so much so that “the shimmering music of Debussy, its colors sparkling and ethereal, even seems to possess its own ‘built-in’ reverberance” (Forsyth 1985: 17).

Not only did composers recognize and articulate the crucial role that places play in music making, but performers also understood intimately the importance of the venues in which they played. Forsyth observes (*Ibid.*: 22) how Johann Joachim Quantz, famous flautist at the court of Frederick the Great and author of *On Playing the Flute*, gave his students advice on how to cope with the different acoustics of the places in which they were to play:

In the choice of pieces in which he wishes to be heard in public, the flautist, like every other soloist, must adjust...to the place where he plays.... In a large place, where there is much resonance, and where the accompanying body is very numerous, great speed produces more confusion than pleasure. Thus on such occasions he must choose concertos that are written in a majestic style, and in which many passages in unison are interspersed, concertos in which the harmonic parts change only at whole or half bars. The echo that constantly arises in large places does not fade quickly and only confuses the notes if they succeed one another too quickly, making both harmony and melody unintelligible. In a small room, on the other hand, where few instruments are at hand for the accompaniment, the player may use the concertos that have gay and *gallant* melodies, and in which the harmony changes more quickly than at half or whole bars. These may be played more quickly than the former type (Quantz & Reilly 1966: 200).

As the above examples demonstrate, source and place have long been tightly integrated into our listening experience.

Dis-embodied Sound through Recording Technology

Decoupling of source and place

The twentieth century’s advances in electronic technology introduced new ways in which to experience sound, its source and place. With the advent of recording technology, the ability to record sounds in one place and reproduce them in another challenged and even broke the

connection between sound and place, liberating sound from place both physically and socially. One can now record the sound of a full orchestra from a concert hall and play it in a small, closed room. No longer does the orchestra need to be physically in front of us as long as its auditory presence is captured and faithfully reproduced. Looking back to the first example, we can see that our hearing of a cello through recording does not depend upon the physical (and visible) presence of a cello, or its performer, as we accept, without question, the ability of technology to present the cello to us. Nor do we need to be in a chamber hall or a concert hall in order to hear the cellist. The advent of digital audio processing has allowed for the simulation of spaces often indistinguishable from their originals.

With the introduction of audio recording technology and its ability to capture the making of sound and the space in which it is made, source and place have been decoupled, inviting listeners to challenge their integration and become engaged with the perceptual, *acousmatic*, circumstances of their original coupling.

Acousmatic situations and reduced listening

The reproducibility and repeatability of sound through the recorded medium allow us to experience sounds in many different ways. As Kane asserts:

Recording and playback through a loudspeaker immediately performs the acousmatic reduction: the recorded sound is stripped of its original causal basis, facilitating a re-direction of attention. Furthermore, recorded sounds can be endlessly repeated without fluctuations in their signal, which is physically impossible outside of mechanical reproduction. Thus, by removing sounds from the flux of causality, recording affords the possibility of studying sounds with a degree of specificity and detail theretofore unimagined. (Kane 2007: 18)

The acousmatic reduction that Kane addresses, born out of the ability to record and play back sound in different spaces, has the potential to engage listeners in the experience of what the electroacoustic music pioneer Pierre Schaeffer called an *acousmatic situation*, which “symbolically precludes any relation with what is visible, touchable, measurable” (Schaeffer

1966: 93). Yet, whatever be the importance of Schaeffer's introduction of the term into music and our contemporary listening culture, the discovery of acousmatic listening does not originate in or coincide with the invention of recording technology. In actuality, acousmatic listening dates back to the era of Pythagoras who, legend has it, drew a curtain in front of himself while delivering his lectures so that students, removed from the distractions of his face or body, would focus on the sound of his voice and the meaning it conveyed.

Acousmatic situations are common in daily life. In fact, we are quite accustomed to hearing sounds without seeing the sources that cause them. However, to knowingly hear sounds through recording is to engage with a fundamentally different type of acousmatic experience, one requiring a mode of listening in which we listen knowing that our benign desire to visually verify the source is being denied. It is these types of acousmatic situations that are the subject of this dissertation, for in their cultivation of visual denial, they intriguingly lead us into the rich subject of how sounds are inferred, and how we can and do read sound through our imaginative hearing of it.

In fact, it was Schaeffer who, in his exploration of composition with recorded sound, first recognized some of the key potentials of acousmatic situations caused by recorded sounds and how the situations invited listeners to listen differently. Schaeffer claimed that an acousmatic situation, created with recorded sound, allows one to “reduce” or “bracket out” the visual cues of the source and to focus, however imaginatively, on the internal quality of the sound and its morphology. For example, when the sound of a car is played back through loudspeakers, listeners, listening in reduced listening mode, attempt to hear the properties of the sound itself divorced from its common, if not simpler, function as semiotic signifier identifying a source, in this case, a car. He called the process *l'écoute réduite*, or *reduced listening* (*Ibid.*: 270-2), in

recognition of the semiotic cues to everyday meaning that this listening mode encouraged listeners to ignore or deny.

Bifurcation of reduced listening

One might imagine that for most people, reduced listening is unlike their daily listening activities. As Michel Chion notes, it is “an enterprise that is new, fruitful, and hardly natural” (Chion 1994: 30) because listeners in reduced listening must make an effort to take “sound—verbal, played on an instrument, noises, or whatever—as itself the object to be observed instead of as a vehicle for something else” (*Ibid.*: 29).

The subject is, no doubt, complex. Closer examination of reduced listening reveals it to be a process involved with more than the sensitizing of listeners to sounds, since in the process of becoming more aware of the sound alone, a comparable sensitivity develops towards the conditions under which sounds minimally and credibly signify; this is particularly the case if the listener (listening from a reduced listening perspective) has difficulty bracketing out the sound’s origin or is more generally inclined to hear sounds as originating in or associated with particular sources and contexts. Viewed this way, reduced listening can be seen as a process concerned with cultivating an awareness of the dialectical opposition between hearing sounds for what they signify vs. hearing them as sound alone—that is, as pure spectral morphologies.

The dialectical nature of reduced listening, with its interplay of sound and source-meaning, was identified early on by the members of the Groupe de Recherches Musicales in Paris (GRM), in particular, Pierre Schaeffer, their most prominent figure. As Trevor Wishart reports:

Although some of the earliest work of the group (e.g., *Symphonie Pour un Homme Seul*) was clearly dependent on the listener’s recognition of the source of the sound material, this approach was quickly rejected. The philosophy of composing which gradually emerged, particularly from Schaeffer’s writings, centred on the notion of the acousmatic and the abstraction of the ‘sound-object’ from any dependent relationship to its origins. (Wishart 1986: 43)

The reasons why Schaeffer and members of GRM turned away from any reliance on the listener's recognition of source are not clear, but, in spite of the direction they finally chose, it is clear that they understood, from their earliest pieces, the role that the listener's identification of sound source could play in acousmatic listening. According to Wishart, it was Luc Ferrari, one of the founding members of GRM, who understood the complex nature of reduced listening. Ferrari thought: "it had to be possible to retain absolutely the structural qualities of the old musique concrète without throwing out the reality content of the material which it had originally." It had to be possible "to make music and to bring into relation together the shreds of reality in order to tell stories." (*Ibid.*: 43)

It is important to acknowledge the bifurcating effect reduced listening has on listeners and their experience of electroacoustic music as it can be seen as fostering and cultivating the type of engagement listeners have with electroacoustic music, a subject of central concern in the chapters to follow. At this point, however, we need to return to the discussion of acousmatic situations.

Effect of acousmatic situations and audio-visual discrepancies

Acousmatic situations are traditionally considered to be those in which we hear a sound while having our visual verification of the making of the sound denied or challenged. What results from them, however, seem to vary. In the case of Pythagoras's lectures, the goal was to have students concentrate on what he was saying—the message. When Schaeffer and other practitioners of musique concrète adopted the acousmatic aesthetic, however, it was used to promote the listener's heightened attention toward the sounds themselves. The difference between being absorbed in a semiotically charged message (the former) and being absorbed in the contemplation of a sound dissociated from its source or what it signifies (the latter) is striking. One similarity between these two scenarios, however, is the absence of the visual cue.

There seems to exist a certain bond between the sounds we hear and the visual cues we associate with sounds and their making; this bond is particularly evident when visual cues identifying sound sources are intentionally removed and the listener subsequently invited into an acousmatic situation.

It is not incidental that the advancement of technology and its integration into our culture have allowed for curious situations involving audio-visual discrepancies that break the bond between the two senses. The use of technology in sound reinforcement is one such situation. Imagine, for example, a flutist onstage, holding (not playing) her instrument while the sound of a flute comes from nearby speakers. If we do not actually witness the cues given by the actions of the flutist playing her instrument, cues which lead us to connect sound with source, then we are led to question the truth of what we see and consequently, the truthfulness of the bond between the sound of the flute and the visual presence of the flutist. And as we face this question, the opportunity emerges to listen to the flute differently. A similar if not more dramatic effect occurs when laptop performers seemingly actualize sound. While what they do may be called a performance, listeners often find it difficult to relate the sounds they hear to the limited physical gestures of the performers. These examples show how listeners can be invited, however unintentionally, into an acousmatic listening mode that heightens either the sound or its context, not because of the visible absence of sound sources (as with recording), but because of the problem of actions and movements that are either missing from the performance or, more subtly, at odds with the sounds heard as a consequence of differences in timing or gesture.

A more telling example in which an acousmatic situation is created as a result of visual-auditory discrepancies can be found in TV programs or films in which the sound is out-of-sync with the image stream; particularly disturbing is a voice that is out-of-sync with the movement of

its actor's mouth. In the case of this synchronization error that causes a discrepancy between the voice and the visible action that produced it, viewers more often recognize when the voice precedes the action of the mouth than when the voice lags it. The Advanced Television Systems Committee (ATSC), for example, suggests in its findings report: "the sound program should never lead the video program by more than 15 milliseconds, and should never lag the video program by more than 45 milliseconds" (ATSC 2003) exactly because of the fact that we experience the sound that precedes the causal action as something inconsistent and detached from the action we see: in short, the sound fails to be *embodied* as a result of its failure to reflexively sonify in proper time the visual action.

In normal (real-world) experiences, sound never precedes the action that causes it, which is why we are more intolerant of sound preceding action. The opposite case, however, is common in our daily life. Sound often lags behind the action that caused it, especially when one is at a distance from the center of the action; it takes more time for sound to travel to our ears than visual information to our eyes. Only through technological (or supernatural or magical) means—either on purpose or by accident—can an action lagging behind a sound be presented to us in a way that appears whole. And even then, the experience can leave many feeling disturbed and uneasy. It is this uneasiness that leads me to call this phenomenon *dis-embodiment*, meaning, literally, that the sound has been robbed of its body. Dis-embodiment is particularly evident when listeners have learned to base the believability of a sound on the tangibility that comes with seeing and feeling its source.

Dis-placed Sound through Recording Technology

Recorded sounds have the potential to be perceived as not only dis-embodied, but also, *dis-placed*. The very act of recording sound, which offers the opportunity to present (recorded) sound in a different place, is an act of 'unplacing' sound: that is, it causes the sound to be

uprooted from its place. The voice of my father, which I recorded during my visit to Korea, sounds strikingly dis-placed as well as dis-embodied to me when I reproduce it in my home in the United States. His voice is not only absent from its body, but also, absent from its place, out-of-place, considering the great distance between my current home and the home where I spent my childhood, where my parents still live. Listening to the dis-placed sound of his voice inspires me to imagine the moment when he was talking and the place that surrounded us (and the others there listening silently). But at the same time it makes me reflect upon my desire to record his voice.

Technology as a mnemonic aid

It is a common desire to record events; it can be thought of as a manifestation of our desire to remember. But to remember what? As commonly seen in photos and video, our desire to remember often centers around a desire to capture our experience of certain places. For thousands of years, people have created maps and paintings of places not only for their intrinsic aesthetic value, but also for their use as mnemonic aids. The invention of photography in the early and mid 19th century, and the later advancement of digital photography that has penetrated much of our daily life, have made the visual capture of places easier. While browsing the large number of superfluous photos that fill a large part of my computer's hard drive, I often wonder: why do people take pictures? What makes people crave photographs? The answer may be found in the very act of photography that captures and even preserves our memory of self and place. Tuan writes:

A photograph is of the moment—an interruption in the flow of time, captured on film, that becomes a stable “place” for one to dwell in and return to should one so wish. Such freezing of a moment was never possible before the invention of the modern camera. Wordsworth, crossing the Alps, very much wanted to retain images of the many scenes that enthralled him, but couldn’t. Now we can. When the camera is defective and none of the pictures we have taken on our vacation trip comes out, we feel dismay. Understandably, for without the images and pauses—without these places—it is as though we have not made the trip. Absent experiences that we can hold on to, it could seem that time just sweeps us along, from one moment to the next, and so on to the last one that ushers in death (Tuan & Mercurio 2004: 26).

Photographs of Robert Smithson’s Spiral Jetty (a monumental earth art work in Utah’s Great Salt Lake) that I took during my recent trip say: I was there. But, I know that I can never be sure that the Spiral Jetty is like these pictures: the pictures may only attest to the fact that the Spiral Jetty was *once* like these pictures, if even that; at best, they bear witness to my *past* experience of this unique trip and place.

Differences between mnemonic technologies

Recording events and places in this medium is like an act of writing with light—which is where the term photography, first coined in 1839, originates.² It is interesting to note that it was about the same time when the term ‘phonography,’ writing with sound, came into use to refer to the recording of sound.³ The etymological construction of these neologisms, *photo-graphy* and *phono-graphy*, reveals the particular undertakings of new technology in the 19th century, which gave birth to these words. With advancements in technology, the way we experience the world has been extended beyond the limits of language and writing, to newer, more sense-based media, such as film, photographs, and sound recordings, that allow us to see and hear the world directly.

² Referring to writing with light, the term photography first appeared on March 27, 1839 in a paper by Andrew Fyfe, presented to the Royal Scottish Society of Arts: “paper smeared with the solution [of lunar caustic] is darkened... Hence the process of photogenic drawing [*as published in May, in Edinburgh New Philosophy Journal, altered to* Hence the art of Photography].” (Simpson 2006)

³ Although the invention of phonography dates back to 1701, it used to refer to a phonetic representation or the spelling of words (*Ibid.*).

It is the superior capacity of new technologies to connect to our sensorium that fundamentally differentiates our experience of a photograph or of a sound recording from that of a painting or a map. As observed by Tuan, with a painting we tend to see not only the picture but also the time it took for the picture to be painted; with a photograph, however, we tacitly believe that we are looking at the very moment in time caught by a camera (Tuan & Mercure 2004: 26-7). In a similar fashion, listening to a sound recording of a place, such as a recording of a street full of people and cars or a rock concert, we seem to make the same assumption: that what is presented to us was captured instantaneously.

While they share many similarities, photography and phonography also have their differences, one of the most important to this study being the way each deals with the capture or *containment* of experience. The process of containing is most evident in painting and photography and their representation of the daily experience of place. While discussing the problem of representing landscape (a form of place) through painting, Casey notes:

Landscape is indeed an extraordinary sort of thing. Composed of particular objects—of animate and inanimate entities, of discrete shapes and colors, of distinctive configurations of many kinds—it exceeds any of them. Indeed, it even exceeds their totality. In this respect, landscape is an instance of what Sartre calls a “totality detotalized” and Jaspers “the encompassing”: it is something that, while being experienced as a single whole, is nevertheless not reducible to the sum of its parts (a “totalization”).... Viewing in this light (which is to say, as not *determinately* viewable in *any* light), the representation of landscape will be predictably problematic. Not only is any straightforward imitation put into question as a matter of principle, but *any* representation of it becomes a matter of difficulty.... The problem of representing landscape can be seen as a quandary of *containment*. How is the artist to contain something as overflowing as landscape within the very particular confines of a painting? (Casey 2002: 6-7)

As Casey points out, experiencing a place—whether one stands on top of a mountain overlooking treacherous sierras that unfold endlessly or sits outside on a patio enjoying the sunny garden—envelops us in a multi-sensory experience: we look at, and at the same time listen to, what is out there; we smell and touch the world—all of which happens simultaneously as we take

the experience in whole. When we find that the technology available to us cannot convey the simultaneity of the multi-sensory experience, we find ways to frame the experience in terms the technology allows. For landscape paintings, photographs, maps, and many similar types of pictographic representation, this means acting to contain what one sees: one decides what to draw or paint, or shoot in a frame. For aural representations, and particularly, the medium of sound recording, however, containing what is heard is difficult to achieve. The reason may well reside in our experience of sound, which is more immersive, encompassing, and, in contrast with seeing, omni-directional; the containment of our experience of sound is more difficult to achieve, at least with current technologies.

Potentials of dis-embodied and dis-placed sounds in electroacoustic music

As has been discussed above, recording technology challenges the coupling of what we hear (source) and where we hear it (place); listening to recorded sounds calls into question the integration of source and place in listening, pulling one apart from the other so much so that the integration, easily taken for granted, is questioned, and possibly, negated. Also, it has been argued that as the result of the decoupling process, sounds in recorded media are both dis-embodied and dis-placed. In addition, sounds presented through recording have the potential to create sensitizing, acousmatic situations in which listeners, denied the visual cues that would verify the source of the sounds they hear, actively seek to identify sound sources through imaginative aural inference.

This dissertation argues that one of the primary concerns of electroacoustic music listening is to recognize and observe the relation between the source-place decoupling of recorded sounds, its process and design, and the listener's process of engaging with dis-embodied and dis-placed sounds. To investigate this relation, therefore, this dissertation must ask the following questions: what potential do the disembodied and displaced sounds of electroacoustic music hold for

listeners? How does their potential emerge and unfold from within the music? And how do listeners, engaged in various kinds of listening, identify and make use of this potential? Furthermore, what opportunities open up to composers as they begin to understand the way listeners discover and experience disembodied and displaced sounds?

I suggest we begin our discussion by listening to and observing how we experience Alvin Lucier's *I am sitting in a room*, a piece I believe offers us inroads into these daunting (but fascinating) questions. Following discussion of Lucier's piece will be a brief survey of other electroacoustic compositions involved in different ways with these ideas; the analyses undertaken are not intended to be comprehensive, but, rather, to serve as sources from which to extract key elements, based on what we have discussed so far, that support the proposed framework for electroacoustic music listening.

A Brief Survey of Electroacoustic Music Based on Body and Place

Separation of Source and Place in *I am sitting in a room*

I am sitting in a room different from the one you are in now. I am recording the sound of my speaking voice and I am going to play it back into the room again and again until the resonant frequencies of the room reinforce themselves so that any semblance of my speech, with perhaps the exception of rhythm, is destroyed. What you will hear, then, are the natural resonant frequencies of the room articulated by speech. I regard this activity not so much as a demonstration of a physical fact, but more as a way to smooth out any irregularities my speech might have. (Alvin Lucier's *I am sitting in a room* for voice and electromagnetic tape 1970)

Alvin Lucier's *I am sitting in a room* is an investigation of the relationship between the sound we hear and the place we hear it. It conducts its investigation by slowly revealing the resonances of the space uniquely excited by its opening sound. The tools that Lucier uses for the piece are two tape recorders, one microphone, and one speaker; with them, he creates a simple feedback process designed to incrementally and transparently capture the room's sound. Regardless of the simplicity of the process, listening to the piece is a unique experience that lets

us recognize and discern the sound or acoustical properties of the place—in this case, the room he is sitting in—from the sound of his voice.

When listening to Alvin Lucier himself perform *I am sitting in a room*, listeners bear witness to what the room does to his voice. As a consequence of the specific process Lucier employs, the repetitive, re-recording of his voice, replayed each time back into the reverberating system of the room, does to the sound what any real-world space would do: it brings to the fore certain frequency components of his voice, preserving and stressing them while cutting out others. As the piece progresses, the place he is in gradually opens up and reveals its acoustical nature; at the same time, his voice is gradually subsumed by the resonance of the space. Thus, what *I am sitting in a room* offers us is an unusual listening experience in which, over time, we hear the process (and the result) of the room being progressively detached from his voice and brought to our attention.

While the process goes through many iterations of replaying and re-recording his voice in the room, it takes, however, only a few (about four minutes worth) for us to begin to hear the sound of the room pitted against the original clarity of his voice; at four minutes, the voice begins to be mostly a memory set apart from the room it now only resonates. The process slowly replaces the sound of the voice with the color of the room, as shown in Figure 2-1, decoupling them from their original (albeit hidden) integration. It is through this unfolding process, and the way it offers us the rare opportunity to observe the gradual decoupling of voice and room, that makes the experience of listening to *I am sitting in a room* exceptional.

Voice vs. Not-Voice

But this decoupling of room and voice also causes our sense of the voice to change drastically. For as the energy of the voice is turned toward revealing the resonances of the room,

the original voice gradually disappears into the overwhelming reverberation of the room, which has become artificially lengthened with each re-circulating pass through the process.

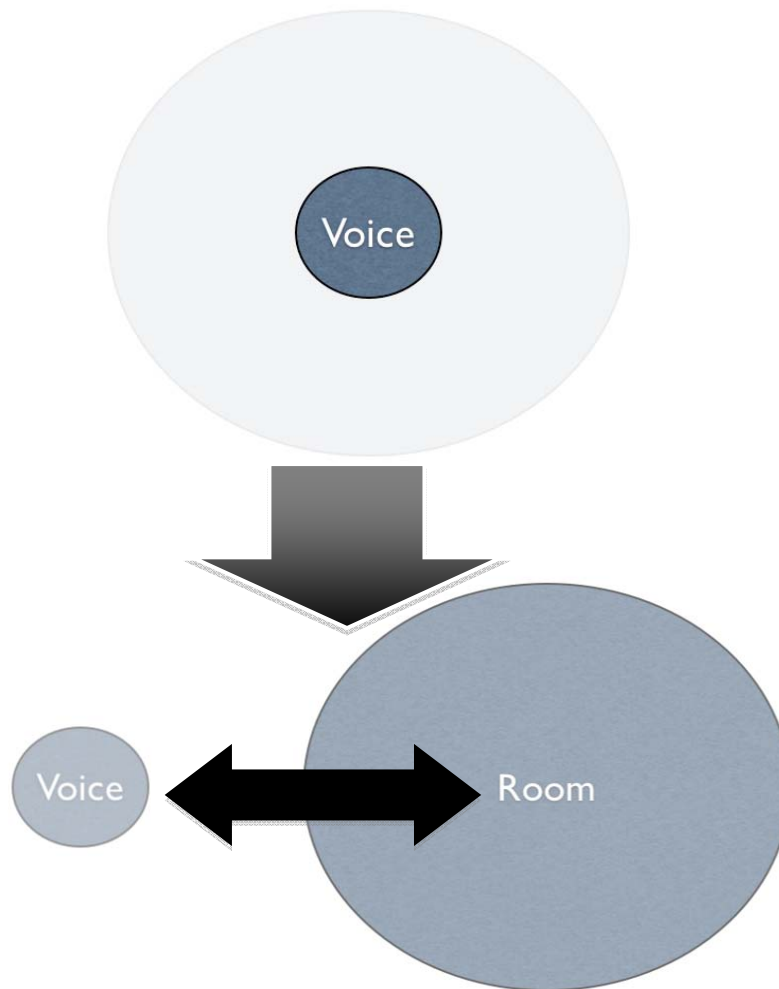


Figure 2-1. Decoupling of voice and room. The voice and the room are gradually decoupled in *I am sitting in a room*.

By the end of the work, only traces of the voice remain, recognizable in the rhythm of the resonant reverberations to those (and only those) who have followed the piece from the beginning. By the end, all the consonants have been ‘smoothed out,’ leaving little information through which to distinguish the speaking of the original text. As key features of the text, useful as aural cues, become smeared in time or disappear altogether, the voice loses its identity,

becoming less and less voice-like. The voice we hear at the end of the piece has lost almost all there is worth associating with a voice, becoming something that is not a voice, or Not-Voice,⁴ as shown in Figure 2-2.

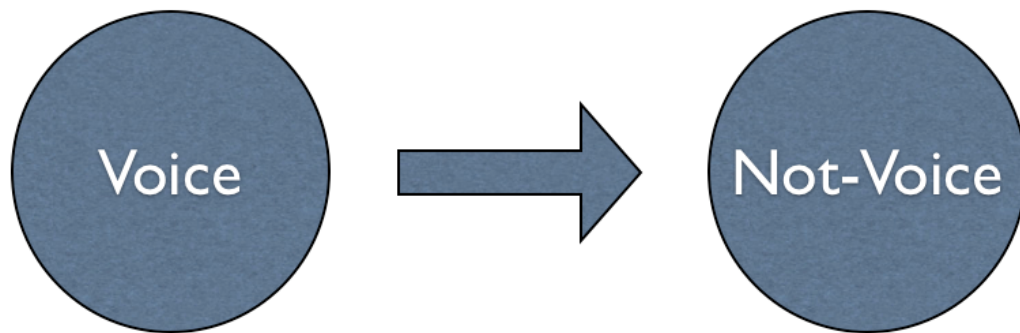


Figure 2-2. Voice vs. Not-Voice in *I am sitting in a room*. In the process of decoupling voice and room, the voice also loses its identity.

By the end of the piece, the sound we hear is no longer the original voice. But neither has it become a new one; at best, it has turned into something we might absurdly claim to be a voice, as we project on to it our memories of the sound's origin.

Body vs. Not-Body

It is interesting to note that a human voice is one of the most representative features of the human body; the voice embodies a human body. When we hear the voice of Lucier in the beginning of *I am sitting in a room*, we immediately imagine his body and flesh “sitting,” as he says, or better, existing in a room. His voice conjures up a rather complete image of a body, sitting and speaking. For the human voice is an extraordinary organ that, once heard, becomes quickly connected with or projected onto the image of the human body. Similarly, we recognize, almost as quickly, the quality of the Not-Voice, which we assigned to the sounds heard at the end

⁴ The process of negation that I have identified here with the voice becoming less and less voice-like will be discussed in more detail later in this chapter.

of Lucier's piece; the sound at that point is ghostly because we cannot imagine a person, with flesh and blood, sounding like that—our attempt at projecting a bodily image fails. The overtly reverberated voice sounds as if its owner were everywhere, omnipresent, and not bounded to a specific place because we cannot detect where the voice comes from.

As an essential feature of the human body, it is understandable that the human voice has been a preferred sound source for many electroacoustic composers, in particular, Pierre Schaeffer, Pierre Henry, Karlheinz Stockhausen, Luc Ferrari, Luciano Berio, Steve Reich, Jonathan Harvey, Michel Chion and Trevor Wishart, whose musical output has particularly focused on it.

In Trevor Wishart's *Tongues of Fire*, another exemplary work that uses the human (in this case, the composer's) voice as its sole material, the identity of a voice is also challenged, not by the overpowering reverberation of a place, as in *I am sitting in a room*, but by a seemingly perpetual machine that operates according to what might be characterized as *acousmatic reasoning*, a concept proposed here as explanation for the way composers of acousmatic works create (and listeners address) works founded on acousmatic principles. Specifically, *acousmatic reasoning*, which Wishart's piece exemplifies, is a *process of listening to and composing with dis-embodied and dis-placed sound materials based on their spectromorphological⁵ and semiotic*

⁵ Although this term 'spectromorphology' will be discussed in detail later in Chapter 5, it may be better to give its definition at this point. Denis Smalley coined the term in conjunction with the development of "tools for describing and analyzing listening experience." Smalley writes further: "The two parts of the term refer to the interaction between sound spectra (*spectro-*) and the ways they change and are shaped through time (*-morphology*). The *spectro-* cannot exist without the *-morphology* and *vice versa*: something has to be shaped, and a shape must have sonic content. Although spectral content and temporal shaping are indissolubly linked, we need conceptually to be able to separate them for discursive purposes—we cannot in the same breath describe what is shaped and the shapes themselves. The term may be rather jargonistic and it is perhaps an ungainly word, but I have not managed to invent an alternative which encapsulates the interactive components so accurately. Each component of the term belongs to other disciplines (visual, linguistic, biological, geological), which is fitting since musical experience radiates across disciplines. But the combination is unique: in music we often need words which are invented specially for defining sonic phenomena. A spectromorphological approach sets out spectral and morphological models and processes, and provides a framework for understanding structural relations and behaviours as experienced in the temporal flux of music." (Smalley 1997: 107)

significations and connotations.⁶ In Wishart's piece, acousmatic reasoning can be found in the way performative characteristics and spectromorphological orders are used to tie together the work's rather wild transformations of the human voice.

Notwithstanding the familiarity of the voice's gestural and performative characteristics, listeners to Wishart's piece find it difficult to determine, or stay assured of, the voice-ness of the material. The performative properties of the voice presented in *Tongues of Fire* seem to suggest a superhuman being whose dexterity with the voice is unparalleled. A voice is evident only briefly at the beginning of the piece and only intermittently later on, as the material soon becomes subject to cycles of relentless transformation that challenge the listener's simple identification of the material as human. The circular process of departing and returning to the voice material gives listeners of *Tongues of Fire* the sense of being faced with a performing mouth, out of which comes diverse, voice-like sounds situated somewhere between a Voice and a Not-Voice.

As mentioned, the use of vocal materials in electroacoustic pieces can be highly suggestive. No sooner do we hear a vocal sound than we imagine the body that made it. However, the voice is but one sound capable of suggesting human embodiment in electroacoustic music.

In *Klang* by Jonty Harrison, we hear sounds that suggest someone playing with something metallic, either by hitting or rolling it. Even though these sounds do not readily offer clues as to the identity of their sources, it is not difficult for listeners to imagine a human agent behind them, for sounds that suggest performance, or performative agency, embody the performer by suggesting the actions the performer took. However, as the piece progresses, the sounds go

⁶ Detailed explanations on acousmatic reasoning will be given in Chapter 5.

beyond what a human might do. Slowly, the listener becomes faced with an image more and more of the Not-Performer, as seen in Figure 2-3.

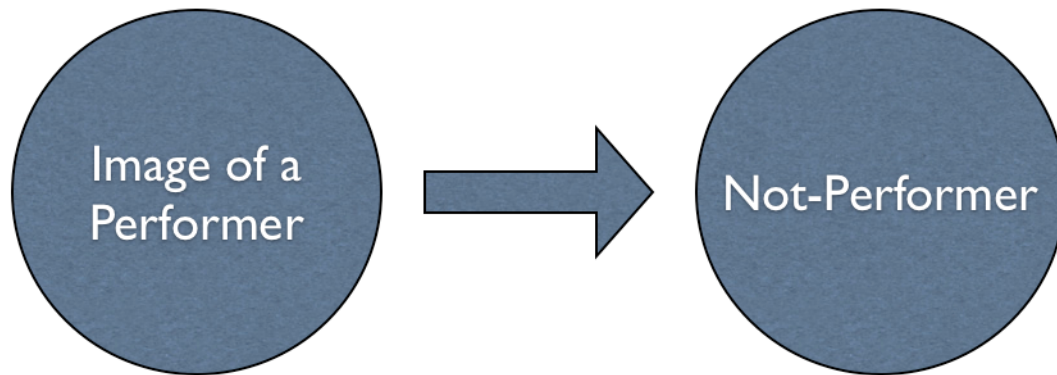


Figure 2-3. Performer vs. Not-Performer in *Klang*.

Place vs. Not-Place

A similar operation of "negation," if you will, can be applied to matters of place in electroacoustic music. In *Kits Beach Soundwalk* by Hildegard Westerkamp, listeners are first introduced to familiar sounds, all of which help them imagine a beach-like place. However, as they continue to listen, they begin to realize that the beach-like place they have been encouraged to imagine has begun to disappear as the sounds, once familiar, have changed.

What the composer does to create this illusion (which, in fact, she, in her calm voice, explains in terms of both technique and sound, during the piece, as we hear it) is not too complicated: mainly filtering or the layering or de-layering of sounds. The effect on listeners, however, is remarkable, for with the composer's careful filtering of particular frequencies, the identity of the beach is transformed; it is as if she had gradually peeled off the semiotic layers out of which the listener's image of the beach was originally formed. What actually happens is that the composer removes sound features central to the semiotic identification of the recording with

a beach. For listeners, the progression suggests a kind of travel from one place, recognizable as a beach, to another that is clearly Not-Beach, as shown in Figure 2-4.

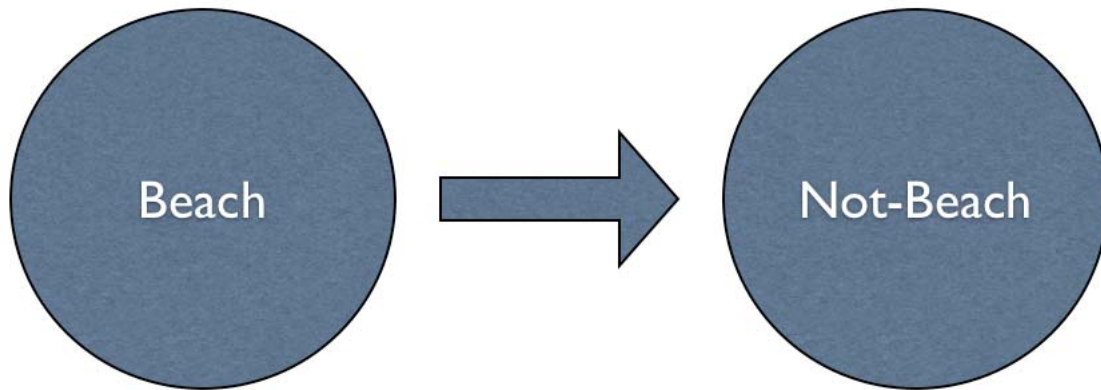


Figure 2-4. Beach vs. Not-Beach in *Kits Beach Soundwalk*.

Listeners can similarly listen to *Empty Vessels* by Denis Smalley and hear a composer playing with our sense of place through the negation of place-ness. In *Empty Vessels*, the composer creates (or gives listeners the opportunity to construct) a sense of place by collecting and presenting sounds whose semiotic identity corroborates a particular type of place. As the composer manipulates certain sounds, or injects new ones, the collection signifying place is changed and distorted; with the distortion of the collection comes a similar distortion of the sense of place that leaves listeners reconsidering what they hear. It is interesting how listeners, once in doubt as to the identity of the places suggested by the work, often shift their attention to the more spectromorphological aspects of the sounds, 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. Either way, listeners find in those moments that they are no longer in the same place; having lost the identity of the place and lacking another to put in its place, listeners hear the collection of sounds as representing no place at all. As illustrated in Figure 2-5, the operation that shifts the listener from place to place through non-place is one easily followed.

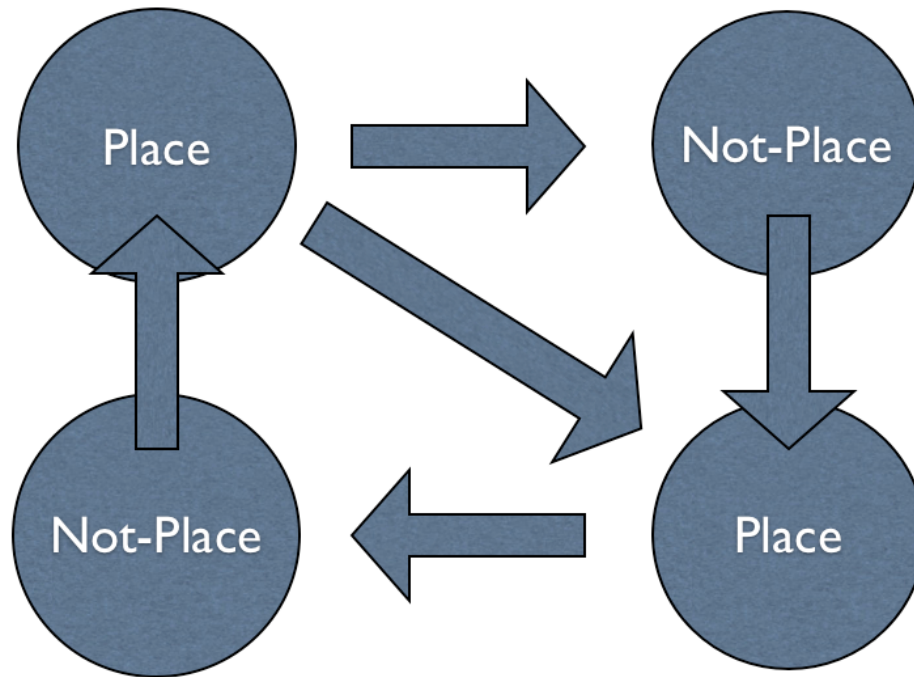


Figure 2-5. Place vs Not-Place in *Empty Vessels*.

A Quaternary Framework for Listening to Electroacoustic Music

One thing unites the compositional processes found in the electroacoustic works I have briefly addressed: their concern with the process of deconstruction.⁷ Many electroacoustic compositions challenge and effectively deconstruct the integration of body and place through their manipulation of the everyday sounds we hear; this disintegration gives us the ‘body/place’ axis. Furthermore, the identity of body and place in these pieces is often challenged, so much so that their identity breaks down into something else, something we can nominally identify as not-body or not-place. The two operations, in combination with the ‘body/place’ axis, give birth to

⁷ Defining what is deconstruction betrays what it does. As Wolfreys notes: “It is to be stressed yet again that Derrida insists one cannot reduce the term ‘deconstruction’ to being just one more metaphor, a substitute or supplement, for analysis or critique. Deconstruction does not have a stable, single identity, if only for the very reason that ‘it’ is not reducible to the concept of an identity” (Wolfreys 1998: 78). However, he also notes: “Instead, I am observing the dislocating of which Derrida has spoken; the dislocation of a desired meaning by the very event of trying to articulate that meaning. This dislocation is what Derrida has termed on occasion ‘deconstruction’ (one among many other terms which are not his and which he has not coined or invented)” (*Ibid.*: 57).

the four poles, Body, Place, Non-Body, and Non-Place, which serve to define a quaternary framework for electroacoustic music listening, as shown in Figure 2-6.

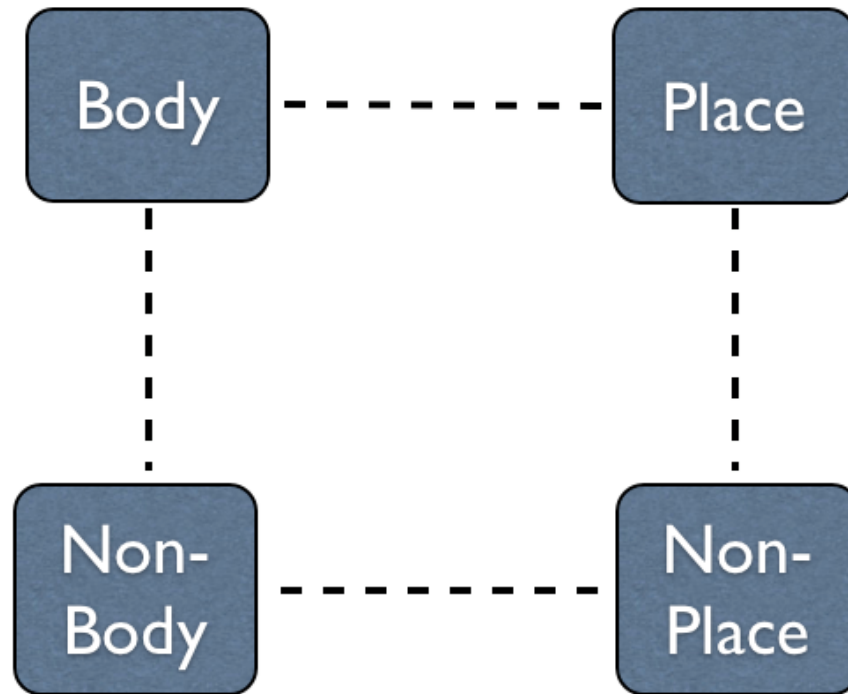


Figure 2-6. Four poles of a quaternary framework for electroacoustic music listening.

In the final design of this framework, I have changed not-body and not-place to Non-Body and Non-Place in order to identify the total negation, and therefore, total deconstruction of body and place. For listeners, body and place are negated when critical semiotic features or sound properties signaling body or place are distorted, omitted, placed in conflict with others, or made discontinuous.

Krauss' Quaternary Framework for Sculpture

The proposal of this quaternary framework has been influenced as much by my listening to electroacoustic music as by my reading of *Sculpture in the Expanded Field*, Rosalind Krauss' seminal paper on sculpture in the 1960s and 1970s. Krauss faced questions concerning sculptural

theory's legitimacy and relevance to the then burgeoning field of new sculpture; the questions she faced parallel those faced by music theorists and musicologist today concerned with evaluating the legitimacy and relevance of music theory to the analysis and interpretation of electroacoustic music:

Over the last ten years rather surprising things have come to be called sculpture: narrow corridors with TV monitors at the end; large photographs documenting country hikes; mirrors placed at strange angles in ordinary rooms; temporary lines cut into the floor of the desert. Nothing, it would seem, could possibly give to such a motley of effort the right to lay claim to whatever one might mean by the category of sculpture. Unless, that is, the category can be made to become almost infinitely malleable (Krauss 1979: 30).

Krauss succeeded in expanding the concept of sculpture to embrace these contemporary artistic endeavors by first identifying the operation of negation at work in them; our introduction of a framework capable of including electroacoustic music's most challenging and musically deconstructive characteristics follows her example:

Sculpture had entered the full condition of its inverse logic and had become pure negativity: the combination of exclusions. Sculpture, it could be said, had ceased being a positivity, and was now the category that resulted from the addition of the *not-landscape* to the *not-architecture*. (*Ibid.*: 36)

Having recognized the two negated essences of modern sculpture, Krauss then expanded the field of sculpture based on the 'not-landscape/not-architecture' axis by observing, with "the viewpoint of logical structure," trendsetting works of sculpture created since the late 60s:

And what began to happen in the career of one sculptor after another, beginning at the end of the 1960s, is that attention began to focus on the outer limits of those terms [the not-landscape and the not-architecture] of exclusion. For, if those terms are the expression of a logical opposition stated as a pair of negatives, they can be transformed by a simple inversion into the same polar opposites but expressed positively. That is, the *not-architecture* is, according to the logic of a certain kind of expansion, just another way of expressing the term *landscape*, and the *not-landscape* is, simply, *architecture*. (*Ibid.*: 37)

In this way, Krauss was able to establish a quaternary framework (see Krauss 1979: 38) of sculptural discourse through which she could explain and situate works that were otherwise perceived as perplexing or outside sculptural theory. But this framework is important for our

study not just because of the obvious similarity of its structure to what I am proposing, but because of the way the structure reveals and articulates what underlies it. Krauss notes at the end of her writing on the subject:

But clearly, since this [mapping a determinant structure of the expanded field of postmodernism] is a matter of history, it is also important to explore a deeper set of questions which pertain to something more than mapping and involve instead the problem of explanation. (*Ibid.*: 44)

Mapping electroacoustic music listening onto a framework is one thing; explaining the consequences of the mapping is another. As Krauss aptly recognizes, any mapping (in our case, of electroacoustic music listening) should be concerned with explaining the relation between the process of mapping and what is mapped out; her point leads to a key difference or fork between the goals of her framework and the framework for electroacoustic music listening proposed here.

The focus of Krauss' framework is on the mapping of sculptural works, which, as distinguished from musical works, are not designed to change during the time in which we hear them; consequently, once positioned in her framework, sculptural works remain well-rooted. In contrast, electroacoustic music, as we have seen, moves readily between the four poles of the proposed framework. Why is this? One reason is connected with the fact that what sculptural works represent is often grounded in their location and the constancy of the work they locate there, that is, constancy as measured from the time frame in which musical works are experienced. Another reason, however, deeper in significance, is connected with the fact that Krauss' framework is concerned with framing and interpreting the 'pre-production' aspects of the work or with developing, as afterthought, an identity for the work within the context of a landscape-vs.-architecture discourse. In dramatic contrast, the four poles of our framework are concerned with how listeners engage the dynamic, changing character of electroacoustic music,

as imaginative witnesses. With this in mind, we should return to the fundamental problem of the framework's construction and the question of its use.

Act of Mapping and Poles of Difference

A map is *not* the territory, as Alfred Korzybski identified (Korzybski 1994: 750); as such, we cannot claim that any framework (including the one I am proposing) identifies what listeners experience as they listen to electroacoustic music. Nonetheless, a listening framework should seek to represent the experience we imagine listeners having, much the way a map seemingly represents a territory we might imagine moving within. Rightly or wrongly, our framework is about representing what we imagine listeners hear. But, taken as such, what of the 'territory' does our framework represent?

This is a difficult question to answer. However, let me, for a moment, refer to Bateson in *Steps to an Ecology of Mind* who asks the following question, which I believe leads to an answer:

Let us go back to the map and the territory and ask: "What is it in the territory that gets onto the map?" We know the territory does not get onto the map. That is the central point about which we here are all agreed. Now, if the territory were uniform, nothing would get onto the map except its boundaries, which are the points at which it ceases to be uniform against some larger matrix. What gets onto the map, in fact, is *difference*, be it a difference in altitude, a difference in vegetation, a difference in population structure, difference in surface, or whatever. Differences are the things that get onto a map. (Bateson 1987: 457)

In this regard, it is not coincidental that our investigation of electroacoustic music listening (instilled as it was with the hope of establishing a map or framework for how we hear electroacoustic music) started by seeking differences between past listening and our contemporary, technologically-mediated listening as it navigates new and emerging differences between body and place. Neither is it accidental that our investigation has produced a framework that is derived from the operation of negation: the production of what-is-not.

To set this framework in motion so that we can have a better understanding of electroacoustic music listening, however, we need to go further than the mere identification of differences. What we need is to discuss the properties of these differences, how they relate to each other, how they work, and most of all, the consequences they produce. To this end, it is necessary at this point to identify how the two listening modes function in the proposed framework.

As I have discussed in the section on reduced listening and bifurcated listening, as well as shown, in brief, through the discussion of several electroacoustic compositions, listeners in electroacoustic music often engage in two different modes of listening: semiotic listening, by which they listen to sounds based on their possible semiotic signification, and spectromorphological listening, by which they listen to sounds based on their spectral types and morphological shapes. Listeners in electroacoustic music travel, constantly, between these two listening modes, depending on their listening goals. Yet, however they are pitted against each other or dialectically opposed, the two modes are always engaged, one with the other, through the listening process I call acousmatic reasoning.

As can be seen in figure 2-7, listeners employ the principles of semiotic listening in the body/place axis where the primary concern is with identifying sound sources and creating sound-images associated with sources. By contrast, spectromorphological listening is concerned with identifying and following the more abstract, less representational, aspects of sounds. In spectromorphological listening, listeners concentrate more on the sounds themselves than on what they possibly refer to. It is important to recognize that neither semiotic listening nor spectromorphological listening explain how and why, and more importantly, when listeners should or will traverse from one form of listening to the other. Rather, it is only through the logic

of acousmatic reasoning, I argue, that the listener's movement between semiotic and spectromorphological listening can be identified and explained. In the next chapters, therefore, we will explore, in detail, these two listening modes, acousmatic reasoning, and their application within the proposed quaternary framework.

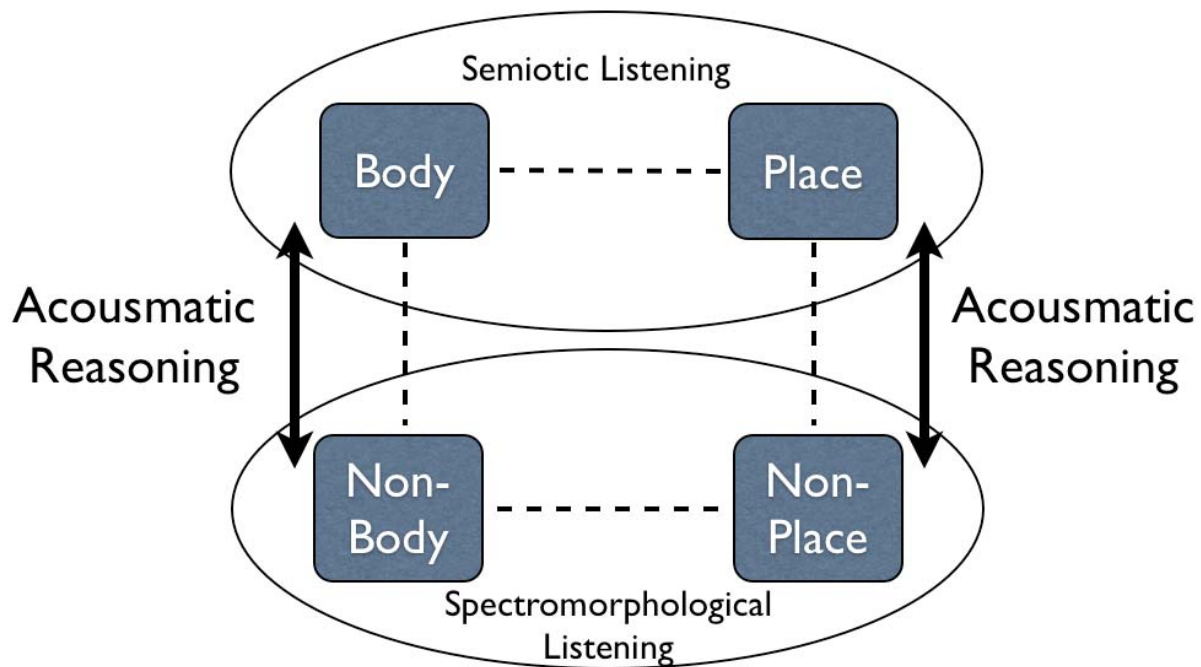


Figure 2-7. Acousmatic reasoning and its two listening modes: semiotic listening and spectromorphological listening.

Imagining as a Key Procedure in the Quaternary Framework

But before we commit ourselves to the task of understanding how listeners navigate through acousmatic reasoning, we need to take a detour and visit an important topic critical to the quaternary framework of electroacoustic music listening: the subject of listening. Listening is an everyday practice, and like any everyday practice, “depends on a vast ensemble which is difficult to delimit but which we may provisionally designate as an ensemble of *procedures*” (Certeau 1984: 43). For Bateson, however, differences in behavior require that we delimit what is relevant to the understanding we seek:

Suppose I am a blind man, and I use a stick. I go tap, tap, tap. Where do *I* start? Is my mental system bounded at the handle of the stick? Is it bounded by my skin? Does it start halfway up the stick? Does it start at the tip of the stick? But these are nonsense questions. The stick is a pathway along which transforms of differences are being transmitted. The way to delineate the system is to draw the limiting line in such a way that you do not cut any of these pathways in ways which leave things inexplicable. If what you are trying to explain is a given piece of behavior, such as the locomotion of the blind man, then, for this purpose, you will need the street, the stick, the man; the street, the stick, and so on, round and round. But when the blind man sits down to eat his lunch, his stick and its messages will no longer be relevant—if it is his eating that you want to understand. (Bateson 1987: 465)

Early in this chapter, as a matter of fact, we discussed the significance of technology in listening to electroacoustic music and its impact on how we listen. There are more aspects to listening, and we will introduce and discuss each in due course. But at this point, it is important to focus on a specific (and special) procedure that we commonly perform when listening to music, especially, I argue, electroacoustic music. What is this procedure? Perhaps Katharine Norman's listening experience of *Petit jardin* by Magali Babin can answer this question:

At some level in my listening I imagine what kind of movements she is making to produce those sounds. (There's nothing unusual in that; we've all played varieties of air guitar.) Then again, she's doing more than moving. I can hear her *listening*, because I can hear thinking behind the scenes, in the pace of events—the striking of the gong is a slow iteration, by somebody who waits (or has waited, once, at that time?) for the sound to die down before they hit again. If this piece were to be mimed by a performer employing fast, angular movements, I'd be unconvinced by the sync. And if someone had merely come on stage and clicked on 'compile and play' to produce those sounds, as sometimes happens, I'd be disappointed by this visual discrepancy. Imagining physical movement is part and parcel of listening to a record of 'a performance'. But there's nothing to see now, and I can't reconstruct exactly what might have happened, so I have to make a fiction of it. The onus is on me, and perhaps that changes my listening. (Norman 2004: 9-10)

Norman's documentary-style notes about her experience of this piece reveal that she is naturally bringing into play mental images, if you will, and using them to devise a type system through which to understand what she is listening to. In fact, her main tool is the image of the human body—see: “movements she is making,” “I can hear her listening,” “somebody who

waits,” or “a record of ‘a performance’”—which she creates through her *imagining* of it; as she writes: “so I have to make a fiction of it.”

Imagining is a powerful practice that is at work in the quaternary framework proposed in this paper. But why do we imagine? A short answer might be because we “intend more than is given” (Casey 1976: 137). Imagining is an indispensable part of the framework, as it connects and relates its four poles to the arena of electroacoustic music listening. To listen to electroacoustic music is to produce images, as we will see; in fact, the four poles can be seen as types of images, or better, paradigms that share many of the properties listeners conjure in their imaginative listening. Therefore, with the framework introduced, it is appropriate that the next chapter examine the role of imagining in electroacoustic listening.

CHAPTER 3 IMAGINAL LISTENING

One must be receptive, receptive to the image at the moment when it appears...the act of the creative consciousness must be systematically associated with the most fleeting product of that consciousness, the poetic image.

—Gaston Bachelard, *The Poetics of Space*

No trace anywhere of life, you say, pah, no difficulty there, imagination not dead yet, yes, dead, good, imagination dead imagine.

—Samuel Beckett, *Imagination Dead Imagine*

Listening with Imagination

Imagining a Listener

Let me imagine someone who is listening to music. How can I tell if she is listening? I imagine her concentrating on music: she would not move much with her eyes closed or noticeably open, as if she were in search of something in that which she was hearing or was trying very hard to memorize or remember as many things as she could in what she was hearing; perhaps, I may be able to tell it from her face, turning and twitching—as I would do searching when I am listening attentively—as if she were in a difficult journey.

Analysis and listener

Analyses of music presuppose a listener. Or they fancy one.⁸ The listener is often slipped implicitly into analytical acts with analysts, who seldom give credit to their imagined listener. In a hurried fashion, they get into their scrutinizing business, delving into the music as something structured but not necessarily heard. While it may be true that to analyze a piece of music is to ask the question: how does it work (Bent & Pople 2008), analysts often seem to turn a deaf ear to

⁸ Discussing ideas developed in Meyer's three books from 1956 to 1973 (i.e., *Emotion and Meaning in Music*, *Music, the Arts, and Ideas*, and *Explaining Music: Essays and Explorations*), Esther Dunsby writes: "A prerequisite for Meyer's definition of musical meaning, therefore, is that the listener be 'competent.' This means that the listener, if not a trained musician, should be familiar through cultural exposure with the style characteristics of the music in question, something close to Tovey's 'naïve' listener and in contrast to Schenker's 'spiritual aristocracy'" (Dunsby 1983: 210).

the fact that the very question quickly becomes: how does this music work *for the listener* once we actually get into detailed analytical acts. The way that one approaches and talks about music is, however, closely dependent on who is doing the *listening*.

Understandably, identifying the listener in analysis is not a simple task. The absence of the listener's point-of-view in analysis is, to a large extent, due to the difficulty of talking about the listener or the implicit desire to presuppose a "neutral" listener, which, of course, is loaded with implicit biases of the analyst to which we are not privy. For talking about the listener is fundamentally about listening, which is not necessarily part of analysis, especially analysis that is immersed in the complexities of information and structure. The problem of identifying how listeners listen to music is somehow reflected in the difficulty researchers face in adequately defining or engaging in the subject's central questions, as Sloboda observes in *The Musical Mind*:

The principal problem facing the student of listening processes is to find a valid way of tapping the moment-to-moment history of mental involvement with the music. As we examine research in the field of perception, attention, and memory in music we shall find that this problem has not really been solved satisfactory. Most research evades this crucial issue by examining responses to very brief segments of music, made up of between two and twenty notes. Such segments hardly present listeners with the range of patterns and relationships which they must deal with in even the simplest short song. (Sloboda 1986: 152)

Sloboda argues that many studies on music perception whose goal is, in part, to understand how we listen to music fall short of this aim, first because they fail to "distinguish effects which are due to real and abiding features of normal listening from those which are special effects of the experimental task, which may involve activity quite unlike that of normal listening," and second, because they fail to recognize the importance of what the listener brings to the listening activity. Many perception experiments disregard the everyday listening behaviors of listeners by putting them in unnatural and conditioned listening environments. Sloboda goes on to note:

In most music perception experiments this familiarity [of music the listener hears] is low—the listener is exposed to sequences that he has never heard before. In contrast, real-life listening often involves the repeated hearing of the same material so that its internal structure becomes better and better known. (*Ibid.*: 153)

What Sloboda implies here, I argue, is that, with repeated listening, not only does the listener become familiar with the music in real-life music listening, but she is also encouraged to bring into the listening process whatever she can offer, which is to say, her historical and theoretical knowledge of music as well as her cultural and social experiences of music.

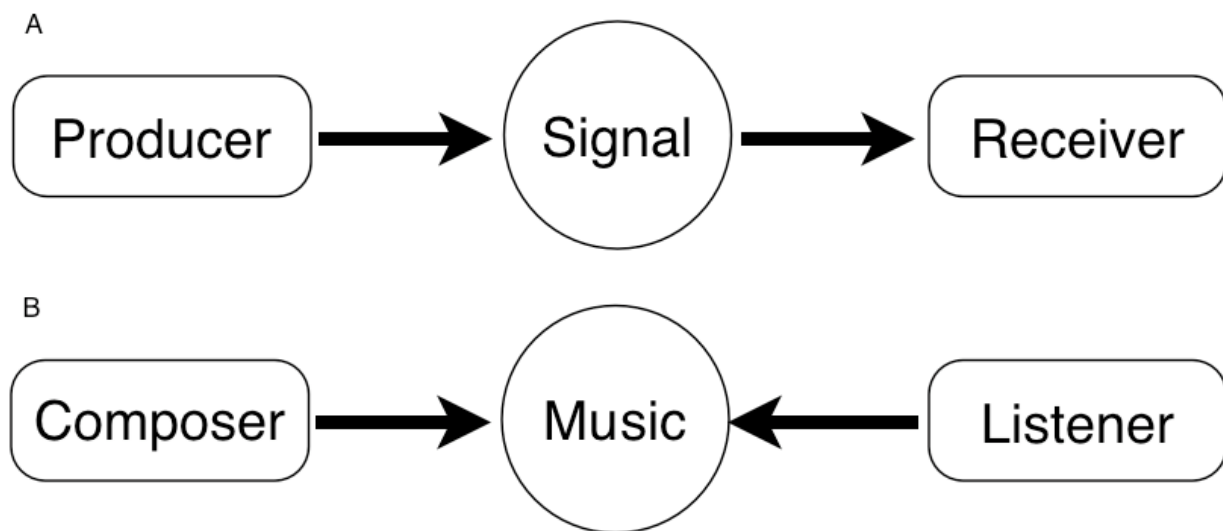


Figure 3-1. Composer-Music-Listener models. A) The relationship between producer and receiver in communication. B) In music listening, the listener actively seeks meaning in the music.

Such is the tenet of Nattiez’s Tripartition (Nattiez 1990), which finds fault with the traditional communication framework, shown in Subpart A of Figure 3-1, in which the listener, a “receiver,” is idealized to receive passively whatever the “producer” creates. Instead, Nattiez argues that the listener actively constructs her own musical meaning from the listening by allowing her experiences and knowledge of music to play a crucial and stimulating role in making sense out of what she hears; the arrow turns backwards, shown in Subpart B of Figure 3-1, and the “receiver” becomes an active seeker of meaning.

Two approaches to the listener

As has been discussed, recognizing the importance of the listener and integrating the works to which listeners listen into analysis is a daunting task for anyone serious about understanding how we hear music. Despite the much-shared agreement between music analysts and researchers in recent years on the importance of acknowledging the listener in music analysis, analysts remain divided on how to approach the subject of the listener.

Ian Cross (1998) discusses an example of a division between analysts and researchers in his article in *Music Analysis*. At the outset of the paper, he quickly categorizes ways in which analysts approach listeners or listening behaviors with regard to analytical tasks based on “the music-analytic idea of perception” as “a partial folk psychology,” which can be read as a somewhat pejorative term, and the other approach to the listener based on “cognitive-scientific accounts of quotidian behavior and common-sense accounts of everyday life” as “scientific psychology” (Cross 1998: 4-5). Insisting that his so-called ‘folk-psychological accounts’ of music, which is to say, the approaches that have been made by traditional musical analysts, are based on “particular insights within a community of experts,” Cross asserts:

There are a number of possible grounds for objecting to such a usage. The apparently unexamined nature of such a vernacular account of the processes of perception sits ill with the detailed and deeply contextualized specificity that characterizes the act of music analysis. Moreover, while the employment of an analytical ‘folk psychology’ in discussing the experience of complex musical phenomena may well adequately characterize the analyst’s listening processes, the fact that these complex musical phenomena are unlikely to be present in the consciousness of ordinary listeners—who may nevertheless enjoy music—makes it difficult to relate the findings of music analysis to the musical experiences of the ‘averagely educated’ but musically untrained listener (except that one might simply assert that the perception of music analysis and the perceptions of such untrained listeners will be different.). (*Ibid.*: 5)

Cross’ objections to analysts’ traditionally held accounts of music analysis, cited above, are based on two grounds: the unexamined nature of the accounts and the remoteness of the accounts from the experience of ordinary listeners. It appears that what Cross means by

“examination” is some kind of scientific examination, governed by scientific reasoning and supported by laboratory test results. It may be true that some of the previous—and current—explanations made by analysts about how we listen may have not been placed under the scrutiny of scientific examination, making Cross’s argument valid when, and only when, such ‘scientifically’ unexamined accounts of the processes of perception (that is, how the listener listens to music) are used in an attempt to solve musical problems closely related to scientific problems. Clearly, the methods used need to match the analytical task. Moreover, they must acknowledge that listening to music is a complex activity that produces a myriad of musical phenomena, including musical perception, and that it is the responsibility of the analyst to recognize which phenomena are most important in listening to a particular piece of music and how they can be distinguished. As Adorno declared: “Its [analysis’] task, therefore, is not to describe the work—and with this I have really arrived at the central issue concerning analysis generally—its task, essentially, is to reveal as clearly as possible the *problem* of each particular work. ‘To analyze’ means much the same as to become aware of a work as a *force-field* [*Kraftfeld*] organized around a *problem*” (Adorno 1982: 181). In short, to analyze is to answer the question: what problems and challenges do listeners face in the perception and reception of musical works?

Indeed, the role of listening in effective analysis (i.e., analysis that distinguishes its subject) should not be surprising, as music itself exists because of the attention we accord to listening and how, through listening, we perceive and organize sound. Therefore, analysis based in listening may, in theory, benefit from findings in the science of perception and cognition. Unfortunately, the sciences of perception and cognition remain relatively new fields, with conclusions about musical phenomena developed only recently. However exciting these newly-

found ways of explaining musical phenomena may be, one should not forget that a listener's response to music is varied. Cross' criticism about the "unexamined nature" of accounts—again, valid in its own regard—can be easily made of some of the more perceptual and cognitive accounts of music analysis since they may remain unexamined from a cultural perspective.

More interesting, particularly to our discussion of acousmatic music, is Cross' criticism of analytical methods based on 'folk psychology,' which, he argues, may not explain what ordinary listeners experience. Cross' argument has two underpinning assumptions that are troublesome. First, underlying his argument appears to be the assumption that whereas the complex analyses that analysts weave out of a piece of music may not explain what ordinary listeners experience, cognitive-scientific accounts of music listening somehow can. His second assumption is that by attempting to distinguish analysts from listeners, he seems to suggest the existence of a group of imaginary listeners who, more or less, perceive the same way and hear the same things.

Ecological accounts of listening

Cross' article points at one of the fundamental problems in understanding how we listen, and its connection to the classic debate about the role of nature and culture. Whether to approach the study of how we listen from the perspective of human biology or cultural learning is a recurring question, particularly with new forms of music. In fact, following Gibson's argument, we can conclude that the choice to separate the problem into issues of nature and culture is itself misleading, the real issue resting on what Gibson identifies as the *sensitivity* encompassing both:

In the study of anthropology and ecology, the "natural" environment is often distinguished from the "cultural" environment. As described here, there is no sharp division between them. Culture evolved out of natural opportunities. The cultural environment, however, is often divided into two parts, "material" culture and "non-material" culture. This is a seriously misleading distinction, for it seems to imply that language, tradition, art, music, law, and religion are immaterial, insubstantial, or intangible, whereas tools, shelters, clothing, vehicles, and books are not. Symbols are taken to be profoundly different from things. But let us be clear about this. There have to be modes of stimulation, or ways of conveying information, for any individual to perceive anything, however, abstract. He

must be sensitive to stimuli no matter how universal or fine-spun the thing he apprehends. No symbol exists except as it is realized in sound, projected light, mechanical contact, or the like. All knowledge rests on sensitivity. (Gibson 1966: 26)

When Gibson says “All knowledge rests on sensitivity,” he does not mean to say that our physiological conditions are the sole determinants of how and what we acknowledge and understand of the world; quite to the contrary, he means to identify how cultural and social factors are in fact embedded in our ‘sensitivity.’ From the outset, Gibson makes an attempt to encompass and integrate nature and culture, as when he defines ecology as “a blend of physics, geology, biology, archeology, and anthropology, but with an attempt at unification. The unifying principle has been the question of what can stimulate a sentient organism” (*Ibid.*: 29). And, importantly, stimuli in Gibson’s view are understood through, among other things, *affordance*, a term he proposes:

When the constant properties of constant objects are perceived (the shape, size, color, texture, composition, motion, animation, and position relative to other objects), the observer can go on to detect their *affordance*. I have coined this word as a substitute for *values*, a term which carries an old burden of philosophical meaning. I mean simply what things furnish, for good or ill. What they *afford* the observer, after all, depends on their properties. The simplest affordances, as food, for example, or as a predatory enemy, may well be detected without learning by the young of some animals, but in general learning is all-important for this kind of perception. The child learns what things are manipulable and how they can be manipulated, what things are hurtful, what things are edible, what things can be put together with other things or put inside other things—and so on without limit. He also learns what objects can be used as the means to obtain a goal, or to make other desirable objects, or to make people do what he wants them to do. In short, the human observer learns to detect what have been called the values or meanings of things, perceiving their distinctive features, putting them into categories and subcategories, noticing their similarities and differences and even studying them for their own sakes, apart from learning what to do about them. All this discrimination, wonderful to say, has to be based entirely on the education of his attention to the subtleties of invariant stimulus information. (*Ibid.*: 285)

A wooden chair and a car, for example, afford an observer (knowledgeable in what it means to sit or move) the opportunity to in fact do so. So too a chair, given similar prior experience, could suggest other activities, such as burning or throwing, and a car could pose a

threat, although these other possibilities for affordance would likely result from the existence of other conditions or situations facing the observer. Gibson's affordance is built on two presuppositions: first, he assumes that stimuli already have "structure, both simultaneous and successive, and that this structure depends on sources in the outer environment"; and second, he assumes that our perceptual system has "meaningful information," which can "correspond to the constants" of stimuli, and therefore, our central nervous system "resonates to information" (*Ibid.*: 267).

Such *corresponding information embedded in both stimuli and the observer's perceptual system* is what this dissertation hopes to examine as an important correlate in electroacoustic music listening. Arguably, the approaches of Gibson and his followers to the process of how we make sense of the world provide us with a useful tool for understanding how and what we listen to in electroacoustic music. Furthermore, ecological accounts seem to succeed in bringing into the discussion valuable cultural, cognitive and physiological aspects of listening. Later in this chapter and in the next chapter, the effectiveness of such ecological accounts of electroacoustic music listening will be explored. For now, however, two issues concerning Gibson's *affordance* beg further explanation.

Everyday listening and musical listening

The first issue concerns the observer: as proposed, Gibson's affordance does not articulate the role of the observer, focusing instead on "what things furnish." But affordance, as posited by Gibson, is revealed through the actions of the observer working to meet certain goals.⁹ That is, what an object affords the observer depends not only on its properties but also on the observer's needs and desires, which can change as a result of learning about the object.

⁹ Recognizing the heavy emphasis on the properties of objects in his definition of affordance, Gibson (Gibson 1979) later gives equal importance to the role of the observer as to the properties of objects.

The second issue, particularly as it pertains to electroacoustic music listening, is more complex; in ordinary circumstances, the identity of an object comes to us almost instantly through the object's various features, the initial stimulus of which leads us to seldom question an object's affordance. This almost spontaneous process by which the properties of an object are acquired and used to determine identity is central to what Gaver calls *everyday listening* and, importantly, is different from *musical listening*. Gaver argues:

In [musical listening,] the perceptual dimensions and attributes of concern have to do with the sound itself, and are those used in the creation of music. These are the sorts of perceptual phenomena of concern to most traditional psychologists interested in sound and hearing. On the other hand, as you stand there in the road, it is likely that you will not listen to the sound itself at all. Instead, you are likely to notice that the sound is made by an automobile with a large and powerful engine. Your attention is likely to be drawn to the fact that it is approaching quickly from behind. And you might even attend to the environment, hearing that the road you are on is actually a narrow alley, with echoing walls on each side. This is an example of *everyday listening*, the experience of listening to events rather than sounds. Most of our experience of hearing the day-to-day world is one of everyday listening; we are concerned with listening to the things going on around us, with hearing which things are important to avoid and which might offer possibilities for action. The perceptual dimensions and attributes of concern correspond to those of the sound-producing event and its environment, not to those of the sound itself. This sort of experience seems qualitatively different from musical listening and is not well understood by traditional approaches to audition. (Gaver 1993: 1-2)

It may be true that, as Gaver argues, we can distinguish between musical listening and everyday listening, particularly with traditional music whose sound and affordance stands apart from everyday sounds. Most of the instrumental and vocal music performed in concert halls focuses our attention on musical properties, while rarely encouraging us to second-guess the sounds and their circumstances; violins are violins and nothing else.¹⁰ Even when we hear a piano or an orchestral piece on a CD and face our inability to visually confirm the presence of the work's performers, we are readily content with that which the music proposes—that we are

¹⁰ Having said that, it needs to be recognized that there are some instrumental composers such as Lachenmann whose odd use of instruments fights against our conception of things like “violin-ness”. Even in his case, though, the physical and performative limitations of a violin are still intact.

listening to a piano or an orchestra and nothing else. We identify the origin of the sound so that we can concentrate on other matters.

Ecological approaches to electroacoustic music listening

Separating musical from everyday listening, however, raises a thorny question when we begin to deal with electroacoustic music and its use of sounds that are, according to Gaver, commonly associated with everyday events and listening. How is it possible to differentiate musical listening and everyday listening once everyday listening experiences and sounds become the subject of musical listening experiences and thereby challenge if not deconstruct the boundaries and terms upon which musical listening is based? Even more daunting is the fact that, unlike classical musical listening in which an ensemble or soloist frames and gives continuity to the kind of sounds a listener expects to hear, in electroacoustic music listening, more often than not, the identity or nature of the music's sounds are not announced, or if announced, may, through processing, betray their identity. With electroacoustic music, the potentially rich, changing, and unpredictable mix of sounds presents listeners with the continuous problem of identifying sounds and what they afford. The listening process can be particularly challenging as it immerses the listener in both musical and everyday types of listening and blurs, if not abandons, Gaver's simple distinction about how and when we hear.

A close look at the electroacoustic listener engaged in a mix of both musical and everyday listening reveals a listener seemingly faced with a paradox. For while the music may succeed in inviting the listener back to the everyday world through the capturing and suggestive presentation of everyday sounds, the absence of visual and tactile information, through which listeners often confirm their perceptions, makes the experience incomplete; the information needed to make the affordance of everyday things and experiences is, as a whole, inadequate and the experience difficult to accept.

How do listeners cope with the absence of other sense information when listening to electroacoustic music? Gibson argues that when faced with inadequate information, our “perceptual system *hunts*” (Gibson 1966: 303). Such a paucity of stimuli is in fact typical in our everyday life as Gibson notes:

More typical of life than absence of stimulation, however, is the presence of stimulation with inadequate information—information that is conflicting, masked, equivocal, cut short, reduced, or even sometimes false. The effort of apprehension may then be strenuous. With conflicting or contradictory information the overall perceptual system alternates or compromises, as noted, but in lifelike situations a search for *additional* information begins, information that will reinforce one or the other alternative. When the information is masked or hidden in camouflage, a search is made over the whole array. If detection still fails, the system hunts more widely in space and longer in time. It tests for what remains invariant over time, trying out different perspectives. If the invariants still do not appear, a whole repertory of poorly understood processes variously called assumptions, inferences, or guesses come into play. Merely probable information, clues or cues, is not as satisfying for the perceptual system as the achieving of clarity, the insight that reveals the permanence underlying the change; but guessing does occur in highly complex situations and the individual may sometimes have to be content with it. (*Ibid.*: 303-4)

According to Gibson, the unsuccessful hunt for additional information leads to a suspension of judgment and, furthermore, a decision to cease hunting for additional cues as assumptions, inferences, or guessing comes into play.

While it may be that what Gibson proposes is in accord with the way we cope with the real world surrounding us, it seems that what the listener does while listening to music is more than an assumption, an inference, or a guess. The electroacoustic listener is engaged with the music, not out of a search for truth or survival, but for the pleasure of the process; consequently, I argue that this difference makes of listening a different situation, one more intentionally creative in which the listener *imagines*.

Imagining as a Phenomenological Probe into Electroacoustic Music

Indeed, imagining has such a romantic ring to it that Charles Rosen begins his book *The Romantic Generation* with a sub-chapter titled “Imagining the Sound” in which he explores the

unusual phenomenon of ‘absent melodies’ and ‘imagined sound’ in Schumann’s music (Rosen 1995: 7-11). But Rosen quickly points out that imagination is not a passive act like daydreaming or hallucinating:

We put our aural imagination to work as a matter of course every time we listen to music. We purify the music by subtracting what is irrelevant from the undigested mass of sound that reaches our ears—the creaking chairs of the concert hall, the occasional cough, the traffic noises from outside; we instinctively correct the tuning, substitute the right pitches for the wrong ones, and erase from our musical perception the scratchy sound of the violin bow; we learn in just a few minutes to filter out some of the obtrusive resonance of the cathedral which interferes with the clarity of the voice leading. Listening to music, like understanding language, is not a passive state but an everyday act of creative imagination so commonplace that its mechanism is taken for granted. (*Ibid.*: 1)

If listening to music is not a passive state of reverie but an active state of creative imagination, what are the differences between reverie and creative imagination, and more importantly, what makes music listening active and creative?

Imagining distinguished from other mental activities

A more thorough and passionate account of imagining is given by Edward Casey. In his book *Imagining*, Casey argues that imagination is an unpopular, if not controversial, subject that has either been unfairly criticized and summarily dismissed as to its role in more rational or quantitative disciplines or celebrated by disciplines like Psychology and Philosophy for the mysteries it might reveal. One main reason that the role of imagination fails to be appropriately acknowledged in all types of disciplines is that there is a common and prevailing, deep-rooted confusion between the way *imagining* is defined versus other related sorts of thought processes. Casey writes: “More frequently, however, an inadequate descriptive basis leads to a much more specific and serious consequence: the failure to distinguish imagination in any decisive way from other mental acts. This is a failure in proper identification—in other words, a matter of descriptive confusion” (Casey 1976: 9). But, what kinds of confusion is he talking about, and how do they occur?:

Such confusion between imagination and other psychical phenomena is by no means confined to explicit theories of imagination, though they exhibit the confusion in its most egregious form. It is also present in the very way in which we use the word “imagination” in ordinary language. To take three expressions from everyday speech: 1) My imagination was playing tricks on me when I mistook that tree over there for a man; 2) It was just my imagination when I thought I saw a red rat in my bedroom; 3) In my imagination I thought that he was out to get me.

In these quotidian examples “imagination” is used to refer to three quite different types of experience, *none of which* can be considered a case of imagining proper. ... Sentence one refers to a case of perceptual illusion, where we mistake one perceived object for another. In sentence two there is reference to a hallucination: to the quasi-perceptual appearance of a nonexistent object, which the hallucinated subject takes to be real. Sentence three uses the same term, “imagination,” to indicate something still different: a fantasy or delusion of persecution. (*Ibid.*: 9-10)

In truth, the effort Casey makes to distinguish imagination from all of the other mental acts (i.e., hallucinations, perceptive illusions, or fantasies) is a difficult task. Not only do we use the word “imagination” freely without much assessment of the appropriateness of the word *vis-à-vis* the contexts in which we use it, but the terms of mediation we use in approaching artistic works and experiences (or even more quotidian experiences) seems to engender confusion as to what exactly is meant by imagination.

Illusion and fantasy are two terms, for example, often associated with imagination. Illusion and fantasy are time-honored tools of artists that are used to engage the viewer or spectator of an artwork. Art history is filled with illustrative examples of *illusion* and *fantasy*. The vanishing point of paintings is often considered to be a window to an illusory or fantastic world. Given that illusion and fantasy engage the viewer or participant, there is no doubt that they have become related to, if not synonymous with, imagination. But this is not what Casey and I mean by imagination. What Casey hopes to distinguish out of the confusing web of terms associated with imagination can be found in the stance he takes as a phenomenologist: “One of the primary aims of a specifically phenomenological method in philosophy is to make more thematic what is otherwise merely implicit and taken for granted in human experience.” Casey goes on to say:

Phenomenology places special stress on firsthand or direct description, thereby minimizing recourse to the highly mediated constructions of metaphysics, natural science, and other theory-saturated disciplines. What is sought in the implementation of such a method is an accurate description of a given phenomenon as it presents itself in one's own experience, not an explanation of its genesis through reference to antecedent causal factors. The phenomenologist's basic attitude is: no matter how something came to be in the first place, what is of crucial concern is the detailed description of the phenomenon *as it now appears*. (*Ibid.*: 8-9)

Thus, imagining, as a process, is distinguished from hallucinations or illusions by the way it immediately connects our experience to phenomena, and, in turn, works to direct our mental activities back to what is happening to us, and around us, at any moment. Quite telling is his argument that imagining does not provide us with anything we do not know because "imaginative experience is inherently circular." We imagine, not something new, but a *new way to think* about that which we already know (*Ibid.*: 7-8). This is, as I believe Casey contends, the power of imagining—a power *not* present in other mental acts often misunderstood as imagining.

Emergence of *imagining* in art and electroacoustic music

Casey argues that the power of imagining shows itself to us, in the world and in our lives, through the perceptual challenges we face, particularly those created by artists attuned to the role of perception and imagination in art. Sculptural works by the so-called 'Light and Space' artists of the 60s and 70s are a perfect example.

In her book *The Art of Light + Space*, Jan Butterfield argues that with the focus of their attention on phenomena, the Light and Space artists, such as Robert Irwin, James Turrell, Eric Orr or Maria Nordman, brought perception to the front of the artistic experience. Designating existing art practice as the art of illusion or of abstraction, Butterfield argues that what these Light and Space artists have articulated through their work is an *art of perception* (Butterfield 1993). Butterfield's views are in accord with those of Robert Irwin, one of the Light and Space artists, who writes:

What appeared to be a question of object/non-object has turned out to be a question of seeing and not seeing, of how it is we actually perceive or fail to perceive “things” in their real context. Now we are presented and challenged with the infinite, everyday richness of “phenomenal” perception (and the potential for a corresponding “phenomenal art,” with none of the customary abstract limitations as to form, place, materials, and so forth)—one which seeks to discover and value the potential for experiencing beauty in everything. (Irwin & Weschler 1985: 29)

In the Introduction to his book *Return of the Real*, while recalling a visit to an exhibition of Robert Morris’ work, Hal Foster similarly stresses the emergence of perception as a focus in recent sculpture and installation work:

Not long ago I stood with a friend next to an art work made of four wood beams laid in a long rectangle, with a mirror set behind each corner so as to reflect the others. My friend, a conceptual artist, and I talked about the minimalist basis of such work.... Taken by our talk, we hardly noticed his little girl as she played on the beams. But then, signaled by her mother, we looked up to see her pass through the looking glass. Into the hall of mirrors, the *mise-en-abîme* of beams, she moved farther and farther from us, and as she passed into the distance, she passed into the past as well.

Yet suddenly there she was right behind us: all she had done was skip along the beams around the room. And there we were, a critic and an artist informed in contemporary art, taken to school by a six-year-old, our theory no match for her practice. For her playing of the piece conveyed not only specific concerns of minimalist work—the tensions among the spaces we feel, the images we see, and the forms we know—but also general shifts in art over the last three decades—new interventions into space, different constructions of viewing and expanded definitions of art. (Foster 1996: ix)

The works of Robert Irwin and Robert Morris, as well as Foster’s account of Morris’ work, attest to Butterfield’s argument that perception has become a mainstay of how these artists and their works attract viewers to participate in the formation of their own perceptions. Participation in one’s most direct perceptions is essential, as the experience can bring viewers to the *re-*cognizing of how they see, hear, and feel the world, and in turn, help them define for themselves the very difference between imagination and illusion. It is through direct and active engagement with one’s own sensory experiences that imagining begins its work.

It is worth noting that *I am sitting in a room*—an electroacoustic piece discussed in Chapter 2—employs a process similar to those used by Light and Space artists in order to reveal for the

listener the way sound is a product of both sources and spaces. As I have argued, the encounter with aural perception that Lucier's work creates depends entirely on technology and the process that progressively changes the sound we hear. But it is more than technology, for what we are experiencing when we listen to *I am sitting in a room* is the result of two human processes, different in kind: one concerned with perceiving and another with imagining. Even though we perceive the sound of Lucier's voice gradually disintegrated into the reverberant sound of the room, it is our imagining that leads us back to the work's opening voice and allows us to establish a relationship between the growing reverberance of the room and the voice we increasingly only remember. To perceive is like recognizing dots, while imagining—which builds upon our perceptions—connects them (or changes the connections held together by conventional assumptions). Once connected by imagining, however, what we have perceived can take other turns, which we witness when listening to *I am sitting in a room*. As Casey argues:

Yet it must be emphasized that this extension is *imaginative* and not perceptual in character. A given perceptual experience is extended, but by means of *another* kind of act which differs intrinsically from perception proper. This supplemental act is one of imagination, even though its function can be designated as a form of "paraperception." In its paraperceptual capacity, imagining is not only capable of linking up with preceding acts of perceiving: it carries on their work in a different modality. Qua paraperceptual, imagining is an act by which the inherent partialness of perceptual experience is momentarily suspended—though not, of course, overcome. Through such paraperceiving, perceived and imagined components become interwoven as conjoint elements of a perceptual object or event which we are striving to apprehend more fully than we could by perception alone. (Casey 1976: 139-40)

As such, electroacoustic music listening engages the interworking of perceived and imagined elements. But what, one may ask, does the interworking of perception and imagination produce? And to what should listeners be listening?

Sound-image in Electroacoustic Music

Listeners engage electroacoustic music by imagining a relational and developmental process between the sounds they hear. In fact, the use in many electroacoustic compositions of

everyday sounds (and the characteristics we associate with them) naturally guides listeners into a process of imagining relations as they find themselves in familiar, if not, curious everyday territory or the vestiges of it. With time, movement through the work offers listeners the opportunity to create and project their own images onto the sounds they hear, as the everydayness of the sounds embolden them to ‘picture’ what they are hearing and the way the sounds sit, move, integrate, disintegrate, or generally relate to each other. The pictures or images that emerge are often called “sound-images’ and are distinguished by the way the listener provides or gives them that which the listener believes the sounds may, in fact, contain (or desire to contain). If ‘image’ is “the mode of givenness pertaining to the total imaginative presentation” (*Ibid.*: 55), then sound-image can be understood as *a mode of givenness initiated and led primarily by aural presentation that, nonetheless, constructs the totality of the imaginative presentation through the act of imagining.*

Sound-image is a puzzling word as it suggests that sounds are somehow seen. It is telling that, despite its oxymoronic merging of vision and hearing, the word is a common term used by listeners probing their first experiences of electroacoustic music. More, sound-image is a concept often used by composers, particularly as they imagine those aural objects suggestive of things listeners might imagine touching or feeling, or places into which they might imagine listeners venturing. That listeners and composers alike characterize electroacoustic music in terms of sound-images suggests evidence of a common, shared framework based on qualities inherent to the activities of both. Young notes:

These perspectives on sonic imagery [as a way of drawing meaning from the corporeality and physicality of music] highlights the perceptual distinction between ‘realistic’ sound images, those understood as tangibly from life, and those more connotative sounds whose imagery is not phonographic but might stimulate feelings of known actions and objects. This framework for imagery, then, is a core aspect of the potential of acousmatic music. (Young 2007: 27)

Young discusses the different experiences listeners have with sound images, identifying sound-images that are ‘realistic’ and sound-images, seemingly less ‘realistic,’ whose identity is based more on connotation. While the meaning of ‘realistic’ may be fuzzy and potentially problematic, Young’s assertion that sounds have, to varying degree, a recognizable everydayness to them associated with their realism is potentially useful; realism, and the degree to which composers desire it and listeners perceive it, could possibly serve as a framework through which key features of electroacoustic music composition and listening might be mapped.

Sound-Images in Electroacoustic Music: What Do We Imagine?

Having explored the idea of perceiving and imagining using Lucier’s *I am sitting in a room*, and after looking closely at the idea and importance of imagining in electroacoustic music, two important questions emerge: what do imaginative listeners imagine and how do they imagine it?

As argued briefly in Chapter 2, the four poles of the proposed listening framework (body and place, and non-body and non-place) have been conceived in response to both the common practice of electroacoustic music composition that focuses on certain types of sounds or images as well as the behavior of listeners, who, at the outset, listen out of a desire to fill in the gaps created by what is missing or hidden by the creative use of sound. The making of the framework, and our return to it, proposes or at least suggests an answer to the first question: *that is, listeners imagine what is missing in order to complete the representation*. Listeners imagine those perceptions, like vision to go with sound, taste to go with sight, or punishing force to go with pain, etc. that complete the partially-experienced event they imagine is taking place.

This is easily observed in our everyday experiences. Our perception of events is typically only partial. For example, while I am writing this sentence in my study, I hear a series of loud sounds—beeps, sharp scratching, thumping and cranking—but I cannot see their source;

nonetheless, I can and do create, out of past experience, a perfect visual image of a garbage truck just outside my apartment as it makes these sounds. I can even picture, almost exactly, what it does (and even conjecture its next movements).

The typically partial nature of our perceptual experiences is likely due to “the fact that the perceiver is always anchored in some specific position in a particular spatio-temporal field” (Casey 1976: 136-7); nevertheless, we somehow succeed in grasping experiences as completely as we need grasp. For listeners and composers, the interplay between what is given and what is not (and which must therefore be imagined) is the very playground of electroacoustic music.

Young notes:

A poetic dimension is afforded by the removal of visual sources since, in representational terms, acousmatic sounds become partial objects—potentially evocative of their sources, yet at the same time introducing ambiguities, potentially impressionistic and requiring active imaginative input to effect reconstruction of a scene or resolve contradictions of context. (Young 2007: 27)

The principal element initially missing from the listener’s experience of electroacoustic music is often the visual appearance of the sound source, although listeners quickly learn to imagine the source as simply out-of-view. Therefore, it seems natural for listeners of electroacoustic music to express their experience in visual terms despite the fact that there is typically nothing to see. ‘Filling-the-gap’ and completing the picture is similarly necessary in other forms of media experience where imagination plays an essential role. Writing on the interactivity of virtual reality, Ron Burnett notes:

Projection allows individuals to visualize a variety of different experiences either through fantasy or the use of prostheses. So, the use of a visual reality helmet to walk through an artificial coral reef depends not only on the technology, but also on the capacity of the user to fill in the gaps between what is there and what cannot be there. (Burnett 2007: 331)

Burnett’s position is not far from the views of the great Russian filmmaker Andrei Tarkovsky; Tarkovsky, discussing the construction of audiovisual images in film, notes that:

As soon as the sounds of the visible world, reflected by the screen, are removed from it, or that world is filled, for the sake of the image, with extraneous sounds that don't exist literally, or if the real sounds are distorted so that they no longer correspond with the image—then the film acquires a resonance. (Tarkovsky 1987: 162).

Quite telling is that while his works concentrate mainly on visual elements, Tarkovsky, like other esteemed filmmakers such as Ingmar Bergman who knew how to use sound, understood the interflowing nature of image and sound in film, which he vividly demonstrated in almost all of his films, including *The Mirror*.¹¹

Sound-Image in Electroacoustic Music: How Do We Imagine?

The interflow of image and sound, as well as other sense information, is common in our everyday experience and, as discussed earlier, is strongly shaped and guided, according to Gibson and Gaver, by an ecology of perception. As such, the interflow of image and sound becomes subject to perceptual ecology's processes of 'hunting' and 'imagining' and the way they interact. In particular, when exposed to a certain set of sensory data, the ecological hunting process may still look for other physical qualities that our body can actually sense, whereas the process of imagining may not, as it does not necessarily need them. How then does the process of imagining fulfill the goals of the perceiver who seeks to experience things whole? Casey

notes:

¹¹ It is interesting to note that Tarkovsky recognized the potential of electronic music in film and used it extensively in *Mirror*. As he writes: "Electronic music seems to me to have enormously rich possibilities for cinema. [Edward] Artemiev and I used it in some scenes in *Mirror*."

We wanted the sound to be close to that of an earthly echo, filled with poetic suggestion—to rustling, to sighing. The notes had to convey the fact that reality is conditional, and at the same time accurately to reproduce precise states of mind, the sounds of a person's interior world. The moment we hear what it is, and realize that it's being constructed, electronic music dies; and Artemiev had to use very complex devices to achieve the sounds we wanted. Electronic music must be purged of its 'chemical' origins, so that as we listen we may catch in it the primary notes of the world.

Instrumental music is artistically so autonomous that it is far harder for it to dissolve into the film to the point where it becomes an organic part of it. Therefore, its use will always involve some measure of compromise, because it is always illustrative. Furthermore, electronic music has exactly that capacity for being absorbed into the sound. It can be hidden behind other noises and remain indistinct; like the voice of nature, of vague intimations... It can be like somebody breathing" (*Ibid.*: 162-3).

But how can I perceive things in such a holistic manner when my perceivings are in each instance intrinsically incomplete? Full-bodied perception occurs in these circumstances because *I intend more than is given*. I intend the object *totaliter* in each case and not only its momentarily proffered profiles. I aim at the total object, i.e., the perceived object insofar as it is a synthesis of given and nongiven components which do not exist in strict isolation from each other. (Casey 1976: 137)

It is our intention to perceive things in their wholeness that initiates the process of imagining. Furthermore, we tend to move freely between what is perceived, which is given, and what is imagined, which is not given, so as to finally form an integrated whole.

In the eight-channel electroacoustic work *Out of Breath* by Paul Koonce, for example, I hear the sound of short and long inhaled and exhaled breaths; some stutter while others are prolonged; all sound as though directed into a tube whose color I soon recognize as that of a flute. A series of similar pitched flute-like sounds—they are flute-like, but not the sounds of a flute in a strict sense because, most of the time, I hear not the flute's full spectrum but only groups of partials—tend to be heard first from the mid-front speaker, although the overall sound soon spreads outward to include the left-front and right-front speakers, followed by the side speakers. Also, I hear the reverberated sounds of the pitched flute-like sounds lingering on mainly in the speakers at the sides and the back. As I hear the sound again and again, in different variations yet with a constancy of shape and presentation, I imagine (as the sound-image appears) a performer in a space, exploring the sound of her instrument in the space as it somehow, fantastically, resonates certain partials of the instrument she holds. The piece seems to play with different configurations of the frequency spectrum of the flute, which are set in motion by the imaginary performer who, initially hesitant and nervous about playing the flute, gradually comes to accept what comes out of it. At the same time, the sound of the flute slowly opens up not only its own property as an instrument, but also the quality of the space in which it is played.

It is important to note that my experience of the piece is the product of what I am actually hearing and what I am projecting onto what is heard—what I am imagining. I could say that all I heard were a series of flute-like sounds—some reverberated, some dry—with added breaths and some additional hard attacks. However, my experience of the piece is much more; as I hear and follow the work, I begin to imagine things—a performer, a flute, the lips of the performer that touch the flute, and even the partials of the flute sounds as they fly about, bouncing back and forth between the walls of the space I am in. My imagining is inevitable, and in fact, the piece encourages it and the sound-images that result from it. 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.

Casey argues that there are three primary ways in which we can image: imaging, imagining-that, and imagining-how (*Ibid.*: 41); and if we examine closely the way I was imagining while listening to the piece, we can surely discover these three ways of imagining with sound and sound-images.

Imaging and sound-images

First, when we listen to electroacoustic music, we are drawn to familiar images of specific, if not simple, form. Casey notes that to imagine is “to image,” which means, “to form an imaginative presentation whose content possesses a specifically sensuous—an ‘intuitive’ or ‘imagistic’—form” (*Ibid.*: 41). Indeed, my imagining while listening to *Out of Breath* created a strong representation of a flute and/or a performer. And the image of the flutist I created consisted not only of aural elements but also visual and even tactile elements as well. In my hearing of the work, I was almost able to see ‘the lips of a performer touching a flute’ or to touch, myself, the sounds as they fly around the space (unbelievable though it may seem)

because imagining almost always occurs “in a sensory-specific way” (*Ibid.*: 41). Moreover, these images often seem to take some form of action or to appear within the frame of some event.

Imagining-that and sound-images

Second, in electroacoustic music listening, we imagine not only sound-images but also their relationships. Casey notes:

When we imagine, we not only envision or project objects and events in imagistic form and as distinct from one another in their sensory specificity. We may also imagine *that* individual objects or events together constitute a circumstance or situation: a ‘state of affairs.’ (*Ibid.*: 42)

Considering my imagining during my listening to *Out of Breath*, I see that I am imagining my sound-images establishing a form of performance—perhaps the flutist is rehearsing. Once I situate these sounds in this setting, I can listen further for possible performative clues from the various juxtapositions of these sounds. In other words, many of the sounds I hear make much more sense to me once I ‘figure out’ a way of imagining their situation(s).

Imagining-how and sound-images

Finally, in our hearing of electroacoustic music, we imagine how the sound-images we hear unfold, situated as they are in the circumstances we imagine: we imagine in a state of expectation. For when we imagine, we anticipate “what it would be like if such-and-such a state of affairs” were to happen (*Ibid.*: 45). In expectation, listeners play an active role in the process of imagining-how. As Casey notes:

This kind of imaginative activity is not realized by projecting an unfolding scene of which the imaginer is the mere witness, but rather by entertaining an imaged state of affairs in which he (or a figure who stands proxy for him) is envisaged as *himself an active and embodied participant*. (*Ibid.*: 45)

Furthermore, he goes on to say:

In other words, there is a sense of *personal agency*, of the imaginer's own involvement in what is being imagined, which is lacking or at least muted in instances of sheer imagining-that. To imagine-how is to project not merely a state of affairs *simpliciter* (i.e., one in which the imaginer is not a participant) but a state of affairs into which the imaginer has also projected himself (or a surrogate) as an active being who is experiencing *how* it is to do, feel, think, move, etc. in a certain manner. (*Ibid.*: 45)

Two of the most effective devices used throughout *Out of Breath* are repetition and silence. As I listen to the piece, these devices serve to challenge my assumptions about what the piece is about, or better, how (or whether) it will continue. Remarkably, repetition and silence prevent the sound-images I imagine, and all that I imagine is happening around them, from becoming fixed, keeping the idea of *what* the piece is about in motion so that I, the listener, can continue to expect or hope for something that is, yet again, new.

Body and Place as Sound-Images

In this chapter, we have discussed in detail how crucial it is to discern from our act of listening the two interwoven processes of *perceiving* and *imagining*. To understand our act of imagining, it was necessary to separate perceiving and imagining from listening and further dissect what and how we imagine. However, our listening is not so easily divisible once we recognize the way the senses and perception are interwoven and how we listen in totality. We have also examined how *imagining* fills the gap, that is, how it supplies what is *not given*, and how the addition of missing parts completes the sound-images any given piece seeks to represent. Additionally, we have observed three ways in which we engage in the process of imagining. Again, it should be noted that, once the process of imagining is set in motion, these three ways of imagining are no longer easily separated from one another.

I argue this simply because it is imagining itself that is responsible for the sound-images upon which the proposed framework is constructed. The observations made in this chapter about the production of sound-images creates an urgency to return to the four poles of the quaternary

framework—Body, Place, Non-body, and Non-place. In Chapter 2, I have briefly discussed the emergence and purpose of these images with some electroacoustic compositions as examples, and this chapter has shown with various examples that these poles are in fact sound-images that listeners conjure up as they listen to electroacoustic music. It should be noted that non-body and non-place are products of body and place by a process of negation that operates according to acousmatic reasoning. This leads us to focus on body and place as the two main sound-images in need of further examination, followed by discussion of the negation process that cause body and place to become non-body and non-place.

CHAPTER 4 BODY AND PLACE AS SOUND-IMAGES

Body and Place in Electroacoustic Music

The quaternary framework for electroacoustic music listening, proposed in Chapter 2, is constructed upon the claim that, when listening to electroacoustic music, listeners imagine sound-images principally through their connection to body and place. It has also been briefly argued that electroacoustic music often challenges the listener's ability to listen in terms of sound-images, encouraging them to hear works more on the properties of the sounds themselves than on their sources; to not hear sound-images hinges upon the negation of body and place, or non-body and non-place, as I have proposed.

This chapter defines and discusses body and place in electroacoustic music, identifying properties of these terms as they operate in the proposed quaternary framework. To this end, this chapter briefly examines several electroacoustic compositions to identify key properties connected with the constitution of body and place in electroacoustic music and how listeners use these properties when listening. As well, the relationship between body and place (i.e., body in place or place surrounding (subsuming) body, and more interestingly, body-becoming-place and place-becoming-body) is explored in several additional electroacoustic compositions. The hope is that these observations on body and place in electroacoustic music will show the explanatory power of the quaternary framework. Finally, the chapter will identify properties at work in non-body and non-place.

Body as Sound-Image

As we found with *I am sitting in a room*, the image of a body typically takes form once listeners discover features of sound suggestive of bodily action into which they can project the memory of their own physical behaviors (and limitations) or those of others as observed and

remembered. What physical behaviors do listeners project onto sounds? Simon Emmerson, in his book *Living Electronic Music*, writes:

The body generates many rhythms and sensations with cyclic periodicities lying within the duration of short-term memory. The most important are breath, heart beat and the limb movements of physical work, dance and sex. These are a product of our biological evolution, our size and physical disposition in relation to the mass of the earth—hence its gravitational field—and would be different if we had evolved to be the size of a bat or an elephant or had the earth been a different mass. (Emmerson 2007: 64)

Furthermore, he goes on to list some of the key properties of the human body (*Ibid.*, p. 62),

which, when detected in sounds, listeners can use to construct the sound-image of a body:

- *Heart beat*: we become conscious of this in ourselves at times of quiescence or stress, hear (or feel) it in others who are physically close;
- *Breath*: from the simple indication of an individual ‘living and breathing’ to an expressive indication of body state (from repose to ‘ready for action’);
- *Voice*: not disembodied in this case but expressing something personal: for example, a feeling, a desire, a personality;
- *Exchange*: conversation and interaction (one to one, one to many, many to many, many to one);
- *Touch and proximity*: the *sounds* of physical interactions (peaceful or hostile), the presence or absence of agents within the limits of personal space will vary with cultural and personal expectations;
- *Human movement*: a sense of both ‘being and becoming’ through a space or different spaces (this may be associated with narrative aspirations or the more intensive activity of dance).

Electroacoustic music has extensively explored the image of the human body, as

Emmerson maintains:

Since the inception of *musique concrète* in 1948, human presence in general and human body sounds specifically have haunted the sound world. This is not just through the obvious intrusion of the human voice into the discourse, but in reference to the body rhythms of limb, breath and heartbeat, and in the representation of personal and psychological spaces.” (*Ibid.*: 62)

Listening to only a few electroacoustic compositions quickly produces a showcase of different examples of these properties. In fact, many compositions create composites of body-associated properties that they then present all-at-once or gradually unfold in order to engage the listener with a growing and evolving human presence.

In *Interiors and Interplays* by Erik Mikael Karlsson, for example, listeners may have little sense of the body until they hear the sound of breathing in and out at 5:39. Breath sounds are remarkably suggestive as demonstrated here: in spite of its brevity, listeners quickly project the image of a body onto these breathing sounds. So cued, the body becomes a vehicle through which listeners recall and retroactively relate earlier sound events first heard without any tie to the immanence of the body and the consequences of its actions: filtered sounds that infrequently travel within the stereo field at 2:20 and on become heard as a voice; resonant sweeps heard throughout the piece moving gracefully from left to right also become framed as breathing; and even the resonating metallic sounds that open the piece could be heard as a human body engaged in action.

In contrast to Karlsson's piece, *Surface Tension* by Jonty Harrison does not so easily lead its listener into the domain of the body through the cues of breath or voice. Nonetheless, a strong sense of human movement or physical action connects the piece to the body. Human movement in *Surface Tension* is manifest in two ways: first, despite the relentless invention and manipulation of sounds, listeners are always taken back to the original wood sound sources and their strong performance signature (they are, in fact, recordings of a human performance with wood); and second, the phraseology of sound events suggests a human performance, despite the non-traditional sound materials. While incessant, the presentation of sounds maintains a sense of

performance, which is a quality found in most of Harrison's pieces, such as *Klang*, *Splintering*, and more recently, *Rock'n'Roll*.

The pieces discussed above are some of the many examples that attest to the body as a sound-image in electroacoustic music listening. More importantly, the cursory analyses provided begin to demonstrate the ease with which listeners with a more corporeal engagement with music may construct their hearing of pieces through images of the body than through other images or conceptions of musical order. As Marc Leman notes, the ways in which listeners interact with music include not only those "based on mimetic skills, or rehearsed action scenarios, such as playing a musical instrument" but also those "based on goal-directed gestures that do not require highly developed skills but nevertheless may be highly culture-dependent, such as symbolic gestures" as well as those "based on direct episodic action sequences, involving responses based on [a listener's] emotive, affective, and expressive capabilities" (Leman 2008: 19). Furthermore, Leman examines the corporeal engagement listeners have with music through a model called "the action-reaction cycle" (*Ibid.*: 53-5), which Leman elucidates by applying it to the making of a musical instrument:

The first step of the cycle is an action (Play) that generates energy and causes physical vibrations in an object. The resulting vibrations are taken up by the air molecules that surround the object. These vibrations are received and processed by the human auditory system (Listen). A perception is then built up in the mind, and a judgment is made about the quality of the instrument (Judge). Finally, the subject can undertake an action and change (Change) the physical conditions of the instrument to optimize the judgment in terms of certain beliefs or values. (*Ibid.*: 53)

Leman uses the action-reaction cycle to discuss the two interlocking processes, listening and acting (such as performing) on a sounding object (such as an instrument), and furthermore, to investigate the relation between human embodiment and technology. However, the action-reaction cycle can serve to explain how and why listeners tend to imagine an agent (or agents) of action, particularly a human agent as a sound-image, from sounds. Considering that

electroacoustic music listening poses listeners with the challenge of the acousmatic situation—that is, the challenge of not being able to visually verify what they are hearing—listeners in acousmatic situations cannot participate (directly) in all four activities of the cycle. In fact, Play and Change are out of the control of listeners; in other words, there is no way listeners can act on anything they hear; they can only observe what is heard. Furthermore, listeners cannot change an instrument or how it is performed like a performer or an instrument maker might do. However, they can *predict*—that is, *imagine*—possible changes to an instrument or how it is performed. Consequently, listeners are encouraged to employ inference to fill in the Play and Change stages of the cycle by observing the sounds they hear and attempting to predict what will come.

Jensenius’ experiment on air performance (Jensenius 2008: 62-77)¹² demonstrates that listeners, whether they are novices or experts in music, can fill in (regardless of whether they are successful or not) the gap in the cycle. Thus Jensenius notes:

Air performance movements may be regarded as an indication of the perception of musical sound in general, and may also be more specifically related to the mental imagery of sound-producing actions perceived in the sound. A person performing in the air shows the ability to quickly extract salient features from a complex sound signal, and reproduce these features as body movement. (*Ibid.*: 62)

It is no coincidence that the desire of listeners to fill in the hidden Play and Change stages of the action-reaction cycle of electroacoustic music listening is closely related to what we have discussed with regard to the three ways of imagining: *imaging*, *imagining-that*, and *imagining-how*. For the engagement of listeners in the observation of Play and the prediction of Change leads them to produce *sound-images associated with the human body*, particularly when pieces engage with Emerson’s sound-types and/or with sounds that hint at human actions.

¹² Jensenius’s experiment on air performance observes subjects (both novices and experts in music) who mimic sound-producing actions to “understand more about the role of movement in our perception and cognition of music” (*Ibid.*: 61).

But what kind of sounds in electroacoustic music, other than those that emanate *directly* from a human body, can suggest to listeners a sense of human action? To identify human-action sounds, it is necessary to recognize the role that gesture plays in bounding human action and how gestural bounds transfer into human-action sounds. As Smalley notes, “A human agent, using the sense of touch, or an implement, applies energy to a sounding body, producing spectromorphologies.... Sounding body and performance gesture are physically indissolubly linked in intimate space” (Smalley 2007: 41). Therefore, it is crucial to identify and examine various instances of gesture in electroacoustic music. In this regard, it is interesting to examine Godøy’s categorization of sound-related gestures (Godøy 2006: 154):

- *Sound-producing gestures*, including both excitatory gestures such as hitting, stroking, bowing, blowing, singing, kicking, etc., and modifying gestures such as modulations of pitch and timbre.
- *Sound-accompanying gestures*, such as dancing or marching, or more vague sound-tracing gestures such as following the melodic contours, rhythmical/textural patterns, timbral or dynamical evolutions, etc., with our hands, arms, torso, etc.
- *Amodal, affective, or emotive gestures*, including movements associated with more global sensations of the music, such as effort, velocity, impatience, unrest, calm, balance, elation, anger, etc.

Furthermore, Godøy notes that the most “embodied” gestures among these categories are “those that follow the sound closely, i.e., the sound-producing¹³ and sound-tracing gestures,” and also maintains that: “[the] sound-producing gestures have an energy transfer from the performer to the instrument, whereas the sound-tracing gestures may mimic excitatory gestures as well as trace the evolution of the resonance of sounds, i.e., the ‘passive’ or energy-dissipating phase of the sounds, hence not transferring energy to a resonating body” (Godøy 2006: 154).¹⁴

¹³ For more discussion about *sound-producing gestures* based on excitation and resonance, see (Godøy 2001).

¹⁴ His terminology for the sound-accompanying gestures may be confusing. This is because the sound-accompanying gestures he is using include not only gestures like dances or marches, which have a strong signification of body movement, but also more subjective sound-tracing gestures that we may identify when we, for example, move our hands or arms to imagine and mimic the movement of a conductor while listening to an orchestral composition. For our discussion, however, only sounds related to sound-producing gestures, in addition to

While Godøy's categories may comprehensively address the different meanings of gesture in music, his range of categories is too broad to be useful in characterizing the more limited collection of sound gestures in electroacoustic music that we can readily connect to human action: first of all, in electroacoustic music, listeners cannot detect sounds that may be related to amodal, affective or emotive gestures—at best, listeners may assume emotional or affective qualities from sounds in electroacoustic music, but these qualities do not impart a well-grounded sense of the human body as source (at best, they may affect listeners after listeners have formed a sense of body from other more salient gestures); second, some of the sounds related to sound-accompanying gestures may be too divorced from notions of corporeality for listeners to produce a sound-image of the human body. Although sound-accompanying gestures may bear gestural characteristics, the image of the body they convey is less an image than a type of affect elicited from listeners. As Godøy writes in another article:

In some cases of air playing we may also see more vague *sound-tracing gestures*, such as in following melodic contours, rhythmical/textural patterns or timbral/dynamical evolutions with hands, arms, torso, or [the] whole body. Such gestures could be understood as reflecting the total sonic evolution of the music more than the assumed sound-producing gestures. (Godøy, Haga, & Jensenius 2006: 257)

Godøy argues that some of the sound-accompanying gestures—that is, more vague *sound-tracing gestures*—are more about “reflecting the total sonic evolution of the music” than about “the assumed sound-production gestures.” For example, the filtered noises beginning to travel in the stereo field at 2:20 in *Interiors and Interplays* may suggest an acting human body, but being abstract, they cannot by themselves convey a sense of one; they must be framed by more obvious, body-connected sounds to be read as representing the human body.

some, but not all, sounds related to sound-accompanying gestures (such as sounds or music that conjure up the images of dances or marches, depending on the context of the sounds) can become aural cues for a human body. Sound-tracing gestures, however, may signify more the effect of music than the human body as a sound-image, and therefore, cannot be included in the gestural cues for the human body.

In this regard, these more vague sound-tracing gestures can be thought of as being properties of non-body. However, it should be noted that the non-body in the proposed quaternary framework does not emerge in and of itself; rather, it emerges by way of the negation of the body. For example, processed sounds in *Splintering*, such as granulated sounds around 12:00 into the piece, do not by themselves form a body. They need to be connected to more salient body-features in the beginning of the piece (as well as several other more credible references to the human body). Therefore, *any discussion of the non-body-ness of electroacoustic music should center on the negated body properties and how they are negated.*

Place as Sound-Image

Place in the proposed quaternary framework for electroacoustic music listening can be defined as a sound-image that listeners conjure up, first, by recognizing and collecting the potential place-ness of sounds, and second, by examining the plausibility of these sounds existing together, measured against the listener's memory of directly or indirectly experienced spaces. Just as a "place is an organized world of meaning" (Tuan 1977: 179) in everyday being, a place as a sound-image in electroacoustic music is a product of a listener's efforts to organize and connect together the things that sounds reference.

First, one must clearly differentiate between space and place as they are used in this dissertation in order to have a better understanding of how listeners produce and make use of these two terms in the quaternary framework. As implied in the above definition, a place is a lived or remembered space; as Gibson points out, we do not live in space (Gibson 1979). In his book *Space and Place*, Tuan notes:

In experience, the meaning of space often merges with that of place. "Space" is more abstract than "place." What begins as undifferentiated space becomes place as we get to know it better and endow it with value. Architects talk about the spatial qualities of place; they can equally well speak of the locational (place) qualities of space. The ideas "space" and "place" require each other for definition. From the security and stability of place we

are aware of the openness, freedom, and threat of space, and vice versa. Furthermore, if we think of space as that which allows movement, then place is pause; each pause in movement makes it possible for location to be transformed into place. (Tuan 1977: 6)

Casey goes even further to argue that most of our knowledge of space may in fact be based on the frame of place, as he writes:

It is a striking fact, on which we do not often enough reflect, that while we can certainly *conceive* of entirely empty spaces and times—radical vacua in which no bodies (in space) or events (in time) exist—such spatio-temporal voids are themselves placelike insofar as they *could be*, in principle, occupied by bodies and events. Moreover, once bodies are found or even merely posited, they *require* places in which to exist.... To exist at all as a (material or mental) object or as (an experienced or observed) event is to have a place—to *be implaced*, however minimally or imperfectly or temporarily. (Casey 1993: 13)

One can certainly feel spaciousness or other spatial properties in electroacoustic music. In fact, a sense of space, conveyed through recording technique or room simulation technologies, is essential to how we hear electroacoustic music and has recently been a favorite topic among electroacoustic composers and theorists (Truax 1998)(Landy 1998; Worrall 1998) (Emmerson 1998) (Harrison 1998) (Lane 2000) (Henriksen 2002) (Blessner & Salter 2006) (Emmerson 2007) (Smalley 2007). Nevertheless, it is questionable whether the spatiality that listeners hear in electroacoustic music will form into a sound-image as I have defined in this chapter; at best, spatial cues are invitations to listeners to imagine a sense of place, the concept of place being, in practice, richer in its details and more suggestive through its inferences than the cues of spatial ambiance by themselves might suggest. Tuan argues that space is often identified by way of place, as he demonstrates:

Neither the newborn infant nor the man who gains sight after a lifetime of blindness can immediately recognize a geometric shape such as a triangle. The triangle is at first “space,” a blurred image. Recognizing the triangle requires the prior identification of corners—that is, places. (Tuan 1977: 17)

Thus, when observing sound-images in electroacoustic music, it is more appropriate to treat spatial cues as key attributes in the determination of space than as lone identifiers of place.

It is also crucial to note that to imagine place in electroacoustic music is to not only exploit but also to limit—that is, to frame—the image potentials and possibilities of the sounds heard. For example, in *Industrial Revelations* by Natasha Barrett, neither the drone at 0:53 nor the short, high-pitched squeak around 1:03 identifies a particular place; each by itself suggests too many places. But heard together, repeatedly with ever increasing loudness, the two sounds form the image of a train approaching with accelerating speed, especially when finally framed by the confirming sound at 1:31 of a real train stopping at a station. This act of framing is essential to the recognition of place (or places) in electroacoustic music. As Eco aptly notes: “in order to identify the essence of something, one selects attributes such that, although each of them has wider extension than the subject, *all together* they have not” (Eco 1984: 52).

More important, however, is the fact that imagining a place in electroacoustic music is not always an easy task; on the contrary, it is often difficult to definitively recognize place at any given moment in a piece, especially when the sounds of different places are mixed, suggesting a kind of simultaneous existence in different places. For example, listeners who framed the high-pitched squeak and drone in the example above into the image of a train station are soon challenged at the return of the sounds between 3:58 and 5:08. While less prominent than before, their return is, on its face, intact, maintaining the original train station image. However, this time, the train station is joined by the sound of an operatic soprano. The new pairing of train station and soprano is a challenging one, for while the judicious mix of sounds, exploiting similarities of pitch and the alignment of attacks and fades, coalesces into one sounding body, the juxtaposition of the associated place-images (i.e., train station and rehearsal/performance room) is startling. Looking structurally at the unique moment, we can say that listeners face the unsettling effect of a simultaneous conjunction and disjunction of different ways of hearing; listening

spectromorphologically, listeners hear conjunction in the event as spectral features join together into simplified auditory forms; however, listening from a semiotic perspective tuned to the objects, places, meanings, and narratives to which the sounds potentially refer, listeners hear disjunction as they face a collision of places.

The interplay between semiotic and spectromorphological listening and the perceptual confusion it fosters is a primary characteristic of electroacoustic music that attracts listeners greatly. However, the subject is difficult to examine in terms of existing electroacoustic listening theories. By combining both spectromorphological and semiotic listening modes and identifying sound-images that change based on the process of negation, as shown briefly in the above example, one can distinguish and discuss this structural interplay in electroacoustic music listening.

While the example above relied more on everyday sounds to explore conflicts of place, other pieces, such as *Night Traffic* by Paul Lansky, depend more on spectromorphological properties of sounds. Listening to Lansky's piece, Norman notes:

This ten-minute work maps a musical chart onto a real world sound. The sounds of traffic on a busy highway are tuned to bring out musical pitches, themselves extracted, by digital 'comb-filtering', from the inherent qualities of the recorded sound material. A dark, but strangely familiar, soundscape ensues. But this is no composed toing and froing between representation and reverie.... This piece does not sound like a highway at night, but listening to it awakes that particular qualia—what listening to the highway *feel* like. How? The sounds of traffic appear recognizable—in contour, shape, pace. The representation of traffic is transparent. Similarly the musical framework is a clear 'representation' that is recognizable—pitches, rhythm and so on. Neither of these would work alone; it is in their (literal) confusion that the lyric simile resides. An epic field-recording of untouched traffic sounds would be too literally a 'picture' of a sound. An abstract musical work that presented a slow, aimless voice-leading harmony would be a pleasant diversion. But the two together offer a musical confusion. (Norman 2004: 68-9)

The confusion created by the interworking combination of a musical framework of comb filter resonances overlaid onto everyday traffic sounds causes Norman to hear the piece as neither simply traffic nor a series of changes in timbre. It is telling that this confusion pulls her

away from the highway (as a sound-image) so much so that the piece comes to represent no place at all. Norman goes on to note:

[*Night Traffic*] is not a descriptive piece at all. Because it starts as it is, and continues much the same, there are no explicit opportunities for flipping between listening to sounds and following memories or associations. ... It does not go on with any place in mind. Listening to it is, essentially, simply beyond the trivialities of making associations with a source. *Of course* those are trucks and cars. The sounds become irrelevant: within a short time, listening becomes a purely subjective response to the feelings such sounds evoke. (*Ibid.*: 69)

Thus *Night Traffic* is a piece that starts by representing a place, but gradually betrays the quick reading of that place as a consequence of the imposition of resonances that would be foreign to the place as most know it. Compared to *Industrial Revelations*, the confusion that emerges in *Night Traffic* is not the result of intruding sounds of similar sonic characteristics; rather, it is the result of resonances that distort and transform the sound, engaging listeners with their unexamined presuppositions about where traffic sounds end and something else, more subjective and musical, begins.

Interaction between body and place

The body/place axis in the quaternary framework for electroacoustic music listening hinges on the listener's implicit understanding of the relation between body and place: our body exists in a place, and a place surrounds us. Thus, in electroacoustic music listening, listeners often make effort to *place* a body. In the beginning of the composer's performance of *I am sitting in a room*, the composer's body, imagined through his voice, is placed in a room. When the body loses its identity and the place emerges, listeners become cognizant not only of the spatial properties of the room, but also of their inability to place a body. Once diffused and disintegrated, the voice becomes without place. Similarly, the semiotic disjunction caused by the merging of train station and operatic soprano sounds in *Industrial Revelations* are, in part, due to the listener's inability to place the body of a soprano in a train station.

Having identified the relation between body and place in this way, *Table's Clear* by Paul Lansky is an intriguing exception to the above examples. From the sounds of kitchen utensils and the occasional children's voice, listeners can easily imagine a domestic scene in a kitchen (or at a dinner table). The scene contains, of course, the image of a body through the sound of children playing water glasses and pots with kitchen utensils. But this body image is neatly integrated into the image of a kitchen; one can even say that the kitchen subsumes the bodily image of the improvising children as we ascribe less and less meaning to how the sounds are produced than to the place from which the sounds hail. However, after a series of changes including an emerging pattern at 1:00, the dropping out of children's voices, and the introduction, after 3:20, of a synthetic bass line to support the chord progression, the piece no longer simply suggests a kitchen; rather, it has become a pure and integrated performing body. What, then, happened to the kitchen? Has the kitchen-image been disintegrated into a non-place? Perhaps. But listeners, if they choose, can continue to conjure up the image of a kitchen because the utensil sounds are still present. However, the way these sounds have come to be played has changed; reorganized to reflect a sense of musical flow and gesture, the new sound order transforms the kitchen table chaos of improvising children into one integrated performing body. Thus, it can be argued that *Table's Clear* shows a unique example of *place-becoming-body*; in this case, place does not simply surround a body (taking from body its most significant properties), but rather, place becomes body.

Non-body and Non-place and Their Properties

Many of the electroacoustic compositions explored in this dissertation reveal the way sound-images of body and place can lose their identity through processes of change that draw them into the non-body/non-place axis. Non-body and non-place are best defined in terms not of negation, but of the underlying processes driving negation. It is, therefore, worth listing the

processes in order to better identify the process of negation at work in electroacoustic music listening.

Three Types of Negation Process

For listeners, a sound-image loses its identity, or fails to fully acquire it, when the properties supporting the image cannot be, or can no longer be, verified. Viewed in the most general sense, sound-image properties can be seen as a kind of information set; in the listener's reading of a sound-image, an incomplete or questionable set can be perceived as insufficient and lead to doubt about the identity of the image. In general, insufficient sets lead to challenged or negated readings. From an informational perspective, three types of conditions tend to characterize the listener's perception of an insufficient set; they are conditions of: *missing information*, *distorted information*, and *informational conflict*. The following explores these informational conditions of negation in relation to both composing and listening.

Table 4-1. Pieces and compositional processes associated with informational negation.

Types of information negation	Musical examples	Compositional processes
Missing information	<i>Kits Beach Soundwalk</i> by Hildegard Westerkamp; <i>I am sitting in a room</i> by Alvin Lucier	Removal of critical frequency components through filtering or critical time segments by editing.
Conflicting information	<i>Industrial Revelations</i> by Natasha Barrett; <i>Mortuos Plango, Vivos Voco</i> by Jonathan Harvey; <i>Come Out</i> by Steve Reich	Merger or fusion of two or more sounds through cross-synthesis; Addition of duplicated components of original sound, displaced in time (e.g. echo) or frequency (e.g. mirroring transposition); etc.
Distorted information	<i>Tongues of Fire</i> by Trevor Wishart; <i>Klang</i> and <i>Surface Tension</i> by Jonty Harrison	Compression or expansion of frequency and/or time domains; Temporal dislocation of components; Transposition and/or rearrangement of frequency components; Temporal (ir)regularity;

While the perception of informational negation is a matter of listening, composers, no doubt, create the conditions for the perception. Consequently, in our search to better understand these forms of informational negation, it is revealing to look at compositional processes. However, it is important to recognize that compositional processes do not automatically challenge or negate sound-images, for composing and listening are separate processes, and while a compositional process may bring change to a sound, it is ultimately the listener and musical context that connect the change with negation. Table 4-1 shows the three types of informational negation along with general compositional processes producing them and musical examples in which they are found.

Discussion of Three Negation Processes based on Musical Examples

The compositional processes shown in Table 4-1 can be observed in many of the musical examples discussed in previous chapters; the discussion that follows will serve to connect them with the ideas explored here. It is important to note that, while Table 4-1 identifies examples of music using only one type of negation, in practice, composers more often use the different processes simultaneously; in other words, challenge to or negation of any one sound image can result from the simultaneous use of more than one type of negation.

Missing information

Composers often process sound in ways that result in the removal, subtraction, or suppression of sound-image properties; the missing information presents listeners with the possible negation of what they imagine hearing. For example, in *Kits Beach Soundwalk*, Westerkamp uses filters and equalizers to remove certain frequency regions strongly identified with the beach. Similarly, in *I am sitting in a room*, Alvin Lucier uses the work's feedback process to reinforce the room's resonant frequencies, which results in suppression of the voice's essential features, such as its consonants, noise, breath, and rhythmic design.

Conflicting information

Another source of sound-image negation arises out of the cultivation of informational conflict; various forms of processing can produce this effect, including cross-synthesis techniques that merge or fuse two or more sounds, or additive synthesis techniques that duplicate and shift components, either in time to create pre or post echoes or in frequency to create mirroring transpositions. As we have observed in *Industrial Revelations* by Barrett, the image of a train station as a place is challenged by the introduction of an operatic soprano. The soprano introduces conflict into the train station scene not only through its different sense of place, but through its sound, which is transposed and positioned to curiously coincide with elements of the train.

In addition to the fusion of two or more contrasting sounds, any type of cross-synthesis technique or additive-synthesis technique employing the duplication and addition of manipulated sound components can challenge the conventional perception of a sound. One example of this type of processing includes *Mortuos Plango, Vivos Voco* by Jonathan Harvey. In this work the voice of a choir boy and the sound of a huge church bell are cross-synthesized to produce a sound that suggests neither the boy nor the bell (or both the boy and the bell). Another example is *Come Out* by Steve Reich in which up to eight copies of the same looped voice material are played *almost* at the same time to produce a phase-shifting effect; the informational conflict of time-shifted voices causes the segment of speech to lose both its sound and meaning, as it becomes reduced to the mix's resultant, collective patterns of rhythm and tone.

Distorted information

Last, we can find examples of distorted information in *Tongues of Fire* by Wishart or in *Klang* or *Surface Tension* by Harrison. In these compositions, sounds are compressed or expanded in time or frequency using granular synthesis techniques or phase vocoding; as well,

sound components are transposed, spectrally rearranged, or temporally dislocated using cut and splice techniques. Distortion can also be created through the rearrangement of spectral components or through the introduction of regularity or irregularity into sounds or sound events. One example of this last process is a Christmas carol ‘sung’ by cats and dogs in which the identity of the animals is challenged not only by the transposition of their barks and meows, but also by the regularity and coordination of their presentation.

Acousmatic Reasoning as a Way of Listening with Imagination

This chapter discussed the four poles of the aforementioned framework: body and place as well as non-body and non-place as their respective negations. It also discussed some important properties of body and place as well as negation processes that engender non-body and non-place. Body and place and their negated sound-images are products of imagining, a concept examined in depth in Chapter 3. However, imagining is found not just in listening, but also in many other activities involving mental representation. To manage this overabundance of imagining’s potential, we need to refine imagining into something identified with our purpose—that is, into something that can work within the proposed framework and ultimately assist us in understanding what and how we listen to electroacoustic music. This chapter, I argue, has shown some of the ways that imagining can be tuned for the purpose of showing how the quaternary framework functions and how sound-images interact within it. This interaction, while alluded to in Chapter 4, will be fully developed in Chapter 5 as a concept in its own right called acousmatic reasoning. I will begin by examining two prominent theories on electroacoustic music listening and key issues in acousmatic reasoning. Then, I will link acousmatic reasoning to the imaginative properties identified in chapter 3, showing an uncanny similarity between the two processes that allows one to comfortably integrate imagination into the listening experience.

CHAPTER 5

ACOUSMATIC REASONING: A WAY OF LISTENING WITH IMAGINATION

Similarity drives semantics.

—John V. Kulvicki, *On Images: Their Structure and Content*

But two things alone cannot be satisfactorily united without a third; for there must be some bond between them drawing them together.

—Plato, *Timaeus*

Introduction to Acousmatic Reasoning

In the previous chapter, I argued that listeners imagine sound-images while listening to electroacoustic music. I have also argued that electroacoustic music actively employs, as its key feature, everyday sounds whose dis-embodied and dis-placed presentation inspires listeners to engage their memories of sound and sense to imagine that which is missing. As Casey might say (and I paraphrase), listeners imagine more than is heard.

Electroacoustic composers are keenly aware of, if not inspired by, this aspect of electroacoustic music listening, and often integrate familiar, everyday sounds in order to engage listeners in a play of sound, images, and memory. Good listeners recognize the ‘network of identification’ into which the composer places them and work to not simply identify and name sounds, but to connect and collect them together, however meaningfully.

However, there is more to the task of listening, for no sooner have listeners begun listening, engaging this game of signification, than they realize that participating in the play of associations is only part of the game, the greater challenge being to follow the way sounds and sound-images (gradually or suddenly) transform. It is not uncommon for new sounds to be slowly and dramatically introduced or suddenly injected, or for existing sounds to be recast through the highlighting of particular features; the changes listeners experience can betray or challenge the makeup of sound collections, leading them to reconsider and modify the sound-images through which they provisionally listen. As sound-images change, listeners quickly find

themselves in a theater of semiotic phenomena where the reading of sounds depends upon “inferential processes” (Eco 1984: 8).

Yet, the drama of changing sound-images is not the listener’s only concern as their ability to recognize and/or connect sounds together is challenged by forms of sound manipulation and combination that stretch the ability of sounds to signify; with less and less quotidian connotations cueing listeners to the nature of scene and sound, listeners soon recognize that they are no longer simply playing the game of signifiers. Faced with the disappearance of semiotically signifying features or collections, listeners focus more on the qualities of the sounds themselves. In fact, many electroacoustic compositions are expressly written in order to provide listeners with a space in which to listen *to* sounds rather than *for* them; that is, listeners, engaged in works of this type, listen primarily to the intrinsic qualities of the sounds. Pulled away from the play of representation and semiotic inference, listeners focus on the abstract palette of sounds and the order defined directly by the work, its sounds, and their self-referencing play.

Consequently, in distinction to other listening methods that focus on one way of listening, electroacoustic music offers listeners the opportunity to listen in two different ways, one that focuses on issues of representation and mimesis and another that focuses on the sounds alone and how they reference their own developing aural orders. As identified by Emmerson, the two listening modes can drive separate and simultaneous discourses, one mimetic, another aural (Emmerson 1987: 24). However, the duality only explains part of the complexity of electroacoustic music listening, for with the duality comes an underlying process, emerging out of the ability and interest of listeners concerned with how the two modes interact. As Denis Smalley notes:

All sounds possess this dual potential—the *abstract* and *concrete* aspects of sound—and all musical structures are balanced somewhere between the two, although exactly how they are found to be balanced can vary greatly among listeners. This is because all listeners have considerable practice at the concrete aspect in daily life, while an abstract approach needs to be acquired. However, the listener used to a more abstract perceptual attitude can easily disregard the mimetic dimension of interpreting sounds. Balancing abstract and concrete attitudes is therefore a question of both competence and intension. (Smalley 1986: 64)

It is important to note that, while everyday listening naturally prepares listeners for listening semiotically, nothing automatically prepares them for the more difficult task of listening to sounds abstractly, a task that begins with and depends upon the listener's ability to ignore or negate the semiotic role of sounds. The idea that electroacoustic music listeners can balance 'concrete and abstract attitudes' and travel back and forth between semiotic and spectromorphological listening depends, first and foremost, upon their ability to negate semiotic references while listening. While this may be a challenging skill to acquire (as conceptual as it is perceptual), once mastered, a field of play between the semiotic and the spectromorphological can open up, offering listeners the opportunity to engage in what I call *acousmatic reasoning*.

Definition and Issues of Acousmatic Reasoning

Definition of Acousmatic Reasoning

I define acousmatic reasoning as a *process of listening to and composing with dis-embodied and dis-placed sound materials based on their spectromorphological and semiotic significations and connotations*. So defined, acousmatic reasoning involves three primary subjects (each to be discussed in the following): sounds dis-embodied or dis-placed by technological manipulation, semiotic and spectromorphological listening as opposing modes of listener engagement, and finally, the listener's inference process.

It should be noted that acousmatic reasoning is a process employed not only by listeners but also by electroacoustic composers. However, as the focus of this dissertation is mainly on

how listeners approach electroacoustic music, compositional devices related to acousmatic reasoning will not be addressed. Nonetheless, the concerns of the listener can support the concerns of the composer, particularly once the composer discovers the value of being the first listener. As Young aptly points out:

In the concrete domain of electroacoustic music, the focus on aural methods of composition has an inherently analytical dimension and, at least in what we might term Franco-Anglo tradition of acousmatic electroacoustic composition, the composer tends to engage in an analytical discourse with materials—since in this medium the composer is, in fact, a listener. (Young 2004: 7)

No doubt, composers, as they learn how to become better listeners to their own pieces, can learn from investigating acousmatic reasoning and the differences between its fundamental modes, a subject explored in what follows.

Dis-embodied and Dis-placed Sounds

In Chapter 2, the effect of audio recording and technologically manipulated sounds was addressed, in particular for the way it fosters the perceptual dis-embodiment and dis-placement of sounds, a subject central to acousmatic reasoning and electroacoustic music. As discussed, the absence of dis-embodied and dis-placed sounds can inspire listeners to imaginatively construct sound-images that ground and complete their perceptual experience.

Yet, however natural, the imaginative construction of sound-images may not be a practical listening goal. For much like other products of the imagination, sound-images are as easily destroyed as they are constructed, especially in pieces in which the mix and shift of aural cues challenges listeners to hear sound-images as anything more than ephemera. Listeners navigating works of this type often overcome the challenge and find ways to read, continually and successfully, the aural cues of sound-images. The question then is: how do listeners successfully turn sound into sound-images? And moreover, why do they base their images on some sounds

rather than others? I argue that, as primary processes, semiotic and spectromorphological listening provide insight into the way listeners choose and turn sounds into images.

Two Listening Modes in Acousmatic Reasoning

Semiotic listening: listening *for* sound

One form of listening used in acousmatic reasoning is semiotic listening. Semiotic listening is *a way of listening to electroacoustic music in which listeners entertain sounds and their potential sound-images based on semiotic significations.*¹⁵

In semiotic listening, listeners focus not only on moment-to-moment sound-images, but also on how they change, sequence, or collect together to create meaning. Consider, for example, the introduction into an electroacoustic piece of a familiar human action sound, like someone typing on a typewriter or answering a telephone call. The sound, imminently recognizable, quickly forms a generic sound-image. That is, after first recognizing a sound (or set of sounds), listeners begin to address the plausibility of the sound, both in terms of the musical place and context in which they hear it and in terms of their everyday experience with it. Depending on what they find, listeners may then imagine a *sound-image framework* capable of encompassing and explaining the function of one or more sounds, which become, through their reinforcement of it, *components* of the framework. Thus, a listener, for example, upon hearing the typing sound, would conceivably progress from an initial identification of the sound with the human action of

¹⁵ Semiotics as used in my definition of *Semiotic Listening* should be distinguished from semiotics as used by others. For example, discussing mainly music in the Classical style in his book *Playing with Signs*, Agawu distinguishes between two forms of semiosis: the semiosis identified through the internal structuring of the music and the semiosis identified by the extramusical “topics” the music draws upon. By borrowing the concepts of Roman Jakobson, he terms the former as “introversive semiosis” and the latter as “extroversive semiosis.” By distinguishing the two different types of semiosis, he proposes to investigate the “interaction between topical signs and structural signs, a notion that might be described in terms of play” (Agawu 1991). As such, Agawu’s use of semiotics is concerned with the identification of both intrinsic and extrinsic sign systems, whereas my use of semiotics is concerned only with matters of source and context identification, and their signifying processes. Interestingly, however, just as Agawu is interested in the play between topical signs (extroversive semiosis) and structural signs (introversive semiosis), this dissertation is also interested in the interplay between sounds and what they represent or signify; my definition of semiotic listening is a step toward recognizing and investigating this interplay.

typing to its possible use as a *sound-image component* in the *sound-image framework* for office scenes.

It should be noted that, in the formation of plausible sound-images, source-identification and context-identification are co-dependent processes. As Trevor Wishart notes:

Without visual cues, however, we may still rely on contextualizing aural cues to aid our recognition of a source. These cues may not only affect our recognition of an aural image, but also our interpretation of the events we hear. As a simple example, imagine a recording of a vocal performance accompanied by piano. Imagine that the vocal performer uses many types of vocal utterance not normally associated with the Western musical repertory, such as screaming, glossolalia or erotic articulation of the breath. The presence of the piano in this context will lead us to interpret these events as part of a musical performance, perhaps the realization of a pre-composed score. The utterance will lie within the formalized sphere of musical presentation. If, however, we were instead to hear a similar recording in which the piano were not present and no other clues were given about the social context in which the vocalizations occurred, we might not be able to decide whether we were listening to a 'performance' in the above sense or 'overhearing' a direct utterance of religious ecstasy or the ravings of an insane person. (Wishart 1986: 49)

We should note, as well, that, being co-dependent, the processes of source and context identification continually impact each other. That is, the reformation of a sound-image or the reinterpretation of a sound-image can change the sound-image framework a listener imagines; similarly, a change in the imagined framework, inspired by new or reinterpreted sound-images, can recast how other sounds and sound-images are heard. If listeners hear, for example, a traffic sound added, at low volume, to the office example given above, they either ignore the sound, or most likely, recognize it as outside traffic, heard through an open, office window. Having identified the traffic as such, listeners maintain the sound-image of the office by simply modifying their listening framework to now include an open window near a busy street. But if the traffic sounds become louder and louder, gaining foreground prominence, the framework is challenged and even changed as the listener is seemingly taken through the open window and into the street, although when the shift from inside to outside occurs exactly is hardly clear, since the spaces we hear are never so clearly demarcated as the ones we see. In fact, the growing

traffic volume could suggest that we are merely walking toward the open window, or more fantastically, that the window is coming closer to us or getting bigger and bigger just before moving us through it into the out-of-doors.¹⁶ As the traffic sound gains more of the listener's attention, listeners fail to assimilate the sound into the image of an office; in fact, the added sound can destroy the office framework altogether. Whether and when a transition from office to street takes place is difficult to determine given the diffuse nature of sound; as the example of an open window demonstrates, aural spaces are more generally defined or delimited than visual spaces, a fact that probably explains why good listeners remain alert to shifts of sound as they hold the potential to change the sound-image frameworks through which they imaginatively hear.

Newly introduced sounds can, no doubt, change a listening framework. However, the identity of an established framework can be challenged not only through new sounds, but also through changes to component sounds already supporting the framework. If, for example, a rhythmic feature were introduced into the typewriter sound of the office scene and became increasingly regular, so much so that it began to sound as if someone were performing music with the typewriter, then the listener would be forced to question the plausibility of the sound as having come from a typewriter, since, conceivably, no one types that way. Although, in theory, one could 'play' a typewriter; however, typists rarely show such ability or concerns short of boasts of speed; more, musical performability is not a common property of typewriters (save those featured in certain early-twentieth century works). At best, it is imaginable that, because of the central role of typewriters in offices (at least those of past decades), listeners hearing the

¹⁶ One can argue that listeners may not necessarily attempt to combine these two sound-images as one; rather, they may entertain the two as they are. This argument may be true. Nevertheless, it should be noted that the previous sound-image of 'a busy office' has effectively been changed due to the introduction of the traffic sound.

regularized typing might attempt to keep the typewriter in its place by changing it into, perhaps, a musical typewriter; however, doing so would no doubt render the office scene more musical and comical than believable.

The emergence of the office framework in the example above is as much a consequence of the assimilation and inclusion of available sound-image components as it is the downplaying and exclusion of other sounds deemed irrelevant or outside the domain of the office framework. Yet, the task of creating and maintaining plausible frameworks is more daunting (if not entertaining), for added to the difficulties of navigating the inclusion and exclusion of sounds to a framework is the problem of dealing with components that betray their original identities or contextual frames; transformations of sound composed to betray a listener's initial reading are common to the field's more engaging electroacoustic compositions, especially since they actively engage listeners with the veracity of the frameworks they imagine.

Given the above, how then do sounds come to betray the readings made of them? And what circumstances of sound, development, and transformation lead listeners to incorrectly identify sounds? Returning once again to the example above begins to answer these questions by showing the role that aural sound features play in cuing and maintaining a listening framework; as discussed, changes to critical sound features (such as the volume of traffic heard in an office scene) can, at their extreme, render a listening framework implausible. The manipulation of spectral features can have a significant impact on image formation. As Smalley notes:

Music is always related in some way to human experience, which means that mimesis is always at work even in music regarded as abstract, though such mimesis is notoriously difficult to explain, particularly as language often proves an inadequate filter for interpreting musical experience. On the other hand, a musical context which appears to depend entirely on mimetic impact is equally deceptive. The power of a concrete sound-image to portray things, events or psychological circumstances, rests not just on the immediacy of the images themselves but on how the sounds are constructed and

combined—their spectro-morphology—and that involves using reduced listening to investigate the more abstract dimension. (Smalley 1986: 64)

It is my argument, aptly supported by Smalley’s discussion, that the decision to reevaluate an established sound-image depends upon engagement with the sound’s spectromorphological properties. Any decision to change how a collection of sounds is heard depends greatly, if not entirely, on underlying changes to the collection’s collective spectromorphology. In fact, the source-identification process relies mostly on spectromorphological properties, which is why a sound-image perceived as no longer tenable inevitably leads a listener back to not just the source-identification process, but to a deeper examination of a sound’s spectromorphology.¹⁷

More important than its role in source-identification, however, spectromorphological listening offers listeners the opportunity to change the nature of their listening to something less semiotic and ‘more abstract’. For, unlike semiotic listening, spectromorphological listening focuses on spectral types and on the formation of aural reductions that capture the way sounds as generalized morphologies change over time. While necessarily negating of the semiotics behind everyday listening, spectromorphological listening, nonetheless, offers listeners, searching for more fulfilling, less function-defined ways of approaching sound, an entirely different way of listening, born out of the aural attraction of sound itself.

Spectromorphological listening: listening to sound

Spectromorphological listening is *an electroacoustic listening mode in which listeners are primarily concerned with “sound materials and musical structures which concentrate on the spectrum of available pitch and their shaping in time”* (Smalley 1986: 61). In spectromorphological listening, the impact of semiotically formed sound-images is reduced or

¹⁷ Many studies attest to the listener’s ability to identify a source based on spectromorphological cues. See *Ecological Psychoacoustics* (Neuhoff 2004).

even negated, allowing listeners to focus their full attention on spectral types and morphological shapes.

While Smalley's ideas about spectromorphology can be useful in discussing electroacoustic music, in the construction of actual analyses, his exhaustive terminology poses problems. In truth, the idea of spectromorphology was devised to be used as "a description of sound materials and their relationships," which is necessary for "evaluative discussion" (*Ibid.*); nonetheless, the extensive use of his invented terms, in analysis or illustration, can result in *semantizing* aural perception by encoding our experience of sounds into a system of semantics, the very hermeneutic phenomenon from which Smalley attempted to move away.¹⁸

However, there are two issues in spectromorphology that need to be discussed in order to relate spectromorphological listening to acousmatic reasoning and the proposed quaternary framework.

First, spectromorphological listening takes reduced listening as an investigative strategy, which means that spectromorphological listening is subject to the same dialectical conditions as found in reduced listening. As proposed in chapter 2, listeners engaged with reduced listening and its removal or denial of the representational and semiotic connotations of the sounds they hear face an equivalent sensitization to the spectromorphological properties of sound that allow sounds to signify; in short, focus on sound can actually encourage a new spectromorphological awareness of how sounds represent.

The second issue, which is crucial to non-body and non-place, is closely related to the first: despite its goal of investigating the abstract dimension of sound, spectromorphological listening

¹⁸ In fact, Smalley recognized this issue early in his article on spectromorphology. Thus, he notes: "the terminology in this chapter often evokes extra-musical analogies and many words were selected because of their association. In adopting a spectro-morphological approach we should use reduced listening as the main investigative strategy, remembering that analogical terminology simultaneously invites necessary mimetic interpretations" (*Ibid.*: 64)

reveals, and is affected by, mimetic structures and the sound-image traces they carry and preserve. Recognizing the presence of mimetic sound-image traces, Smalley discusses their relation to spectromorphology:

There are two facets of electroacoustic music which would have to be examined for a more complete perspective of the medium. These are *language* and *mimesis*. The use of words in electroacoustic music has been ignored in this chapter because it involves a separate investigation prior to considering its incorporation into music; and beyond noting how inextricably music is bound up with mimesis, we have left discussion of this topic to others, commenting only that any extra-musical message conveyed in a strongly mimetic work is carried and articulated by spectro-morphology. (*Ibid.*: 64)

Later, Smalley discusses the concept of surrogacy and the process by which sounds come to be increasingly abstracted from their everyday, semiotic functions and appreciated for their spectromorphological properties:

Let us regard musical instruments and their sounding gestures as stand-ins for non-musical gestures. This is *first order surrogacy*, the traditional business of instrumental music. If that instrumental source is electroacoustically transformed but retains of its original identity it remains a first order surrogate. Through sound synthesis and more drastic signal processing, electroacoustic music has created the possibility of a new, *second order surrogacy* where gesture is surmised from the energetic profile but an actual instrumental cause cannot be known and does not exist. It cannot be verified by seeing the cause. Second order surrogate therefore maintains its human links by sound alone, rather than by the use of an instrument which is an extension of the body. Beyond this second order we approach *remote surrogacy* where links with surmised causality are progressively loosened so that physical cause cannot be deduced and we thus enter the realms of psychological interpretation alone. (*Ibid.*: 82-3)

As Smalley illustrates, source-identification becomes increasingly difficult as gestural sound features become more and more abstract and decayed as a consequence of higher orders of surrogacy. The more difficult the source-identification process becomes, the more listeners are encouraged to listen to sounds than to what they represent.

Nevertheless, it is interesting how the aural abstractions of gesture and texture can be identified, however remotely, with the sound-images of body and place, respectively. While

Smalley treats gesture and texture as two fundamental structuring strategies, he nonetheless acknowledges their relation to body and place.

In Chapter 4, I discussed Godøy's categorization of sound-related gesture where I argued that most sound-producing gestures and some sound-accompanying gestures could be related to actions of the human body. Smalley identifies the energy of a sound with its causal origins, stating that, without knowing the gesture, we can at least "surmise from its energetic profile that it could have been caused, and [that] its spectromorphology will provide evidence of the nature of such a cause" (*Ibid.*: 82). "Gesture," as conceived by Smalley, corresponds with Godoy's gestural categories that cue listeners to the presence of a body; as Smalley argues: "gesture has its origin in the human body" (*Ibid.*: 82).

On the other hand, texture is "concerned with internal behaviour patterning, energy directed inwards or reinjected, self-propagating; once instigated it is seemingly left to its own devices; instead of being provoked to act it merely continues behaving." (*Ibid.*: 82). And, Smalley goes on to note: "while we are very aware of texture in musical compositions, texture as a feature of spectro-morphological structuring is more influenced by textures found in environmental sounds," and thus, texture is based on "objects and phenomena independent of the human body" (*Ibid.*: 83). Given its inspiration in environmental sounds and its independence from the human body, texture as a spectromorphological concept has the potential to become a remote form of place.

I have argued that by employing acousmatic reasoning in electroacoustic music, listeners listen to dis-embodied and dis-placed sounds by traversing back and forth between the semiotic and the spectromorphological. But how can we examine this act of travel? To answer this question, it is necessary to first explore the subject of acousmatic reasoning.

Acousmatic Reasoning at Work

Inference Processes in Acousmatic Reasoning

Listeners, faced with a work's unfolding sonic events that move them about between semiotic and spectromorphological listening, search for ways to follow, comprehend, and even identify significance in what they hear. Their search builds upon the experience they have with sound and the codes and referent systems they have learned to associate with sounds; however, experience alone does not guide them, for electroacoustic music, with its inventive explorations of sound, quickly challenges their conventions of listening. As the music unfolds and the challenge of new sounds replacing old grows ever more severe, the descriptive power of semiotically-based sound-images or spectromorphological abstractions is more and more questioned.

The power of listening modes and frameworks to orient the listening experience may render new sounds or changes in sound as random and trivial—as extraneous to the work and, therefore, *semantic noise*.¹⁹ With time, however, what initially is taken for noise or meaningless distortion can, through emerging order, design, and exposition, come to be heard as noteworthy and even essential to how one understands a piece. Bateson gives an intriguingly similar example of such a process in the perception of anatomy:

To the aesthetic eye, the form of a crab with one claw bigger than the other is not simply asymmetrical. It first proposes a rule of symmetry and then subtly denies the rule by proposing a more complex combination of rules. (Bateson 1987: 416)

¹⁹ With regard to semantic noise compared to engineering (or channel) noise, Hockett notes: “Ordinary Spanish usage reflects this distinction quite neatly. If A speaks to B and B responds with *no entiendo*, it means ‘I have not heard your words, because of interfering sound or lack of attention; please transmit the same message again’; if he responds with *no comprendo*, it means ‘I heard you all right, but what I heard doesn’t make sense; please paraphrase or explain.’ Channel noise, thus, is the responsible factor when that which leaves a transmitter is not that which reaches the receiver; semantic noise is a discrepancy between the codes used by transmitter and receiver” (Hockett 1952: 257).

It is important to note that recognition of the crab's asymmetry comes only after the viewer's presupposition that the crab is, at some fundamental level, symmetrical (even though the two process appear to occur at the same time). By extension to music, Bateson's example in what might be characterized as the issue of informed perception, interestingly suggests that the evaluation of new sounds or changes to the properties of existing sounds proceeds along a three-stage process: first, that, regardless of the listening situation, listeners bring whatever rules or codes they know to listening (no matter how limited or naïve they may be); second, once a music succeeds in challenging a presupposed system of codes, listeners make new assumptions and broaden or change existing code systems or propose new ones; and then finally, listeners choose the best, most explanatory code system from amongst the plausible systems they have imagined.

As we will examine in detail later, this three-step listening process is based on an inferential process called *abduction*, termed by Pierce and further expanded by Eco. Acousmatic reasoning begins with the process of abductive listening and ends with the choices listeners make, however intuitively, consciously or personally. However, listening to music is an ongoing process that continuously offers up new sounds, sounds that can (and will) call into question the explanations listeners have made; consequently, the process of acousmatic reasoning needs to be applied continually, using it to accumulate additional input that either furthers previous explanations or undermines them on the way toward the invention of newer, more plausible ones.

Abduction in Acousmatic Reasoning

When listeners face new sounds or incomprehensible moments in a piece, they rely on a process of inference called abduction in which they return to the work and attempt to re-establish

what it means to them.²⁰ According to Eco, abduction is Peirce's term to refer to "a case of synthetic inference where we find some very curious circumstances, which would be explained by the supposition that it was a case of a certain general rule, and thereupon adopt that supposition" (Eco 1976: 131). Eco further explains:

Kepler noticed that the orbit of Mars passes through points *x* and *y*: this was the Result, but the Rule of which this was a Case was not yet known (the consequents of this antecedent being, therefore, equally unknown). Points *x* and *y* could have been points of, among other possible geometrical figures, an ellipse. Kepler hypothesized the Rule (and this was an act of imaginative courage): they are the points of an ellipse. Therefore, if the orbit of Mars were in point of fact elliptical, then its passing through *x* and *y* (Result) would have been a case of that Rule. The abduction, of course, had to be verified. In the light of the hypothesized rule, *x* and *y* were 'signs' of the further passage of Mars through the points *z* and *k*. It was obviously necessary to wait for Mars at the spot where the first 'sign' had led one to expect its appearance. Once the hypothesis was verified, the abduction had to be widened (and verified): the behavior of Mars was hypothetically thought to be shared by all the other planets. The behavior of a planet thus became a sign for the general behavior of planets. (Eco 1984: 40-1)

Like Kepler's use of abductive imagination to propose the elliptical orbit of Mars, electroacoustic listeners use abduction to imagine "the Rule" that might explain "the Case" they are hearing. Once proposed, listeners "widen (and verify)" the suppositional rule relative to new sounds and the ability of the rule to continue to sufficiently explain what they imagine. Close examination of acousmatic reasoning reveals three types of abductive listening. Interestingly, Eco differentiates three types of abduction, *overcoded*, *undercoded*, and *creative abduction*,²¹ which correspond to the three types of abductive listening found in acousmatic reasoning, as the following explores.

²⁰ Although listeners may refer to other resources to get more information about the piece, such as program notes, discussion with the composer, or other extra-musical data they may find, in our discussion about acousmatic reasoning, we will disregard the introduction of such resources.

²¹ Eco notes: "these three types of abduction [are] a sort of rough segmentation of a more finely segmentable continuum. In other words, one could find concrete examples of abduction which cover intermediate positions between the first and the second or between the second and the third types, as well as complex processes that combine these different types" (Ibid.: 41).

Overcoded abduction

Eco defines an abduction as *overcoded* when “the law is given automatically or quasi-automatically” (*Ibid.*: 41). Looking back at the discourse explored here, I have argued that within the practice of acousmatic reasoning, listeners have the choice to listen semiotically or spectromorphologically.

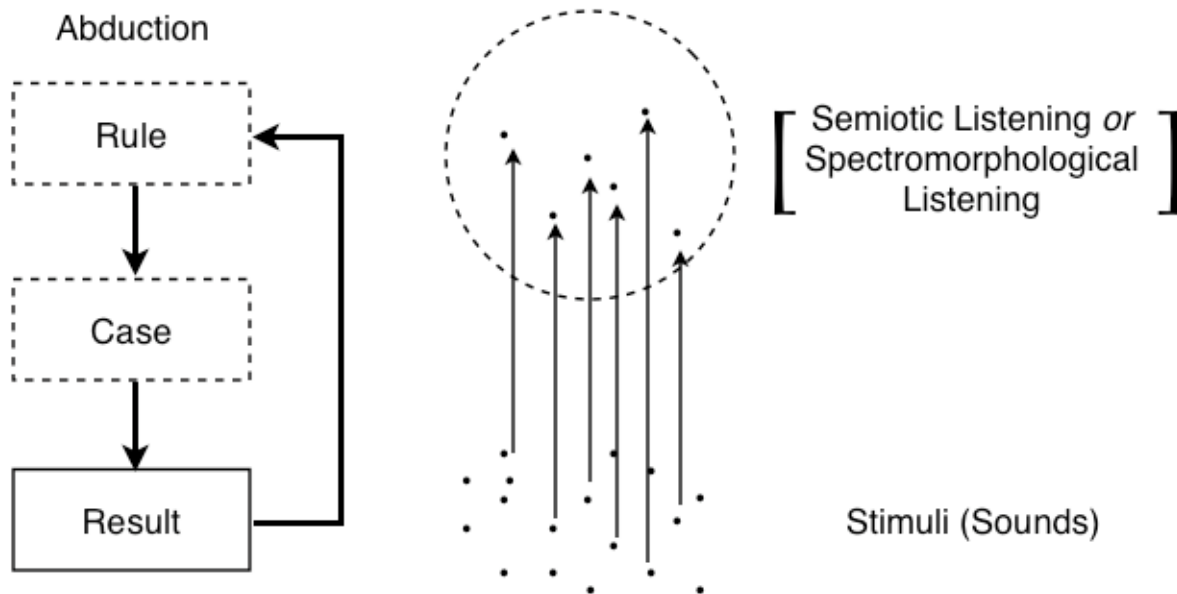


Figure 5-1. *Overcoded Abduction*. The choice, in acousmatic listening, to listen either semiotically or spectromorphologically engages listeners with an overcoded abduction in which they explain what they hear according to the chosen mode’s rules.

Assuming that there is some kind of process predisposing them to listen according to one or the other mode, we can say that each mode by itself, can, in essence, function as a kind of “automatic” rule, in the spirit of Eco’s overcoded abduction, specifying the way in which sounds will generally be heard. However, given that listening according to one or the other mode is a choice, the rule is therefore adopted “quasi-automatically,” since certain choices or conditions must first be met to incline or direct a listener into one or the other mode. As Eco notes:

This ‘quasi’ is to be taken very seriously.... When someone utters /man/, I must first assume that this utterance is the token of a type of English word. It seems that usually we do this kind of interpretive labor automatically, but it is enough that we are living in an international milieu in which people are supposed to speak different languages, and we realize that our choice is not completely an automatic one. To recognize a given phenomenon as the token of a given type presupposes some hypothesis about the circumstances of utterance, the nature of the speaker, and the discursive co-text.... I insist on the fact that, since one has *to decide* to connect that Rule with that Result through the mediation of the Case, then the process is never fully automatic. (*Ibid.*: 41)

Figure 5-1 shows the process by which sounds (aural stimuli), perceived according to one or the other mode, are explained by an overcoded abduction; the sufficiency of the abductive reading is determined by the ability of the stimuli to map into the rule’s codes.

Undercoded abduction

In acousmatic reasoning, however, listeners suppose much more than any one listening mode might necessarily address. In particular, listeners imagine sound-images that function, however temporarily and tentatively, as rules, explaining the sequence of sounds they hear.

According to Eco, this form of abduction that employs imagination and supposition in the ongoing creation of explanatory rules (in our case, the sound-image as explanatory rule) is *undercoded* because “the rule must be selected among a series of equiprobable alternatives” (*Ibid.*: 42). Sound-images must be seen as *undercoded* because of the uncertainty surrounding them; that is, the ability of their features to feed multiple explanations introduces doubt; however, in spite of the doubts at play, the rules of sound-images, however undercoded, are standardly, albeit provisionally, embraced by listeners given the tenable explanations they momentarily offer. Eco explains further about undercoding:

Our semantic representations do not follow the model of a dictionary but of an encyclopedia. Therefore, we have no guarantees that the meaning of /man/ is necessarily, and in every context, «rational mortal animal». According to different contextual and circumstantial selections, a man also can be a very virile person, a brave male, a two-footed creature, and so on.... Thagard calls this kind of reasoning an abduction *stricto sensu*: the rule selected can be, in a given co-text, the most plausible one, but it is not certain whether it is the most correct or the only correct one. Thus the explanation is *entertained*, waiting for future tests. (*Ibid.*: 42)

Figure 5-2 illustrates how, in a given context, listeners, searching for explanation, choose the most plausible sound-image. Eco writes that in undercoded abduction, which is conditioned by “the absence of reliable pre-established rules, certain macroscopic portions of certain texts are provisionally assumed to be pertinent units of a code in formation, even though the combinational rules governing the more basic compositional items of expressions, along with the corresponding content-units, remain unknown” (Eco 1976: 135-6).

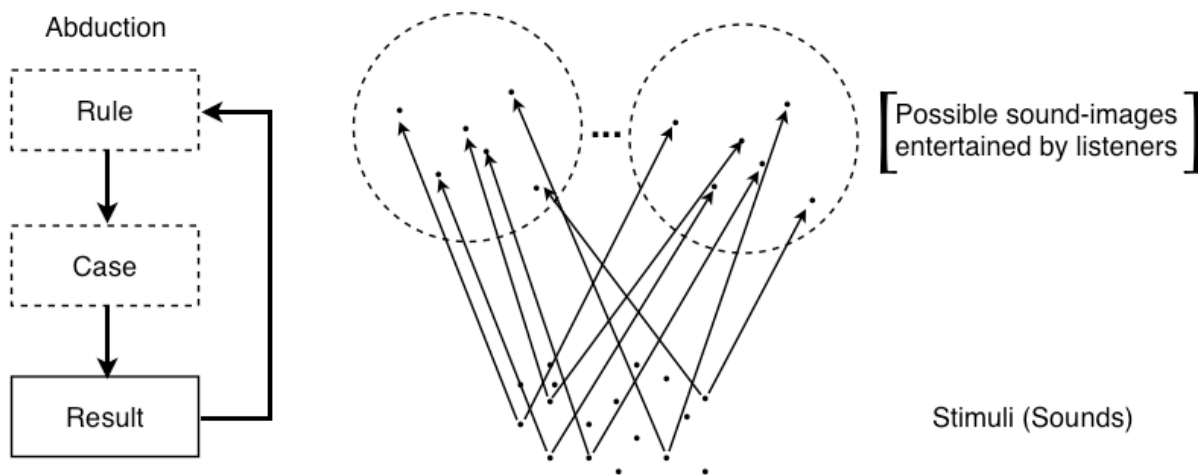


Figure 5-2. *Undercoded Abduction*. In acousmatic reasoning, listeners make undercoded abductions when they suppose the most plausible sound-images for a given context or circumstance. Note that a set of given sounds (or properties of sounds) may offer more than one possible sound-image.

Likewise, compared to the two listening modes that function as a pre-established and quasi-automatic rule in acousmatic reasoning, sound-images in undercoded abduction are based on a listener’s provisional assumptions that “certain macroscopic” properties of sound can be

considered as “pertinent units” of the supposed sound-images; but, as shown in Figure 5-2, the ability of some sound components to code into multiple sound-images introduces doubt, judgment, and even guessing into the explanatory process. Consequently, listeners, faced with sound-images that are, at best, only plausible, *entertain* them until they are seriously challenged, requiring the development of new sound-images, a process easily identified with what Eco calls *creative abduction*.

Creative abduction

In a *creative abduction*, Eco writes, “the rule acting as an explanation has to be invented *ex novo* [anew or once again]” (Eco 1984: 42).

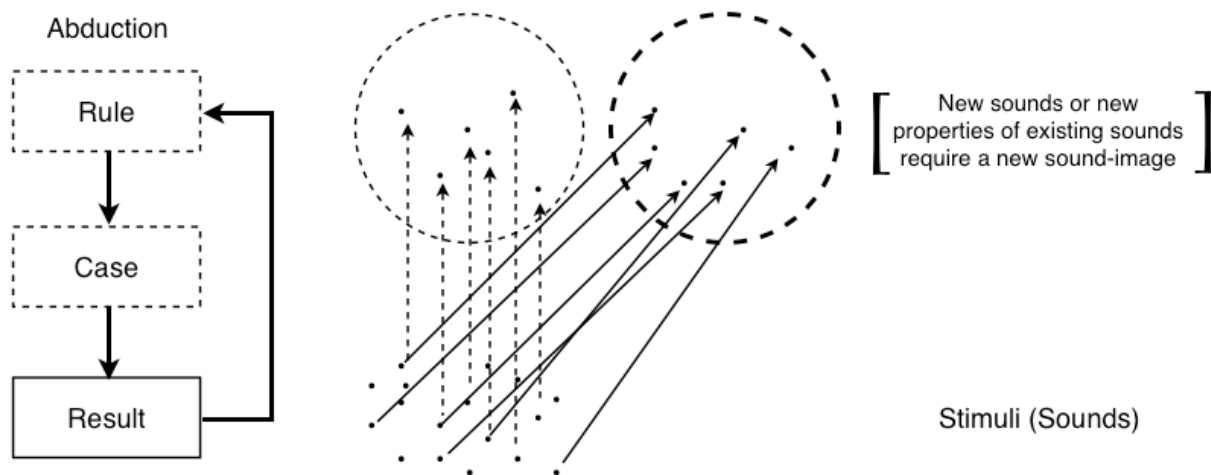


Figure 5-3. *Creative Abduction*. In acousmatic reasoning, listeners, faced with sounds or properties of sounds that cannot be explained by previously supposed sound-images, invent sound-images whose ‘reasonable-ness’ has yet to be determined.

Eco further notes: “In creative abductions one is not sure that the explanation one has selected is a ‘reasonable’ one.... Many cases in which language is used not to confirm but to challenge a given world view or a scientific paradigm, and to decide that certain properties cannot belong any longer to the meaning of a given term require an interpretive cooperation that displays many characteristics of a creative abduction” (*Ibid.*: 43).

In a similar fashion, listeners who realize that some of the sounds or properties of sound that can no longer be explained by the sound-images they suppose need to establish new sound-images. As shown in Figure 5-3, this process can involve not only the introduction of new sounds or new properties of existing sounds, but also the continuation of previous sounds into new contexts.

Syntactically Relevant Properties (SRPs) in Acousmatic Reasoning

The discussion about the three types of abduction in acousmatic reasoning has revolved around the establishment, verification, and invention of plausible explanations for sounds or properties of sounds in electroacoustic music. It should be noted that the abductive process in acousmatic reasoning presupposes that sounds in an electroacoustic composition may signify more than one thing, and that, relative to a particular context, listeners choose the most plausible meaning. Using Eco's terms, the possibility of multiple significations in electroacoustic music listening is based on the assumption that listening to an electroacoustic composition is a process that examines "a polydimensional network of properties, in which some properties are the *interpretants* of others" (*Ibid.*: 113).²² Given this, the question then becomes: what properties in acousmatic reasoning are meaningful to listeners?

The answer to this question depends upon a listener's current listening mode; as shown in Figure 5-4, semiotic listening focuses on sound-image components, while spectromorphological listening focuses on spectral types and morphological shapes.

²² Eco terms this network *Model Q*. For a further discussion about Model Q, refer to Eco's *A Theory of Semiotics* (Eco 1976: 121-5).

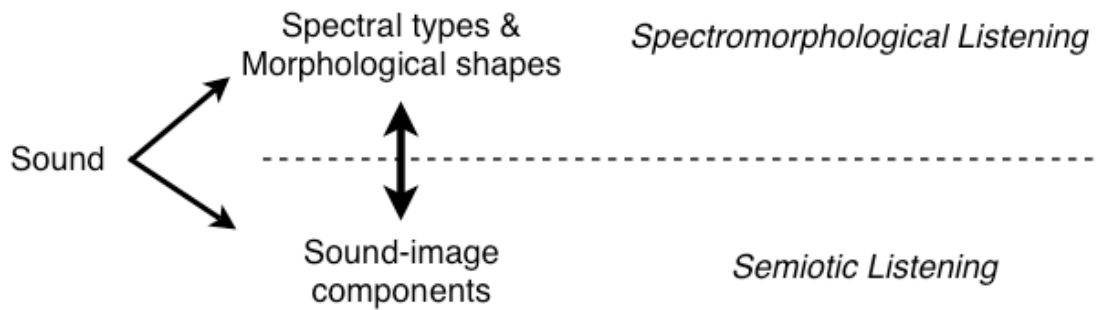


Figure 5-4. Properties of Sound in Acousmatic Reasoning. Depending on the listening mode listeners employ in electroacoustic music listening, listeners are more attentive to either spectral types and morphological shapes or sound-image components. Note the thick arrow that indicates the interaction between the two property categories.

Furthermore, not every property that can be categorized in Figure 5-4 is significant in acousmatic reasoning. In fact, it is crucial to note that some sound properties are more relevant than others, and that these differences affect acousmatic reasoning. The differences among properties of competing relevancy to the perception at hand is fittingly articulated by John V. Kulvicki in his book *On Images: Their Structure and Content*, in which he proposes the concept of Syntactically Relevant Properties (SRPs):

Let the *syntactically relevant properties* (SRPs) of tokens in a certain system of representation be those properties on which the syntactic identities of the tokens supervene. Changing the syntactic identity of a token requires changing its SRPs, though there can be changes in a token's SRPs that do not affect its syntactic identity. Shape, for example, is an SRP of most alphabets. One can change the shape of a letter without altering its syntactic identity, but if one wants to change a letter's syntactic identity, one must change its shape.... The SRPs are the realization bases of the multiply realizable, higher order properties, such as being of a certain syntactic type. For pictures, the shape and color of every patch of the picture surface are relevant. To change the identity of pictures, one must change the shapes and colors of their surfaces. (Kulvicki 2006: 30)

While his concern is mainly with visual images, Kulvicki briefly discusses the SRPs of non-visual representational systems, including audio representations:

First consider the difference between an audio tape that records ‘ticks’, say of a Geiger counter, and one which is meant to record all of the sounds in a room from a particular point in space. In the former case, all that matters to the representation is that a tick happens at such and such a time. One could change the audible quality of the tick in any way one likes without affecting the representational content of the tape, and one could even insert background noises as long as those noises do not obscure the ticks.... The tape’s playback...is not very replete, since many additions and changes in the character of the playback that represents the ticks are not relevant to the representation of the events in question: They are not relevant to the timing or presence of the ‘ticks’.

When recording all of the sounds in a room, however, things are quite different. The system is indeed syntactically sensitive, since arbitrarily small changes in the magnetic field on the tape, and hence in the playback characteristics of the tape, are sufficient for syntactically distinct representation. All of the representations that are syntactically distinct (have different playback patterns) are semantically distinct since if the playback is different then the sounds it represents are different. (*Ibid.*: 107)

To look at this from a sound perspective, in more detail, let us consider an audio example in which we hear a voice whose first five formants are gradually shifted; in particular, formants centered at 609Hz, 1000Hz, 2450Hz, 2700Hz, and 3240Hz are shifted to 650Hz, 1100Hz, 2860Hz, 3300Hz, and 4500Hz, respectively.²³ What we hear is a person singing the vowel “a” whose gender curiously and unexpectedly changes from male to female. In terms of SRPs, the SRPs associated with the gender of the voice can be identified as having changed from those of a male to those of a female; however, the SRPs associated with the voice itself has not changed. It is matters of audio detail like this, seemingly hidden, that can have a significant impact on how we hear electroacoustic music. Therefore, any discussion of the listening process based on acousmatic reasoning requires a close examination of SRPs, acknowledging their dependence upon not only the operative listening mode, but, as well, the image or framework to which listeners are, at any given moment, most attentive.

²³ (Dodge & Jerse 1997: 230-1)

Acousmatic Reasoning As an Act Seeking a More Understandable Form of Sonic Events

Acousmatic reasoning is a process concerned with how people navigate the complexities of sound in electroacoustic music and become listeners. Its focus is not on what listeners actually hear or how they choose, but rather on what they *do* while listening. Just as Rescher notes on the nature of process,²⁴ in acousmatic reasoning, “what a thing is consists in what it does” (*Ibid.*). This quality of acousmatic reasoning has been examined in detail in this chapter; I have argued that listeners not only recognize changes in sounds and their semiotic significations (if there are any), but, more critically, reflect on how these changes function in their reading of a piece. I have further argued that listeners employ three abductive processes in acousmatic reasoning and that, in our search to understand how they acousmatically reason, it is important to recognize and examine the syntactically-relevant properties (SRPs) of sounds or sound-images and how these properties impact the listener’s evolving hearing of a piece.

It should be noted that the primary goal of listeners engaged in acousmatic reasoning is to find the best way to understand sonic events, while accounting for both the semiotic and spectromorphological complexities of the piece. In the next chapter, I will conduct an analytical listening exercise using *The Flywheel Dream* by Paul Koonce. In this exercise, I will make particular observations about acousmatic reasoning and the role of the quaternary framework and ultimately show how the framework and acousmatic reasoning, working together, create a rich interpretive lens through which listeners can bring meaning to a work.

²⁴ Rescher notes: “Instead of very small things (atoms) combining to produce standard processes (windstorms and such) modern physics envisions very small processes (quantum phenomena) combining to produce standard things (ordinary macro-objects) as a result of their *modus operandi*” (Rescher).

CHAPTER 6
LISTENING TO *THE FLYWHEEL DREAM* USING ACOUSMATIC REASONING WITHIN
THE QUATERNARY FRAMEWORK

Every analysis that is of any value, therefore—and anyone who analyses seriously will soon realize this for himself—is a squaring of the circle. It is the achievement of imagination through faith.

—Theodor W. Adorno, *On the Problem of Musical Analysis*

Introduction to *The Flywheel Dream* and Limitations of the Listening Exercise

Introduction to *The Flywheel Dream*

The Flywheel Dream (1994) by Paul Koonce is replete with everyday sounds. Their semiotic and spectromorphological features offer ample opportunities for listeners to engage in acousmatic reasoning. In line with the quaternary framework, the work's sounds often conjure up images associated with the human body or familiar places; more important, however, is the way these sounds undergo various processes of transformation that constantly force into question the identity of sound-images. For listeners, the continuous transformation of sound-images places them in a state of unrelenting tension where their uncertainties about what they are listening to keeps them working to determine what each sound is (and just as relevantly, what it is not). The composer describes this experience in the liner notes:

The Flywheel Dream is staged in the nether world betwixt waking and sleeping, where the dreaming mind, beset with a host of invading domestic sounds, finds solace in a creativity that turns disturbance into invention just to forget. To this, the conceit of the mediating flywheel, well or misunderstood in its caste position, is a conceit made not out of the dreams it might wish, nor those we might romanticize upon it, but out of the torment of the dream, its invention, and the flywheel it seeks. (Koonce 2000: the program notes from the CD.)

The composer's intent to "stage" the piece's sound world between a waking reality and a seeming dream is, no doubt, the inspiration for the piece's sounds and sound-images, which are constantly confirmed, challenged, betrayed, or transformed as a consequence of the play they are

subjected to. Given this, the focus of this (analytical) listening exercise is on the properties of the piece's sounds and sound-images, in particular, their syntactically relevant properties (SRPs). As discussed in the previous chapter, SRPs depend not only on the mode listeners adopt, but also on the attention and reason they show, at any one moment, toward the identity of sounds and how they change. Consequently, what this exercise in listening ultimately seeks to identify is the functional relationship between SRPs and acousmatic reasoning as they work, together, to distinguish that which listeners hear.

The listening exercise conducted here using *The Flywheel Dream* will function along the lines described above; as such, it will explore the ongoing process by which listeners actively engage SRPs and choose, given moment-to-moment circumstances, one explanation over another. As such, this exercise will explore the imaginative process by which listeners create, question and ultimately negate sound-images of body and place in their imaginative and acousmatically reasoned movement through the proposed quaternary framework for listening.

Limitations of the Listening Exercise

From the outset, it is important to understand that the intent of this listening exercise is to explore the thesis of this dissertation, which seeks to affirm and celebrate the unique interpretation that each and every listener can and may make in their own hearing of a piece. Furthermore, the intent of this listening exercise is not to identify a complete and communally agreed upon analysis of the piece, but, rather, to highlight some of its most salient features using acousmatic reasoning and the quaternary framework.

It should be noted that the absence of visual documentation of this piece (and electroacoustic music in general) necessarily limits the way in which this exercise can be illustrated. The problem of illustrating sound is common in the discourse on electroacoustic music, be it concerned with analysis or listening. Recent years have seen the development of

various tools, potentially useful in the illustration of electroacoustic music; unfortunately, the data these tools offer is, in many cases, neither sophisticated nor appropriately descriptive to be used effectively, especially in comparison with the illustrational possibilities offered by traditional scores, which, as Bossis observes, are significantly different in kind:

The difficulties encountered in the analytic approach are found less and less in the segmentation and description of perceived morphologies, especially since the emergence of effective computer tools. On the other hand, a deep understanding of the mechanisms of electroacoustic composition is still difficult to achieve. It must be said that although current methods of spectral investigation by FFT or automatic segmentation permit a certain illumination of the structure of acoustic textures, they remain considerably below the level of precision obtained by the careful reading of a traditional score. Even for sophisticated contemporary pieces, the time-honoured system of representation with notes permits an analytic reading of complex arrangements (doublings, aggregates, polyphony, polyrhythm) while spectral representations and automatic segmentation more often describe the perceived acoustic phenomenon as a global timbre. While traditional notation bears a written representation *a priori*, signal analysis brings representation *a posteriori* (Bossis 2006: 101).

Nevertheless, in spite of the *a posteriori* nature of these tools, they will nonetheless be useful in navigating this listening exercise, assuming that what they depict concurs with what needs to be identified. Given the nature of sonograms, this amounts to frequency content and morphological shapes, which, with luck, will assist in identifying particular features.

The listening exercise we will conduct is one in which we listen attentively to the piece through multiple hearings in a high-fidelity listening environment. While our hearing of the piece benefits from multiple hearings, the knowledge we gain through repeated hearings is intended not to diminish our hearing of the work's drama, but to magnify our appreciation of it as we further enter into its unfolding in time.

Preliminary Listening

Our listening exercise necessarily begins with a preliminary hearing of the piece, which is understandably conditioned, due to our unfamiliarity with the piece, by the limitations in what we can recognize and remember, and how long we can remember it. These limitations merit a

brief discussion, as they shape considerably, but at the same time illuminate, how we listen to *The Flywheel Dream*.

Limited Capacity of Recognition and Remembrance

The Flywheel Dream utilizes many *seemingly* recognizable everyday sounds. However, in our preliminary hearing, we can identify only a handful. Not only do these sounds pass too quickly for us to recognize their identity, but they are also presented in a way that cannot make sense. The combination or sequence of sounds is, from an everyday perspective, either not believable, or if momentarily so, quickly undermined by other sounds.

Second, the fast-moving sounds, their sometimes-severe transformation, and the heterogeneous mix of juxtaposed sounds often impede our effort to remember exactly what we hear. It is interesting how not being able to remember often encourages us to *imagine*—we find many gaps to fill. However, whatever we imagine at this stage of listening is mostly fanciful, as more experience is needed in order to constructively imagine. Overall, our preliminary experience of the piece is one of a theater of fantasy where things rarely make sense.

Two Features of *The Flywheel Dream* from the Preliminary Listening

Regardless of these limitations, our preliminary listening experience reveals two prominent features to the piece: its form and large-scale spectromorphological features. With repeated listening, these features reveal a close relation to the processes and properties of the piece.

Interplay between contrast and repetition

It is interesting that even though our listening is, at this point, exploratory, we can nonetheless easily remember the dramatic change in sound material at the work's midpoint where the palette of sounds changes in both type and number. In particular, for the first 5:10, the piece showcases a multitude of sounds of differing origins, after which it refines its palette into a more consonant set of pitched vibraphone sounds with percussion, presenting a samba-like

ostinato based on the pitch class set [D, E, F#, A#, B] with stress on E and F#. Thus, we can, at this point, easily identify the way the piece plays with a sense of contrast between its first and second parts.

In *The Flywheel Dream*, however, this sense of contrast is nicely complemented by a sense of repetition; in fact, the interplay between contrast and repetition runs throughout *The Flywheel Dream*. Before the samba-inspired sounds of the second half begin, we hear repetition in the work's returns to the collage of sounds heard at the beginning. While the design of each collage-like return is different, its gestural shape and phrase-like beginning is nonetheless familiar; for with each, there is a sense that things are starting up and springing out, together and all-at-once, as though a box full of toys and gadgets had just been opened. But at the same time, the collage-like repetitions are separated by more reverberant, less playful, even lethargic sounds that reduce the tension of the imagined act, as if the energy behind the original spill had, for the moment, died, or were it a deflating balloon, was seeing the last escape of its air. Just as contrast and alternation are central to the work's first half, the second half with its samba-themed sounds and short, demarcating silences, as well uses pause, contrast, and alternation in its design; formal contrast completes the second half where the samba rhythms are replaced with a more sedate texture of squeaks and filtered noises.

These observations on the use of contrast and repetition can be illustrated in a sonogram of the piece. As shown in Figure 6-1, the first two statements of the collage-like opening are fairly similar, given their spectral and gestural shapes; the third statement, while sharing some key sounds with the previous two, takes a different gestural shape, partly due to the different placement of sounds in time; and finally, the fourth statement only represents the gestural opening as it pivots and segues into section B.

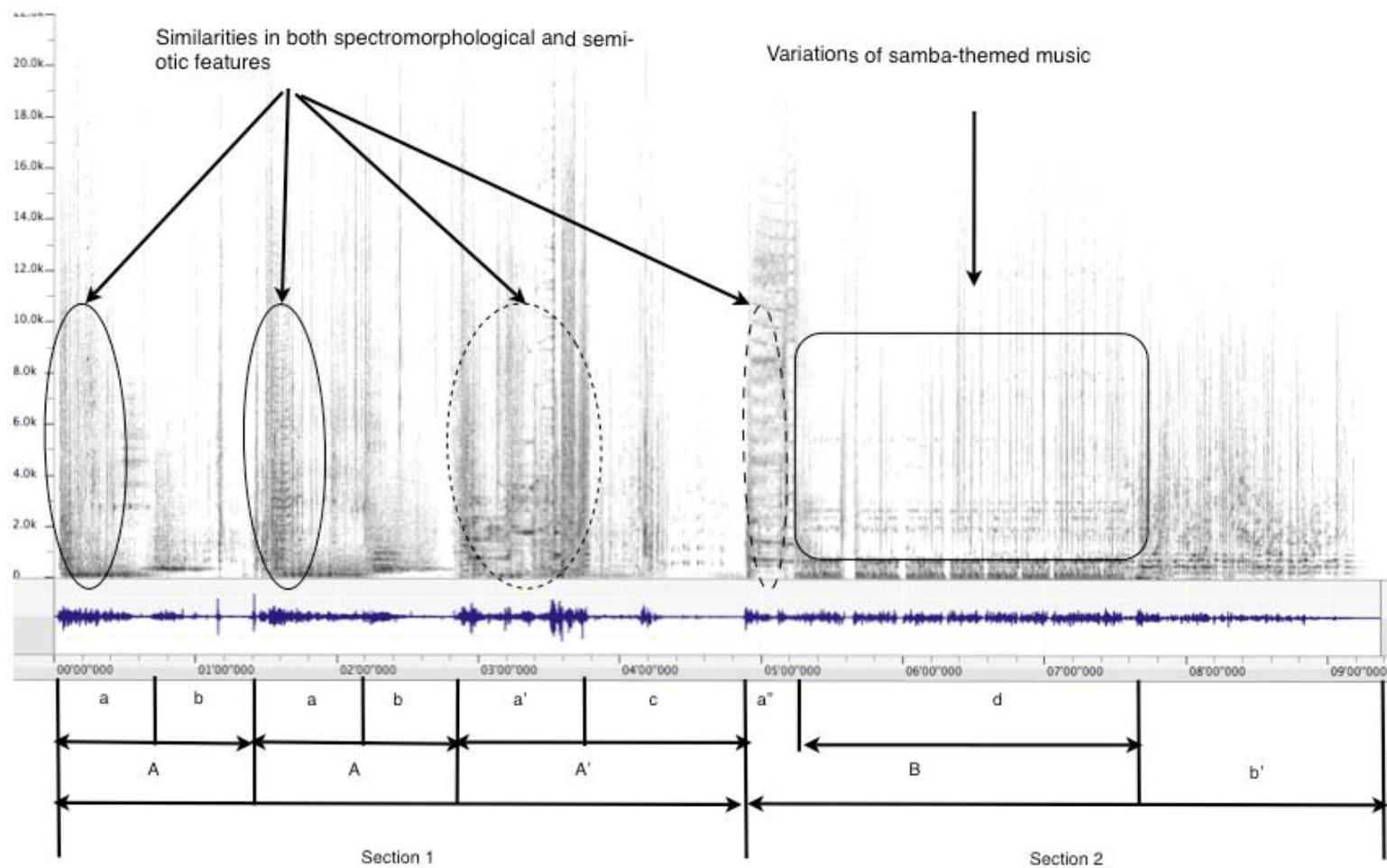


Figure 6-1. Formal analysis of *The Flywheel Dream*. Note the similarities and differences between Section 1 and Section 2, subsections (a) and subsections b, and how they contribute to the overall form. Also note that the first two subsections (a) are similar in both spectromorphological and semiotic features (refer to Table 6-1) while the third subsection (a') and the subsection (a''), though they share some similarities with the previous two subsections, are different from them. The sonogram also shows the gradually shortening silences of subsection (d), which demarcate the segments of samba-themed music.

The sonogram also shows the B section's use of repetition in the segments of samba music; similarly demarcated at regular intervals, the samba's shorter length segments and use of silence is in contrast to the A section repetitions, which are longer and continuous, save their moments of musical repose; so too, we can see the different sound materials (i.e., vibraphone and percussion) which strongly contrast with the first half of the piece. Despite these differences, the first and second parts show a surprising connection through their mutual use of the pitch class set [E, F#, A# (sometimes A), B]; interestingly, the first part stresses E and F#, whereas the second focuses on A# and B, thus distinguishing them in their use of the set that otherwise binds them.

Spectromorphological features of *The Flywheel Dream*

What is perhaps most memorable after our preliminary listening to *The Flywheel Dream* is its sense of continuity, especially given the many sectional contrasts in the piece. What gives the piece its sense of continuity, and threads together its many, multifarious sounds, are its spectromorphologies. In particular, one hears a consistent set of primary pitch materials as well as familiar morphological shapes either through the piece's more characteristic sounds (the fishing reel, the musical instruments, bird crying, the car horns, the tossed coin, or the memorable shapes created through time expansion, etc.) or through specifically composed events, such as the beginning gestural collage of sounds or its vicissitudes.

It is challenging to listen semiotically to the rich array of everyday sounds as they are glued together by the work's spectromorphological features, although the difference between the two ways of listening, and the problem of choosing one listening mode over the other, is what, in fact, enriches the listening experience. As we listen acousmatically, our choice to read the work according to one mode is soon confronted with the possibility of reading it according to the other, a fact that quickly sensitizes us to listening and to how the different modes are, in fact, different. Even more, the experience begins to identify and confirm the curious way in which

works of this kind find their interpretive richness in the confrontation between semiotics and spectromorphologies.

As we review our preliminary listening and the observations we have made, it is important to note the attention we have given spectromorphological features and to recognize the crucial role they have played at this early point in our exercise and our initial hearing of the work. It can be argued that the features we have identified become a way of understanding the piece, a potential set of SRPs that capture the work's most relevant features, at least from a macro-perspective. At the same time, we might hope that, with additional listening experiences, the more semiotically-oriented features of the piece will eventually offer similar sets of SRPs as well, and that these SRPs will be potentially illuminated and/or confirmed by the piece's spectromorphological qualities. No doubt, the potential interplay between semiotics and spectromorphology can be uncovered through additional listening; needed detail comes from further listening, to which we now proceed.

Detailed Analytical Listening to *The Flywheel Dream*

In this detailed analytical listening, we will pick some interesting parts of the piece considered challenging, both semiotically and spectromorphologically, and examine SRPs of sound-images and the possible application of the quaternary framework. But, first we need to discuss briefly the piece's form, which has been identified in on our preliminary listening. Furthermore, this discussion will help us determine the best sections to use in further analytical listening, relative to the purpose of this chapter.

Formal Design of *The Flywheel Dream* based on Semiotic and Spectromorphological Features

Our preliminary listening exercise allows us to now comment on the piece's formal design and to notice important semiotic and spectromorphological differences between sections of the

work. We have discussed the contrast between Section 1 (00:00-04:52) and Section 2 (04:52-09:22), which is easily identified, partly due to the stark differences in their sound materials as well as the number of distinct sounds used in each part.

From our listening, we can argue that Section 1 can be further divided into three sub-sections where two are similar to each other and the third is different. Table 6-1 lists the semiotic features (recognizable sound materials) and the spectromorphological features (pitch materials and morphological peculiarities) in these sub-sections of Section 1. I have further divided each sub-section into two parts, having recognized the differences in sound materials, density and morphological shape. Figure 6-1 shows the differences in density and morphological shape among these subsections, and Table 6-1 annotates different sound materials used in the subsections and their features.

Table 6-1. Formal design of *The Flywheel Dream* based on semiotic and spectromorphological features in Section 1.

Time	Sect ion	Sub- section	Semiotic Features	Spectromorphological Features
00:00 - 00:37	(A)	(a)	jackhammer, pizzicato jazz double bass, clicking fishing reel, singing voice, child's (baby's) voice, clacking typewriter, twittering or singing bird, ringing telephone, rhythmic bongos and cymbals, etc.	Primary pitch materials (D, E, F# A#(or A), and B; the sound collage in the beginning implies the following melodic line: F#-D-A#(or B)); Bass iteration (wandering around F#); juxtaposition of different sounds all seemingly connected through their quasi-regular percussive morphologies; cymbals and bongos are synchronous; collages of sounds are dense and complex.
00:37 - 01:24		(b)	jazz double bass with rhythmic ride cymbals, crying bird, flapping bird wings, water babbling in cave stream, footsteps in shallow water, sharp clicking, and spinning fishing reel, etc.	Primary pitches (E and F#); time expanded and cross-synthesized sounds, highly reverberated; collages of sounds are much less dense; gestures of sounds are slower than those in (A)(a)
01:24 -	(A)	(a)	starting engine, honking cars, spinning fishing reel,	Primary pitch materials still heard (by voice); Bass iteration (around F#); the

Time	Sect ion	Sub- section	Semiotic Features	Spectromorphological Features
02:11			rhythmic bongos, flapping bird wings, singing voice, child's voice, ringing cash register, pizzicato acoustic bass, quasi-rhythmic typewriter, clattering kitchen objects and utensils, and shakers, etc.	juxtaposition of sounds based on morphologies similar to (A)(a). Dense
02:11 - 02:48		(b)	spinning and clicking fishing reel and flute sounds, reverberated water stream, sharp clicks, ticking bicycle derailleur, ping-pong balls, soft breathing in-and-out, clock ticking, etc.	Pitches (E and F#) carried by resonant-filtered noise; heavily reverberated; sharp clicks followed by ping-pong balls and fishing reel; clicks becoming regular (becoming a clock-like sound?)
02:48 - 03:46	(A')	(a')	clicking fishing reel, tossed and spinning coins, running cars, volleyed, bouncing ping-pong balls, police siren, playing children, ringing school bell, industrial drilling machine, slammed heavy door, closed lightweight (screen) door, etc.	The same primary pitch material; Similar morphological juxtapositions
03:46 - 04:52		(c)	closed door, barking dogs, ticking clocks, running and laughing children, toy gun sound, whimpering cat (or a whimpering baby), dish washer being prepared for running, etc.	Less recognizable morphological juxtapositions;

The data collected from the detailed listening exercises reveals marked differences between subsections (a) and (b)—particularly differences in the density of textures, level of reverberation, and speed of gestures, as well as similarities, principally in pitch. And in comparing subsection (a) and (b), we can hear many similarities between the first two (A) Sections. However, the first two (A) sections contrast sharply with the varied (A') section that

follows; in particular, the last subsection of Section 1, subsection (c), which is a subsection of (A'), exhibits semiotic features (i.e., sounds identifying a door, dogs, clocks, children, a cat, and a dishwasher) that may assist us in imagining a more identifiable place—such as an indoor, domestic place, a kitchen, perhaps—than the places suggested by the mix of conflicting features found in Section 1. It should also be recognized that the primary pitch content centered on E and F# runs throughout Section 1, regardless of the sound materials used, save subsection (c) in which pitch materials are less recognizable than in previous parts of the piece.

The preliminary analysis coupled with the discussion about the formal design of the piece has revealed acousmatic reasoning at work at the macroscopic level. In particular, we have identified both the piece's semiotic complexity, created by the wealth of sound-images, as well as its spectromorphological simplicity, resulting from its use of recurring pitches and morphological shapes. This interplay between the semiotic complexity and the spectromorphological simplicity has been observed both in the overall scheme of the piece as well as in the more detailed formal design of the piece.

Looking at the semiotic and spectromorphological features identified in Table 6-1, we can see how our preliminary listening to *The Flywheel Dream* suggests the work to be, at a more intricate level, engaged in a play of sound-images and, potentially, the quaternary framework of body and place, and their negations. Given this, we will now expand and refine our hearing of the piece by conducting several additional listening exercises with parts of Section 1 in order to discuss how sound-images emerge and are incorporated into our listening experience and, furthermore, how the interplay between sound-images and their negations, distinguished through acousmatic reasoning, map our listening experience onto the proposed framework.

Detailed Listening Exercise

In this detailed listening exercise we will analyze three segments in Section 1 of *The Flywheel Dream*. First, we will look at the use of acousmatic reasoning to position various moments from 00:00 to 01:24 within the quaternary framework. Following this, we will make detailed observations of some key sounds from 01:24 to 02:48, with the purpose of examining the interplay between semiotic and spectromorphological listening and the distinctive shifts that occur between the four poles of the framework during the segment. Last, examining the music between 04:00 and 04:50, I will discuss an interesting example of a misread sound and how acousmatic reasoning can be used to explain the misreading.

Acousmatic reasoning within the framework (00:00 to 01:24)

Figure 6-2 shows the results of the analytical listening exercise I conducted from 00:00 to 01:24, which includes subsections (a) and (b) of the first (A) section of Section 1. Moving from top to bottom, we see spectromorphological features (SRPs) collected by a sonogram as well as through our spectromorphological listening followed by semiotic features (SRPs) collected through the semiotic listening. Below the semiotic features are the sound-image frameworks, identified by dotted circles, which I inferred through undercoded and creative abduction; the figure is completed at the bottom with the quaternary framework. As shown on the right side of the figure, both spectromorphological and semiotic listening modes are overcoded abduction processes in that they progress according to relatively rigid rules connected with and distinguished by the particular form of listening. Sound-image frameworks, however, as shown, are products of undercoded or creative abduction, representing a listener's explanation of sonic events based not on hard facts or rules but on imagination.

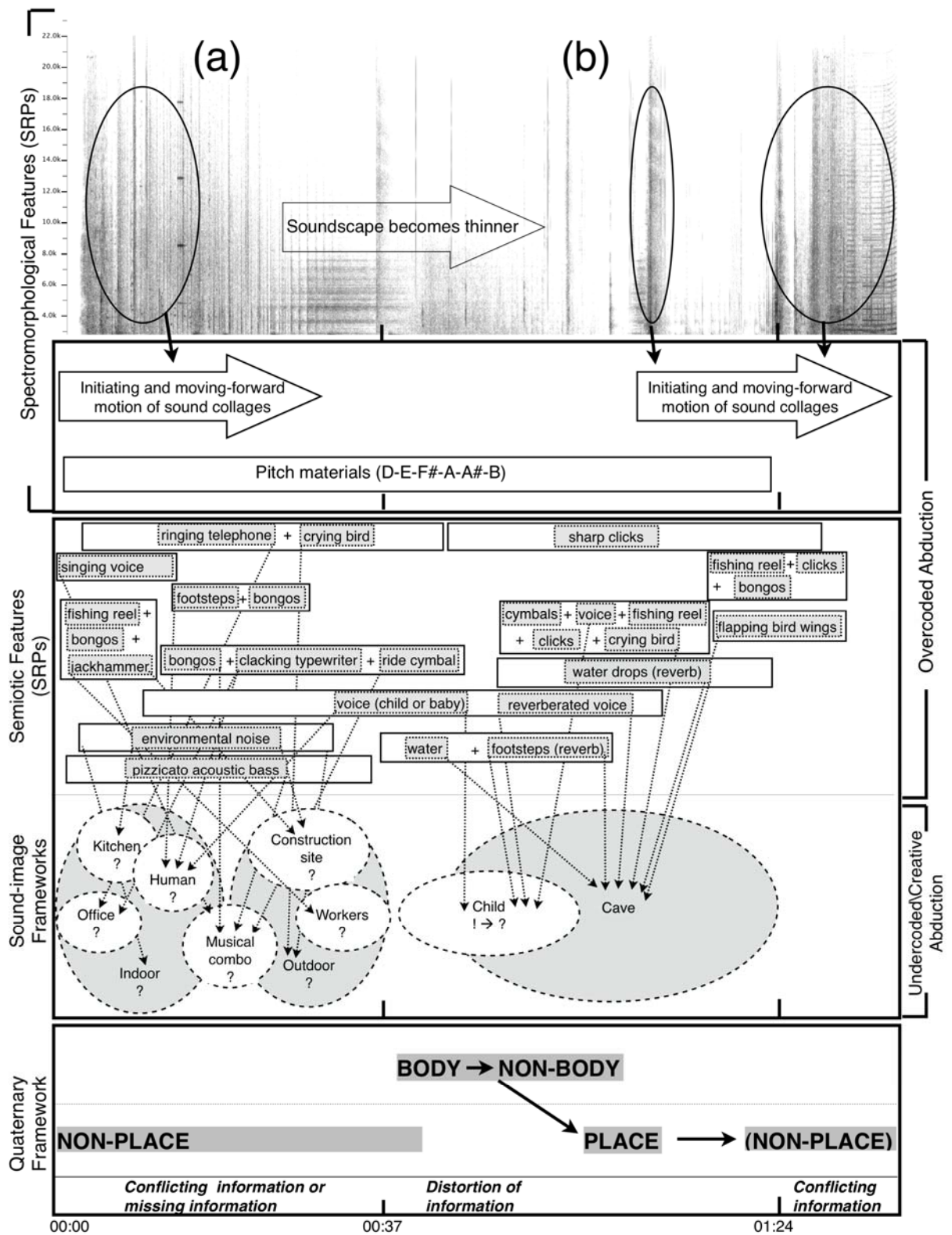
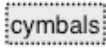
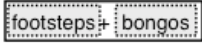


Figure 6-2. Detailed listening exercise for *The Flywheel Dream* (00:00 – 01:24) using acousmatic reasoning within the quaternary framework

Table 6-2. Explanation of symbols and codes used in Figure 6-2.

Section	Symbols and Codes	Explanation
• Spectromorphological Features (SRPs)	(a), (b)	• Subsections
• Semiotic Features (SRPs) and Sound-image Frameworks	     ? !→? ?→!	• Sounds in gray, dotted-line rectangles denote preliminarily identified sound-image features and possible sound-image framework components. • Sound-image features enclosed in white boxes and linked by “+” denote spectromorphologically linked sounds, regardless of semiotic implications. • Dotted lines with an arrow identify the use of sound-image features in sound-image frameworks as a result of undercoded or creatively coded abduction. • Sound-images in white, dotted-line circles denote sound-image frameworks formed through undercoded or creatively coded abductions using one or more sound-image features as framework components. • Sound-image frameworks with gray backgrounds indicate ‘super-set’ frameworks; super-set frameworks are formed through the joining together of related frameworks into more generalized frameworks. • Question marks beneath the name of a sound-image framework identify the framework as questioned, challenged, or potentially negated. • An exclamation point followed by a question mark beneath the name of a sound-image framework identifies the framework to be first affirmed and then questioned, challenged, or even negated. • A question mark followed by an exclamation point beneath the name of a sound-image framework identifies the framework to be initially questioned, challenged, or even negated, but then finally affirmed.
• Quaternary Framework	NON-PLACE BODY → NON-BODY	• Quaternary framework poles in gray boxes denote the pole currently in effect; boxes extend over the length of time during which the pole is identified. • Gray boxes containing processes of negation or affirmation (denoted by arrows) indicate

Section	Symbols and Codes	Explanation
		framework shifts operating within the context of a single sound-image framework. • Solid arrows denote transition between two or more poles of the framework. • Poles enclosed in parentheses indicate preceding or upcoming poles otherwise not indicated by accompanying information.

Dotted-line arrows connecting one or more semiotic features (SRPs) to a sound-image framework indicate an undercoded abduction in which the semiotic features become components of the sound-image framework. For example, typewriter and telephone are *sound-image components* for a sound-image framework called “Office.” An important feature of sound-image frameworks is the question mark “?” beneath the name; the question mark identifies that the imagined framework is in some way fleeting and difficult to verify as it is likely challenged by missing, conflicting or distorting information. Question marks combined with exclamation points and arrows, “!→?” or “?←!,” identify sound-image frameworks that shift from being affirmed to negated or vice versa, as can be seen in Figure 6-2 with the “Child” framework.

An important characteristic of sound-image frameworks is that they can combine or merge to become ‘super-set’ sound-image frameworks, as they effectively become components of the super-set. For example, sound-image frameworks like “Kitchen” and “Office” are sound-image components of another sound-image framework called “Indoor.” Consider, also, a sound-image framework called “Musical combo,” as found in Figure 6-2, which intersects with both “Indoor” and “Outdoor,” suggesting that, in this section of the piece, “Musical combo” could support both “Indoor” and “Outdoor” frameworks.

The Quaternary Framework, included beneath the sound-image frameworks, is divided into two levels: Body/Non-body and Place/Non-place. Gray boxes identify poles on the

quaternary framework and solid arrows between them indicate shifts from one pole to another. If the shift is contained within a gray box, then the shift takes place within the same context. For example, in Figure 6-2, **BODY → NON-BODY** shows that the transition from Body to Non-body—in this case, the shift of “Child/!→?”—is due to the changes in the SRPs of “Child,” which should therefore be identified together. Compared to the shift from **BODY** to **NON-BODY**, the shift from **BODY → NON-BODY** to **PLACE**, which is not in a single box and has an angled arrow shifting focus to a different axis, indicates that **BODY → NON-BODY** does not become, but is rather subsumed by **PLACE**.

Subsection (a) has a quality of relentless locomotion that is supported by both semiotic and spectromorphological readings of the work. This sense of locomotion is caused not only by the spectromorphological features of the collaged sounds, but also by the diversity of materials, which resist being circumscribed by any one sound-image of body or place. As we have briefly discussed, the sound-image frameworks in subsection (a) are potentially somewhere indoors, possibly an office or a kitchen or domestic place with added environmental noise. However, none of these sound-image frameworks is definitively distinguished by support through sounds, context, or circumstance. Subsection (a) may offer listeners the opportunity to imagine a sound-image framework connected with place, but there is just *too much conflicting information*, or better, too many plausible yet unconfirmed frameworks that leave listeners little choice but to take what they hear, for the moment, as **NON-PLACE**, as shown in the Quaternary Framework.

In sub-section (b), listeners get a strong sense of the human body as a result of SRPs associated with the body: the voice of a young child or even baby, and footsteps moving through shallow water. However, these SRPs are *distorted* by expansion in time and the introduction of

reverberation; consequently, listeners are led away from “Child!” toward “Child?” (again, the symbol “!→?” denotes a shift from the affirmation to the negation of a sound-image framework), as the image of the voice becomes less and less natural and the distortions of a reverberant space are added.

Our traversal through the quaternary framework in subsection (b) begins with Body, due to the strong sense of the human body as we have discussed, but quickly moves to Non-body. To form Non-body in this section, listeners collect together the reverberated and time-expanded voices, joining them together based on their spectromorphological similarities (this issue will be discussed later). Place soon subsumes the shift in the quaternary framework from Body to Non-body as a result of the cave framework whose SRPs include not only reverberated voices and footsteps, but also the sound of birds and reverberated water drops. In subsection (b), thus, the listener’s experience, as mapped onto the quaternary framework, shifts from Body to Non-body, and then finally, to Place.

One benefit of the detailed listening is how it illustrates the interaction between spectromorphological and semiotic listening modes. We have already seen this process at work in our preliminary listening stage, where I argued that the process functions not only at the macroscopic level, but also at the more microscopic and momentary levels of the piece. In Figure 6-2, we can see that, in the semiotic listening section, there are various sounds linked by a plus sign (+) and circumscribed by a rectangle. These notations indicate that the sounds are linked together spectromorphologically, despite the possibility that they may be semiotically unrelated. *The Flywheel Dream* offers listeners copious examples of these unlikely semiotic bedfellows cultivated through spectromorphological congruencies; notable examples include the

[fishing reel + bongos + jackhammer] sounds in the beginning to 00:05, the [footsteps + bongos] from 00:19 to 00:22, the interplay in rhythm and pitch between the [ringing telephone + crying bird] sounds from 00:24 to 00:46, and the rhythmic interplay between the [bongos + clacking typewriter +ride cymbal] from the beginning to 00:40. I have mentioned that in subsection (b) the voice loses its identity when it is combined with other sounds (the result of conflicting information—this was not included in Figure 6-2 because the distortion of information through reverberation and time-expansion was enough to represent the voice’s loss of identity). Between 01:07 and 01:12, you can hear a collage of sounds that starts with clicks, followed by (in series) the ride cymbal, fishing reel sounds with a time- expanded voice, water drops, fishing reel sounds with clicks, and a bird call.²⁵ This is another example of the juxtaposition of semiotically heterogeneous sounds based on the similarity of their spectromorphological designs. The role of this sound collection is twofold: it functions to not only move away from the cave as a place (a semiotic function), but to also reinstate the motion observed in subsection (a) and move into the next section (a spectromorphological function), thus, effectively encouraging listeners to move from Place to Non-place.

Interplay and metamorphosis of the four poles (02:10 to 02:50)

The analytical exercise explored above using *The Flywheel Dream* shows, I argue, how acousmatic reasoning and the quaternary framework function in listening. While the rest of the piece is equally amenable to this treatment, I will not extend this analytical listening exercise beyond the above example as the goal of this chapter is not to analyze the piece in its entirety, but rather to show how acousmatic reasoning and the proposed framework work. Instead, I will now examine in more detail the interplay within the quaternary framework of semiotic and

²⁵ Interestingly, the crying bird is inserted in such a way that makes it difficult to detect in a first listening. However, the bird as a sound-image is immediately confirmed by the sound of flapping bird wings from 01:19 to 01:22.

spectromorphological properties. The segment to be examined is from 01:24 to 02:48, which includes the sound sequence fishing reel → clicks → water drops → ticking bicycle derailleur →
ping-pong balls → ticking clock → alarm clock from 02:10 to 02:50.

Shown in Figure 6-3 are the results of an analytical listening exercise for the segment mentioned above from 02:10 to 02:50. This segment offers another example of the interplay between spectromorphological and semiotic features in the piece, displayed primarily through its rhythm (a spectromorphological feature). The continual metamorphosis of the segment's rhythmic features causes it to momentarily conjoin with different semiotic features and sound-images; listeners following and responding to the changes in rhythm naturally shift their reading of the segment among the poles of the quaternary framework.

The segment begins with the sound of a reverberated and time-expanded trilling flute, along with the sound of a clicking fishing reel, which, by this point in the piece, should be familiar to listeners. One of the spectromorphological features of the fishing reel is its decelerating rhythm. Based on semiotic listening, one can hear the clear combination of the fishing reel with the clicks, which are then followed (through superimposition) by the sound of water drops, the bicycle derailleur, ping-pong balls, a clock, and finally, an alarm. It should be noted that listening to the metamorphosis of the fishing reel into the water drops and finally the clock requires, among other things, close attention to the regularity and irregularity of sound events. For example, where the water drops are intermittent, the clock, conversely, stands out through its much faster, regular ticking. The fishing reel, which is regular while changing in speed, decelerates and metamorphoses into the sound of the water drops, gradually adopting their irregular rhythmic identity. At the same time, the water drops, the ticking bicycle derailleur, and

quasi-regular bouncing ping-pong balls metamorphose into the regularity of the clock. As shown in the spectromorphological listening diagram, the rhythmic features progress from “decelerating” to “irregular” to “regular,” which coincides with the contributing sounds, from clicking fishing reel to ticking clock to finally alarm (the solid arrows indicate the contribution that spectromorphological rhythmic features make to the sequence and identity of sounds).

In addition, it should be noted that the change of sound-images through changes in their degree of regularity is a feature that combines with other sounds to create new sound-images and shift preexisting ones. The rhythmically irregular sounds identified as water drops combine with the running water to suggest a cave as a place, and the rhythmically regular sounds that eventually become identified as a clock, underscored at the end of the segment by a disrupting alarm, combine with the sound of soft, restful breathing to suggest a bedroom as a place.

The stability of Place is present and evident in this metamorphosing segment. However, the cave place, which is a reprise of the previous cave image, carried over by reverberated water drops and running water, is not as strong a sound-image as when it was first introduced. Compared to the earlier moment, this sound-image lacks the information listeners need to identify it as a cave; even the most important cave SRPs, such as those connected with the water drops, quickly change to suggest a bicycle derailleur or ping-pong game, causing our listening experience to shift from a cave to something that is not a cave (“Cave (Reprise)/! →?”) and, by correspondence within the quaternary framework, from Place to Non-place. Furthermore, the bedroom, while identifiable, appears but for a few seconds, as it is quickly eclipsed by the awakening call of the alarm clock and the collage of noisy sounds that follow; the intrusion of construction sounds and honking cars combine with the return of familiar sounds to re-engage

the toy box spilling moment. Thus, sound-images and frameworks connected with Place are as soon challenged as they are imagined, as denoted by “Bedroom!→?”.

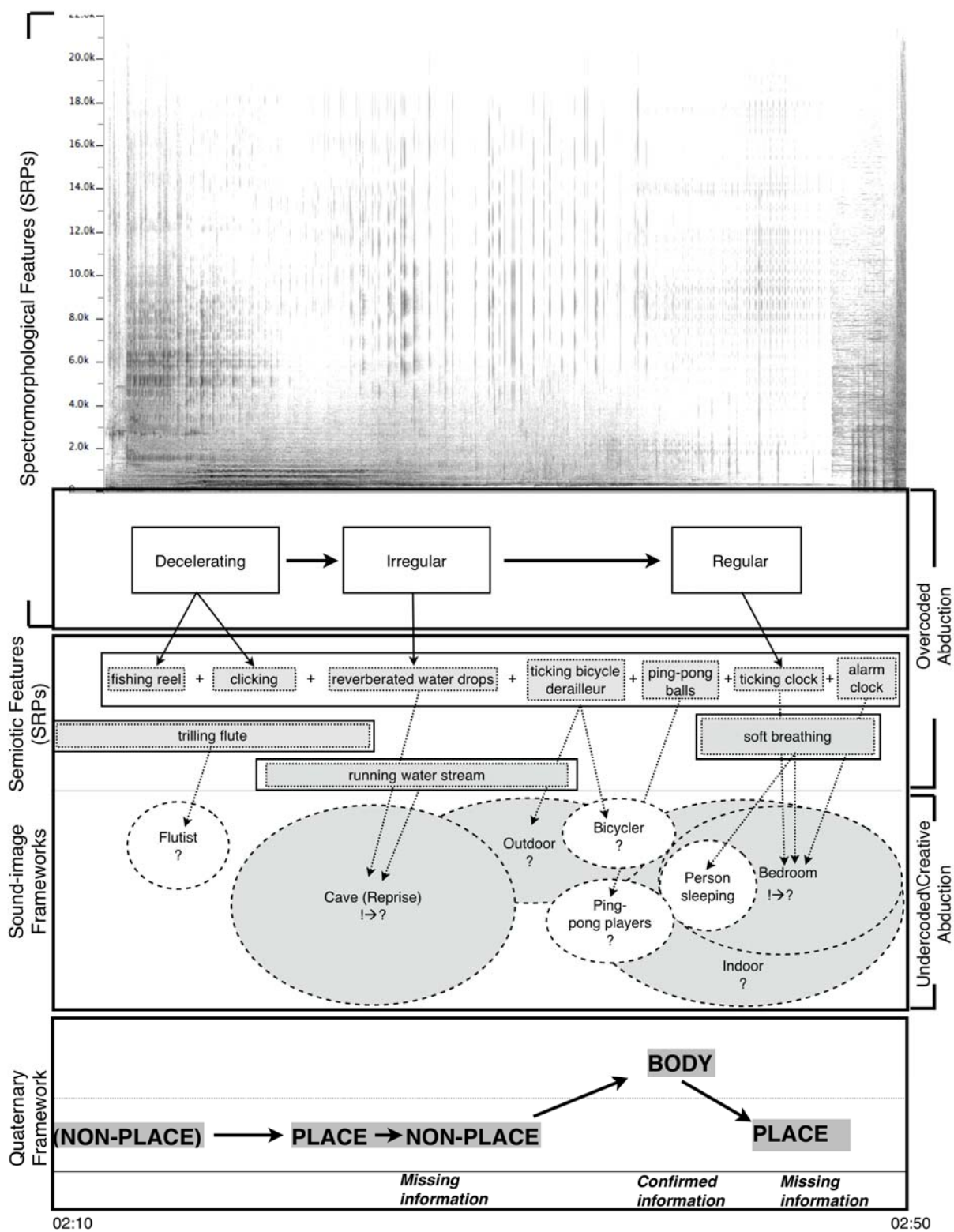


Figure 6-3. Detailed listening exercise of *The Flywheel Dream* (02:10-02:50) using acousmatic reasoning within the quaternary framework.

As shown in the example above, spectromorphological features in *The Flywheel Dream* play as primary a role at the microscopic level as they do the macroscopic, as they thread together the work's assorted sound materials and their divergent semiotic identities. As well, we can see from the example how our hearing of the work can be described through acousmatic reasoning and the quaternary framework.

Misreading and acousmatic reasoning (04:20 to 04:44)

Acousmatic reasoning using the proposed framework is a powerful tool for studying how listeners interpret electroacoustic music. Observing how listeners experience electroacoustic music according to the interplay of semiotic and spectromorphological listening can explain why they listen in certain ways.

It is not uncommon for listeners to assemble sound information from a piece and make conclusions about the source or identity of a sound that is surprisingly different from what others experience. In their search for identity, they may even fail to recognize certain sounds others easily identify and lead themselves, unexpectedly, into a misreading of the piece. Acousmatic reasoning in the quaternary framework can, interestingly, offer insights and observations about these cases of misreading. To this end, the following example discusses my misreading of a certain sound in *The Flywheel Dream*, observing the process of misreading from within the quaternary framework and acousmatic reasoning.

From 04:20 to 04:44 of *The Flywheel Dream*, I heard in my initial listening a sound that I took to be a whimpering baby. My reading was based on several cues that I considered important SRPs of a baby sound. However, the occasional discussion with other listeners (and ultimately a discussion about this specific sound with the composer of the piece) revealed that I had been mishearing the sound: it was not the sound of a baby, but that of a cat. How did this misreading happen?

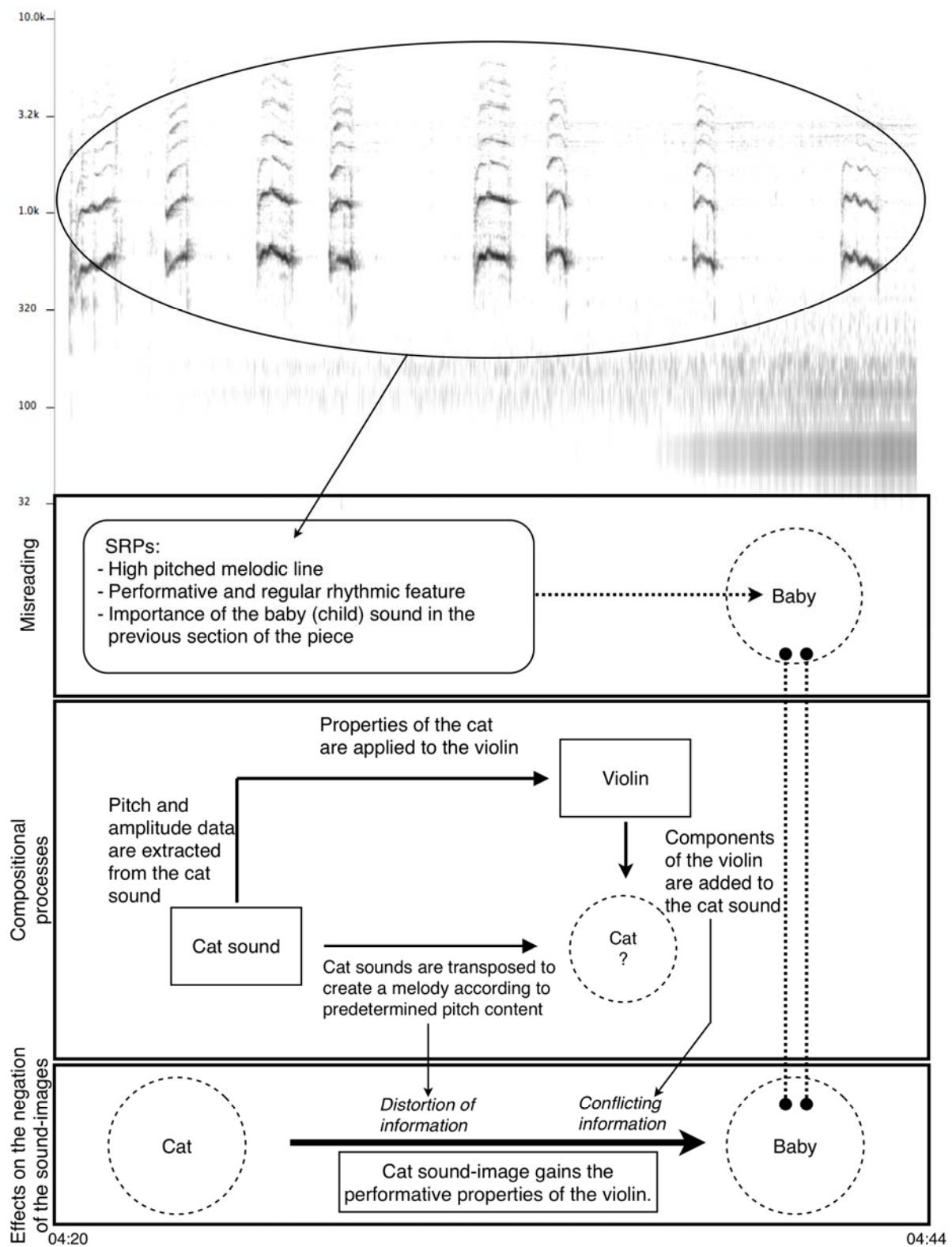


Figure 6-4. Misreading of the sound of a cat as that of a baby (04:20-04:44) and an explanation based on acousmatic reasoning.

Figure 6-4 shows the process by which I misread the cat sound according to acousmatic reasoning. In the figure, we can see how compositional processes distort the features of the cat sound by first transposing it and then adding components acquired from a violin cross-synthesized with the cat sound using its amplitude and pitch data—what, in short, might be characterized as the addition of a violin playing along with the cat an octave higher. The addition of components to the already distorted features further confused my listening because there was too much information, or too rich a field of information, to affirm that what I was hearing was in fact a cat. In fact, the processes of distortion and the addition of information effectively gave the sound of the cat a quality of performance, one that I could not intuitively ascribe to a cat and therefore assigned to a human; in this case, a baby.

This example of my misreading and my explanation of it according to acousmatic reasoning show how I, as a listener, was engaged in the active interplay between semiotic and spectromorphological listening modes encouraged by the SRPs I identified with the sound-images of both cat and baby. Despite the fact that I misread the sound, acousmatic reasoning has effectively revealed why my misreading occurred, if not more, one might imagine, some of the motivations of the composer engaged with the sound and its possible connotative role within the context of the work and its ideas.

Reflections on Acousmatic Reasoning and the Quaternary Framework in *The Flywheel Dream*

Listening to *The Flywheel Dream* using acousmatic reasoning and the quaternary framework shows two important aspects to the piece: the prominence of spectromorphological features and the difficulty of reading the piece semiotically, both of which attest to the resistance of the piece to being read in terms of the Body/Place axis of the quaternary framework.

As shown both in the preliminary listening and detailed listening exercises, spectromorphological features—the primary pitch content and morphological shapes—offer listeners a simpler way to ‘understand’ *The Flywheel Dream*. Sounds carrying these spectromorphological features are the common thread that runs through the piece, knitting together all of the heterogeneous materials that do not otherwise go together. Listening to the piece according to acousmatic reasoning, one can regard the piece as being similar in structure to the mobiles of Alexander Calder in that the spectromorphological features of the piece act as the armature holding together copious and seemingly mobile objects. Furthermore, like a mobile whose moving parts are powered by wind, a motor, or the observer, *The Flywheel Dream* is powered by the semiotic whimsicality of the sounds as well as the listener’s imagination.

Despite the various easily recognizable sounds that we hear in *The Flywheel Dream*, listening to it semiotically is never easy; the piece resists the listener’s semiotic reading of it. While we are able to detect some place-like images in the piece, they are, however, never verified. The only potentially verified place in the whole piece is in subsection (c) of Section (A’) where one hears various domestic sounds (dogs, cats, children playing, a clock, and a washing machine, etc.) suggesting a kitchen. Notice, however, that this section is contrasted with Section (B)(a”) and quickly (B)(d), which is the most “non-place” section of the piece.²⁶

²⁶ The composer’s goal in combining the cat and violin sounds in subsection (c) (discussed previously with regard to my misreading of the sound) was to fuse the everyday sound of the cat, read semiotically, with the more musical, spectromorphologically-read sound of the violin. Considering that this fusion takes place in subsection (c), the most “place-like” section of the whole piece, and that it is soon followed by the most musical section of the piece, the long, samba-themed music of Section (B), I imagine that the compositional decision to join cat and violin was to not only balance the two listening modes, but to also foretell, perhaps, the nature of the music to come.

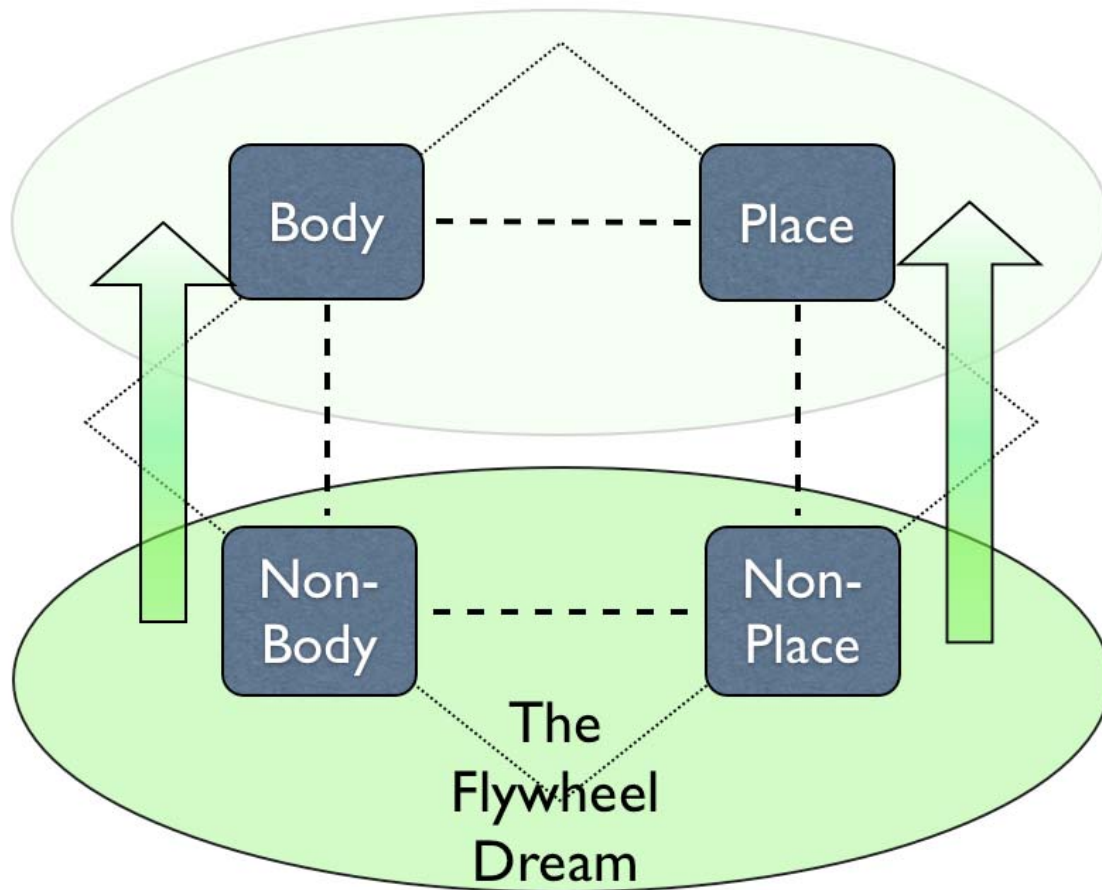


Figure 6-5. *The Flywheel Dream* according to the quaternary framework. *The Flywheel Dream* can be mapped into the Non-body/Non-place axis of the quaternary framework. While listeners are encouraged to travel to the Body/Place axis, it is only connoted, but rarely denoted by the piece.

Therefore, I argue (as shown in Figure 6-5) that the large-scale, macro experience of *The Flywheel Dream* is readily mapped onto the Non-body/Non-place axis of the quaternary framework; however, the semiotic connotations of the shorter, more ephemeral moments of the piece always encourage listeners to travel, for however short and fleeting a period of time, to the Body/Place axis. In other words, *The Flywheel Dream* connotes Body and Place, but it never denotes them; it only approaches them by various degrees of proximity.

CHAPTER 7 EPILOGUE

This dissertation presents a way of listening to electroacoustic music, more precisely, an interpretive listening framework, through which listeners may listen to electroacoustic music. In this regard, what this dissertation proposes may be seen as a theory of electroacoustic music listening. However, it is not the intention of this dissertation to present a listening theory, *per se*—that is, this dissertation does not claim that listeners should listen to electroacoustic music in the way the dissertation has presented; rather, its goal is to identify a process that listeners may employ—perhaps, even without knowing—in listening to electroacoustic music. In other words, it attempts to explore one path by which listeners may navigate and interpret the vast world of electroacoustic musical sound.

To this end, this dissertation has followed and examined some of the key issues involved with electroacoustic music listening. To begin, in chapter 2, it identified and examined the consequence of dis-embodied and dis-placed sounds incurred through recorded sounds. As well, chapter 2 focused on the implications of source-place decoupling caused by recording technology and discussed the effect of this source-place decoupling in electroacoustic compositions like *I am sitting in a room* by Alvin Lucier. Finally, the chapter concluded by proposing a quaternary framework for listening by conducting a short survey of electroacoustic compositions.

With an understanding of the role that imagination plays in electroacoustic music listening, Chapter 3 explored listening and imagination, as well as sound-images as the products of imaginative listening. In this chapter, the dissertation argued, after Casey, that imaginative listening employs three different, but interlocking, processes: *imaging*, *imagining-that*, and

imagining-how, and showed how these three imagining processes are found in electroacoustic music listening by observing my short listening exercise using *Out of Breath* by Paul Koonce.

In Chapter 4, the dissertation examined Body and Place, the two principal poles of the quaternary framework, as sound-images that listeners conjure up in electroacoustic music listening and discussed their particular properties. Furthermore, chapter 4 explored Non-body and Non-place, the two subsidiary poles of the framework, as the product of the negation of Body or Place sound-image properties and how negation causes the identity of Body or Place to be challenged or lost. To discuss the negation process in detail, the dissertation studied some of the compositional processes that electroacoustic composers often use to manipulate sounds. Close examination of the compositional processes showed that, from a listener's point of view, change in a sound's properties, through these or other compositional processes, results in a change to the sound-image previously associated with the sound. Moreover, the compositional processes and their effect on sound-images can be organized according to the listener's perception of: *missing information*, *distorted information*, or *conflicting information*. The dissertation, then, provided several musical examples to illustrate these three types of negation.

In Chapter 5, the dissertation discussed acousmatic reasoning and its use in navigating the quaternary framework. The dissertation first recognized the two listening modes that listeners employ in electroacoustic music, the semiotic and spectromorphological listening modes, and observed how they are connected. One of the dissertation's main assumptions was that attentive listeners, faced with sonic events in electroacoustic music, desire and seek significance or meaning in sonic events. Having discussed the two listening modes, the dissertation argued that, without firm rules by which to read sonic events, listeners use a process of inference, in particular, one called abduction. The dissertation, then, referred to Eco's three types of

abduction, *overcoded*, *undercoded*, and *creative abduction*, and discussed in detail how these three types of abductive processes operate in acousmatic reasoning. Finally, Chapter 5 recognized that, although listeners may identify various and copious features with sounds—that is, properties of sounds—in electroacoustic music, context causes some sound properties to be more relevant than others, and that these differences affect acousmatic reasoning. Therefore, the dissertation introduced Kulvicki’s *Syntactically Relevant Properties (SRPs)* to discuss the difference between properties of competing relevance to the perception at hand.

Finally, in Chapter 6, the dissertation conducted a listening exercise of *The Flywheel Dream* by Paul Koonce based on acousmatic reasoning within the quaternary framework. The preliminary listening and detailed, analytical listening exercises revealed that, given the semiotic complexity of the everyday sounds used in the piece and the spectromorphologically consistent way the sounds are knitted together, listeners are encouraged to engage in acousmatic reasoning and to explore the interplay between semiotic and spectromorphological listening. Furthermore, the dissertation argued that, despite the everydayness of sounds in *The Flywheel Dream*, the piece should be mapped not onto the Body/Place axis, but onto the Non-body/Non-place axis of the quaternary framework given the prominence of spectromorphological features and the difficulty of reading the piece semiotically; the piece resists being read semiotically. More importantly, however, the dissertation recognized that, while the semiotic connotations of the sounds used in the piece always encourage listeners to travel to the Body/Place axis, the piece’s resistance to being read on that axis forces listeners to continue to engage in acousmatic reasoning.

The goal of the proposed framework, well stated, has been to address how listeners listen to electroacoustic music that is clearly engaged with everyday sounds and their connotations. By

definition, other forms of electroacoustic music, not so engaged with everyday sounds, are not addressed. Also, this dissertation has focused mainly on acousmatic reasoning, a process it has imagined listeners might well employ. However, as the definition and discussion in chapters 4 and 5 propose, acousmatic reasoning is a process not just for listeners, but for composers as well. As composers more and more realize how they are, in fact, their first listener, they need to learn how to be attentive to what they, and others, experience when listening and work to examine how acousmatic reasoning, as a fundamental process behind how they listen, plays a role in their compositional processes.

This dissertation has persistently argued that listening to electroacoustic music is as much an act of reasoning as of imagining. Good listeners are not only attentive to both modes of listening, but, as well, balance their attention in accord with the pieces they hear. Acousmatic reasoning and the quaternary framework, as proposed in this dissertation, show how listeners proceed to listen.

APPENDIX A
WELCOME TO HASLA: FIVE-CHANNEL ELECTROACOUSTIC MUSIC

The Great Khan has dreamed of a city; he describes it to Marco Polo... and says: “Set out, explore every coast, and seek this city,” the Khan says to Marco. “Then come back and tell me if my dream corresponds to reality.”

“Forgive me, my lord, there is no doubt that sooner or later I shall set sail from that dock,” Marco says, “but I shall not come back to tell you about it. The city exists and it has a simple secret: it knows only departures, not returns.”

—Italo Calvino, *Invisible Cities*

Welcome to Hasla! A faraway land in which everything appears to be as strange as it is familiar; a place to which you have never traveled, yet one that resembles eerily every town you have visited before; a town where as soon as you arrive, you realize that you have already left.

Welcome To Hasla is a five-channel electroacoustic composition loosely based on Italo Calvino’s *invisible Cities*. Ever since reading the novel, I have thought about, dreamed about, and imagined composing electroacoustic music that could auralize some of the cities about which Marco Polo told Kublai Khan. Each story that Marco Polo tells is a metaphor for the regrets, memories, relationships, and other human conditions experienced by a traveler, who is presumably Marco Polo himself, although eventually, by extension, Khan as he hears of cities where he is now King.

At first I thought about composing a piece based on one or more of the cities Calvino describes in the novel, but quickly I came to the realization that the city I had in mind was not one of his cities, but a new city of my own making, formed while reading his book.

My wife Sung Eun then offered me a list of names for 76 imaginary cities. Although the list had only names, they intrigued me. Of all 76 cities, one particular name caught my imagination as soon as I saw it: Hasla. Strictly speaking, Hasla is not an entirely imaginary city;

but it is, just the same, a forgotten one. It is an ancient name for Gangneung, Sung Eun's hometown where I had spent my high school years and met her for the first time.

And one day, while pondering the name and imagining my travel to the old city, I dreamed of a writer:

I am imagining a writer, who has just returned from a city whose name continuously slips from his memory. In the middle of the night, he awakes from a strange dream. Trying to write about the city he has been to and now dreamt about, a name suddenly comes to him: Hasla! But, at the same time, now having a name, he is no longer sure whether he has actually made the travel, or whether his dream has finally caught up with him for good!

I thank the people of Visby International Center for Composers (VICC) for allowing me to use their fantastic studio and equipment; in particular, Jesper and Mijram for lending me a slew of medieval instruments. Thanks to Paul Hanmer for lending his voice and to Ramon Anthin for the title!

Welcome To Hasla was commissioned by the Institut International de Musique Electroacoustique de Bourges (IMEB), France and composed at IMEB, France and VICC, Sweden.

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