

## Touching the Audience

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*Deep Listening is a practice that is intended to heighten and expand consciousness of sound in as many dimensions of awareness and attentional dynamics as humanly possible.* – Pauline Oliveros

*They see with their hands.* – René Descartes

*An ethico-political articulation – that I call ecosophy – between the three ecological registers, the one of the environment, the one of the social relations and the one of the human subjectivity.* – Félix Guattari

*Another dream: in the inside which is the outside, a window and myself. Through this window I want to pass to the outside which is the inside for me. When I wake up, the window of my room is the one from my dream; the inside I was looking for is the space outside.* – Lygia Clark

### Abstract

The paper investigates the idea of dynamic relations of sound and space perceived and experienced by touch. Therefore, embodiment of sound through proprioception is explored. The study introduces the idea of art and electroacoustic music as an experience for dynamic perception behaviours. Spatial representations through mental imageries are discussed to determine how sound perception can be augmented in order to develop dynamic multimodal experiences in electroacoustic contexts.

In addition, relevant artists, who created new forms of experience through embodiment, are presented. The neo-concretist artists Lygia Clark and Hélio Oiticica are paramount in regards to ideas about participative art. The composer Marianne Amacher defined a body of work directly relating to architecture (structure borne sound), which allows the audience to embody the sound through space. Furthermore, she investigated physiological properties of the body, which become the sonic emitter and receptor. Whereas, Max Neuhaus' sound installations (a term he defined), created situations between sound and space, in which the participants embody the works through water or while walking through them.

The paper starts with definition and contextualisation of the terminology of proprioception, haptics, mental imageries and deep listening. Then, case studies are introduced in relation to those terms, and future opportunities for electroacoustic contexts are discussed in the conclusion.

### 1. Introduction

The paper investigates the idea of perceiving sound through touch, where the body as a sonic receptor involves architectural spatial representations by mental imagery. The vibrational properties of sound, the notion of proprioception and embodiment in sonic arts lead to a

possible novel form of spatial perception. How can it be augmented by touch in order to develop dynamic multimodal experiences of sound?

The essence of the research emanates from a background of the author at the intersection of architecture, art and music, including research conducted in sonic arts and neurosciences. Specifically, the ideas lying around sound cognition, and in particular leading to the investigation of the notion of experience of the artwork. Including the loop existing between the artists' emission and the audience's perception. (Blanke, Forcucci, Dieguez, 2009)

In order to trigger the tactile, haptic devices are part of the sonic experience. They have a long history going back to the Greek antiquity and have been extensively investigated for blind persons in order to perceive the world. Although, the present paper is not investigating medical and impairment issues, research conducted in those areas might be of great interest to develop and inspire theory and artworks.

### 1.1. Proprioception

The term suggest a perception of the world through our 'secret sixth sense' as proposed by Metacek and Mechsner, which defines the term as follow:

In 1906 Charles Sherrington coined the term proprioception (perception of one owns) for the sensory modality based on these receptors and called it our 'secret sixth sense' [...] Proprioceptors precisely measure physical properties, such as muscle length, tendon tension, joint angle or deep pressure. Signals from this sensory orchestra are sent by afferent nerves through the spinal cord to the somatosensory, motor and parietal cortices of the brain, where they continuously feed and update dynamic sensory-motor maps of the body [...] So proprioception provides information on the physics of the body, the momentary distribution and dynamics of masses, forces acting on the limbs and their highly nonlinear interactions. The maps derived from these complex calculations not only guide body movement, they also (together with touch) sense the size and shape of objects and measure the geometry of external space. (Smetacek and Mechsner, 2004, p. 21)

Proprioception provides information to the body on the geometry of the external space and invigorates the idea of a possible novel form of listening inducing a novel spatial perception. In particular, it highlights the idea of experience of the work of art as a physical perception, which triggers the phenomenal world of sensation. Accordingly Lotze propose that:

The original nature of our mind compels us to arrange the elements of our sensations according to a spatial pattern and a subsequent consideration of the infinite number of such arrangements which we have made consciously leads us to a more or less livid total concept of an infinite all-embracing space [...] Thus we apply these innate intuitive forms of space and time to those impressions, whose reciprocal relationship is thereby transformed for us into the sequence and contiguity of the phenomenal world of sensation. We cannot dissociate ourselves from it, because it is necessary and unavoidably valid, and because it is the outcome of the original nature of our perceiving and transforming mind. (Lotze in Revesz, 1950, p. 5)

### 1.2. Haptics

In order to trigger the tactile, haptic devices are part of the experience. They *trigger* the sixth sense. According to Revesz and Krueger '*Haptikos* meaning *able to touch* and *haptesthai* which translates to *able to lay hold of*' (Revesz, 1950; Krueger, 1989; NCSU n.d.). In the present context, where haptics are linked to hearing and touch, Gunther and O'Modhrain underline similar vibrational paradigms:

It turns out that our senses of hearing and touch have some fundamental similarities, specifically their ability to perceive and process vibrations. Research on the psychophysics of touch provides evidence that in certain respects the perceptual ranges and discriminatory limits are roughly compatible, at least overlapping, with those of hearing. Hence the skin should be able to process and ultimately appreciate what we will call a tactile composition similar to the way the ear does for music. (Gunther and O'Modhrain, 2003, p. 369)

Following this proposal, Prytherch and Jerrard made a survey in art practice, and they propose haptics as a secret sense:

Given the intimate interaction between the sensory and motor functions of the haptic system, and the sheer complexity of its functioning, it has been shown that much of the sensory information being produced moment to moment is filtered by gating mechanisms within the primary somatosensory cortex and as a rule, is managed at a pre-conscious level. In this respect, haptics may be viewed as a secret sense and its importance to the practicing artist should not be under-estimated. (Prytherch and Jerrard, 2003, p. 384)

The secret sense revealed by haptics in the mechanisms of perception and the similarities between sound and touch in perceiving vibrations open the door to the idea of art and electroacoustic music being an experience for dynamic perceptive behaviours. It includes as well the opportunity to augment sound perception toward dynamic multimodal experiences in electroacoustic contexts and the resulting spatial representations by mental imageries.

### 1.3. Deeper Listening

The perception of sound through touch implies deep listening practice in order to reveal mental imageries. This is activated through conscious listening, which is listening to one's own listening and the conscious awareness of the related effects. This includes in the current context, considerations of all the sonic and vibratory aspects of sounds. The idea of participatory experience is not through the idea of interfaces (even if those are present to trigger sound through touch), but through the direct involvement of the audience *into the work*:

Pauline Oliveros herself describes Deep Listening as 'listening in every possible way to everything possible to hear no matter what one is doing.' Basically Deep Listening, as developed by Oliveros, explores the difference between the involuntary nature of hearing and the voluntary, selective nature – exclusive and inclusive – of listening. The practice includes bodywork, sonic meditations, interactive performance, listening to the sounds of daily life, nature, one's own thoughts, imagination and dreams, and listening to listening itself. (*Deep Listening Institute*, n.d.)

Oliveros describes how she practices *Deep Listening* on stage by 'listening and expanding on the whole space / time continuum of perceptible sound. What she perceives as the continuum of sound and energy draws her attention and informs what she plays.' (Oliveros, 2005, p. xix)

In the current context of the research, the deep listening mode is extended to the multimodal experience of sound through touch, implying perhaps a novel form of deep listening.

## 2. Context and Background

Case studies from the Brazilian neo-concretists' Lygia Clark and Hélio Oiticica, and the American composers Maryanne Amacher and Max Neuhaus, are investigated to discuss the

experience of art resulting from the embodiment of their works. According to the philosophers Robin and Aydede:

Conscious experience is not restricted to what is in my head but includes the environment around me, then the richness of experience is not an illusion. Experience really is rich, even though internal representations are sparse. It is rich because experience is partially composed by the world, and the world is rich. The idea that the world is literally a component of conscious experience may sound bizarre, but it has been proposed as a serious possibility. (Prinz in Robin and Aydede, 2009, p. 423)

The Brazilian neo-concretists Lygia Clark and Hélio Oiticica presented early interesting examples where the experience is properly the artwork. Maryanne Amacher included physiological reactions of the body to sound to reveal her work. Max Neuhaus includes perception through the whole body while walking, or embodiment of sound through water. The vibrational aspect of sound through experience and touch provide new ways for spatial perception. It provides as well new paths in novel philosophy of sound and auditory perception. O'Callaghan claims that:

The philosophy of sounds and auditory perception is one emerging area of the philosophy of perception that reaches beyond vision for insights about the nature, objects, contents, and varieties of perception. This entry characterizes critical issues in the philosophy of auditory perception, which bear upon theorizing about perception more generally, and mentions outstanding questions and promising future areas for inquiry in this developing literature. (O'Callaghan, 2009)

## 2.1. Neo-Concretists

The Brazilian neo-concretists did not focus often on sound in their approach to the experience of art, but on relational aspects of objects. They are paramount in order to appreciate the idea of perception and experience through haptic devices. Lygia Clark

encourages the spectator to use his own energy to become aware of himself. This is something very unusual, and it seems to be a specifically Brazilian contribution to art, a kind of kineticism of the body [...] Clark's experiences tend to merge the body's interior and exterior spaces, stressing the direct connection between the body's physical and psychological dimensions. (Osthoff, 2004)

She developed her ideas about participative art, as pointed by Manning:

Clark's relational objects create worlds: this is how their value is felt. These objects – plastic bags filled with breath, nets with stones in them – are of little artistic value in and of themselves. The value of Clark's relational objects is not expressed in their capacity to stand alone as objects. It is felt in the emergent qualities their coupling with bodies in relation brings forth. Their value lies in how the forces of potential express themselves in their relational movement toward the world. (Manning, 2009, p. 218)

Hélio Oiticica pioneered works, which promoted suprasensorial experience. The experience is also far more important than the artwork and the body explores the work through movement and touch:

On view at the Geffen Contemporary at MOCA, Hélio Oiticica and Neville D'Almeida's *Cosmococa – Programa in Progress, CC4 Nocagions* (1973) features a 90-centimeter-deep swimming pool installed amid colored lights and multiple wall projections of John Cage's book *Notations*, a collection of music manuscripts, covered with lines of cocaine. (Ruiz, 2011)

There is no sound being played in Oiticica's piece, the implication resides in the water being an analogy of how sound would be directly perceived by the body like in Max Neuhaus' *Water Whistle* series introduced at section 2.3.

In Neuhaus' *La Barma* from the same section, instead of a swim, the participant takes a stroll into the sound installations, like in *Parangolé*, another piece from Oiticica, which describes metaphorically the idea of movement:

The spectator 'wears' (*veste*) the cape, which is made of layers of coloured cloth that appear to the extent that he moves, running or dancing. The work requires direct corporal participation; beyond covering the body, it requires that the body move, that it dance, in the final analysis. The very 'act of dressing' (*ato de vestir*) oneself in the work already implies a corporal – expressive transmutation of oneself, which is the primordial characteristic of dance, its primary condition. (Da Silva, 2005, p. 213)

In electroacoustic contexts, the cape would be the sound, like 'wearing the sound' and the dance would be the stroll of the audience into sound installations. The sound is integrated through movements in the internal space of the participants.

## 2.2. Maryanne Amacher

The composer Marianne Amacher defined a body of work directly relating to architecture (as structure borne sound), which allows the audience to embody the sound through space by exploring it during her performances. Furthermore, she used physiological properties, where the body is the sonic emitter and receptor. She claims that:

When played at the right sound level, which is quite high and exciting, the tones in this music will cause your ears to act as neurophonic instruments that will seem to be issuing directly from your head. In concert my audiences discover music streaming out from their head, popping out of their ears, growing inside of them and growing out of them, meeting and converging with the tones in the room [...] Tones dance in the immediate space of their body, around them like a sonic wrap, cascade inside ears, and out to space in front of their eyes, mixing and converging with the sound in the room. (Amacher in Ouzounian, 2006, p. 74)

In an interview with Oteri she discusses the phenomenon of otoacoustic<sup>1</sup> emissions, which are properly an embodiment of sound:

I think I do music because I'm trying to understand. The ear-tones that I played for you are referred to as otoacoustic emissions. I heard those very early on when I was beginning to work, so I wanted to create a kind of music where the listener actually has vivid experiences of contributing this other sonic dimension to the music that their ears are making. I've become very involved with situations like that. My approach is more like in science, although music is emotional and everything else. I sit and listen and I hear things, then I discover how I can expand them or increase them and try to understand them. I think of them as perceptual geographies actually. 'Ways of Hearing' – how we hear things far away; how we hear things close.

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<sup>1</sup> 'In 1992 I read a remarkable short article *Ear's Own Sounds May Underline Its Precision – A Tiny Loudspeaker Inside the Ear* (New York Times) by Dr. William E. Brownell, of the John Hopkins University School of Medicine. A leading researcher in "otoacoustic emissions," or OAE, sound which is generated from within the inner ear, Brownell reported dramatically: "Physiologists are still marvelling at the discovery that ears produce sound. It is almost as astonishing as if the eye could produce light or the nose produce odors." And further: "A person who fails to emit sounds from his or her ears in response to a test tone generally turns out to be deaf, or suffering from disease or the influence of certain drugs. Significantly this response disappears a few minutes after death. This, many scientists believe implies that the otoacoustic response is the result of ACTIVE SOUND PRODUCTION, NOT JUST A PASSIVE ECHO OF EXTERNAL SOUND.'" (Amacher in Zorn, 2008, p. 11)

How suddenly in your head there almost is sound, continuing and continuing. It's particularly effective after very strong sections with enormously long fades, but it has to be done in such a way that the sonic shapes are lingering in your mind afterwards. (Amacher in Oteri, 2004)

The embodiment of sound she proposes is a very sensual one. An experience that a listener will hear through his own body, a very personal experience, a response of his ears to a composition, and the response *is* the work.

### 2.3. Max Neuhaus

Consider a sound installation perceived through touch and proprioception, in which the body is not only the interface between the sonic artwork and its perception, but is the medium for the artwork. When sound is integrated inside the body, the body becomes the actual venue for the artwork. The artwork is then solely one's own personal corporeal experience,

Neuhaus went on to pioneer artistic activities outside conventional cultural contexts and began to realize sound works anonymously in public places, developing art forms of his own. Utilizing the sense of sound and people's reactions to it that he acquired after fourteen years as a musician, he began to make sound works that were neither music nor events and coined the term 'sound installation' to describe them. In these works without beginning or end, the sounds were placed in space rather than in time. (Kunsthau Graz, n.d.)

Max Neuhaus created such situations between sound and space, in which the participants embody the works while walking or driving through them.

His *Water Whistle* series the water creates the ideal situation to transmit the sound to the whole body. In discussing the *Water Whistle Series* Neuhaus states:

These events / installations were done in water and mark the beginning of my transition from working in concert halls to making site-specific sound works. The basis for the series was the exploration of the new sound world offered by our different sense of hearing in water [...] The sound sources were hydraulic: a network of hoses fed water through a configuration of whistle-like devices, each enclosed in a reflector. The water pressure in the hoses caused them to flex constantly, reorienting each sound source independently. This formed a shifting sound texture, which varied, according to the listener's position in the pool. (Neuhaus, *Water Whistle Series*, n.d.)



**Figure 1:** Listeners at *Water Whistle III*, St. Paul YMCA, 1972

*La Barma* is a sound installation that involves a walk into the landscape. The interesting part is the perception of the own footsteps of the listener into the work, perceived externally and internally in addition to the piece itself, thus involving an embodiment of sound through touch, movement and listening.



Figure 2: Neuhaus, *La Barma*, 2002

### 3. Achievements; Conclusions

The idea that sound may be perceived through touch, opens new opportunities for the perception of the dynamic relations of sound and space as multimodal perceptions. Primarily, the experience *is* the artwork, as the four artists presented in this paper illustrate. Movement and touch generates proprioception for the measurement of the geometry of external space, when sound is included in this equation, it opens new possibilities for psychoacoustic and listening experiences.

Electroacoustic compositions may trigger physiological reaction to the body as pointed out by Amacher, and therefore experienced directly by the listener as a response of the ear to a sonic vibration, causing an embodied and intimate experience.

The sound installations of Max Neuhaus delineate an experimental way of sound perception such as the participant's own footsteps whilst walking through *La Barma*, or when the body is immersed in water in his *Water Whistle* series.

Considering proprioception opens new possibilities for the composition of works in electroacoustic contexts where the audience is sensually involved by touch in the artworks and the body become the place where the piece appears. The geometry of the external space is measured by a sonic proprioception, allowing new insights for psychoacoustic and (deeper) listening experiences. More fully explored in dance, proprioception is a sense that could enhance perception of sonic arts beyond spatialisation and may even have the potential to redefine spatialisation.

Future research will be in the neuroscience by merging art and science, and in this context research on proprioception and movement may be a possible direction:

Interdisciplinary work with specialists in areas such as perception could be very useful, not only in terms of providing relevant information for composers, but also in terms of furthering our knowledge of how electroacoustic music is experienced (Landy, 2007, p. 81)

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