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Thesis Prep
Bibliographic Essay

Multi-Sensorial Architecture
Seeking Perception Beyond the Visual

Throughout the nineteen and twentieth centuries, the argument for multi-sensory design has been argued as a counter to the issue of ocularcentrism in contemporary perception of architectural spaces. Ocularcentrism, or dominance of the eye has led designers to produce spaces that do not fully utilize the other senses, but rather casts them down as archaic or unpractical. Finnish architect and professor Juhani Pallasmaa states, "modernist design has housed the intellect and the eye, but it has left the body and the other senses, as well as memories and dreams, homeless."[1] By designing for all the senses, architects can create a spatial awareness, clarity, and engagement that can allow the building to move past its functional program and towards an active experiential quality. This study has been framed by concentrating on the visually impaired, who have a more intimate connection to architectural space and the non-visual senses.[2]

The origins of the hegemony or hierarchy of ocular perception traces back to ancient Greek philosophers who considered the eye to be the gods' greatest gift to humanity. During the Renaissance, reverence of the eye became an

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[1] Juhani Pallasmaa, *The Eyes of the Skin: Architecture and the Senses*, 3 ed. (New York: Wiley, 2012), 35

[2] Jasmien Herssens "Haptic Design Research: A Blind Sense of Place," *Katholieke Universiteit Leuven Press* (2011): 1 http://www.aia.org/aiaucmp/groups/aia/documents/pdf/aiab087187.pdf (accessed September 10, 2012).

obsession for designers concentrating on visual imagery to form magnificent spaces based on perspectival representation.[3] Reliance on solely visual components have been reinforced with the invention of computer imaging technology, flattening the natural multi-sensory perception in the design process into "a passive manipulation of space, a retinal journey."[4]

This becomes an issue because, as professors Malnar and Vodvarka observed:

> "One appreciates a place not by its impact on the visual cortex, but by the way in which it sounds, it feels and smells. For instance, the full understanding of wood is often achieved by a perception by its smell and its texture which can be appreciated by both looks and feelings and by the way in which it modulates the acoustics of space."[5]

This argues that visual perception alone is not enough to develop complete spatial awareness, clarity, and engagement. If designers do not take into account full sensory perception, then the spaces being created can become a static rather than an active experience to the occupier. Although humans inherently experience natural and urban environments in a multi-sensory way, architect Jasmien Herssens argues that "few architects consider the haptic, olfactory,

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[3] Juhani Pallasmaa, *The Eyes of the Skin: Architecture and the Senses*, 3 ed. (New York: Wiley, 2012), 18-19

[4] Juhani Pallasmaa, *The Eyes of the Skin: Architecture and the Senses*, 3 ed. (New York: Wiley, 2012), 14

[5] Joy Monice Malnar and Frank Vodvarka, *Sensory Design* (Minneapolis: Univ Of Minnesota Press, 2004), 24

gustatory and auditory senses while designing."[6] This acknowledges that there is a lack of multi-sensory consideration in architectural design, and calls for more exploration with the other senses.

Comprehension of a place relies not only on the sensation, the flow of data received through the sensory organs, but also through perception, the data after it has been processed and interpreted.[7] It is necessary to understand the combination of "sensation" and "perception" to realize that full spatial understanding cannot be achieved using visual cues alone. People should "build up the shape of the world rather than recognizing it as the source, which stares into the face."[8] Ultimately, people become more knowledgeable about spaces through individual experience and engagement. Haptic perception results in the reactions of the skin with our environment resulting in the understanding of tactile, thermal, kinetic and pressure properties. For instance Herseens states that haptic exploration allows individuals to process particular focus points of information throughout a space, where as vision gives a simplistic overall understanding just by turning the head.[9] According to Pallasmaa, one's sense of reality is strengthened and articulated through the constant interaction of the

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[6] Jasmien Herssens "Haptic Design Research: A Blind Sense of Place," *Katholieke Universiteit Leuven Press* (2011): 1 http://www.aia.org/aiaucmp/groups/aia/documents/pdf/aiab087187.pdf (accessed September 10, 2012).
[7] Joy Monice Malnar and Frank Vodvarka, *Sensory Design* (Minneapolis: Univ Of Minnesota Press, 2004), 21
[8] Joy Monice Malnar and Frank Vodvarka, *Sensory Design* (Minneapolis: Univ Of Minnesota Press, 2004), 25
[9] Jasmien Herssens "Haptic Design Research: A Blind Sense of Place," *Katholieke Universiteit Leuven Press* (2011): 2 http://www.aia.org/aiaucmp/groups/aia/documents/pdf/aiab087187.pdf (accessed September 10, 2012).

senses.[10] Humans experience three different kinds of sensory response: involuntary immediate physical response, a response conditioned through prior knowledge of its source, and a remembered sensation, which can reconstruct a past response.[11] This shows a much deeper subconscious understanding of spatial interaction that should be considered when designing spaces.

How does someone without sight or with a visual impairment experience space? Those who are severely visually impaired or totally blind, caused by a disconnect between the eye and the brain, cannot perceive through descriptions of form, volume, and color. They can only perceive volume through sound and touch.[12] Those who are moderately visually impaired, but still considered blind can use large forms and color to help navigate themselves though their environment. About 80% of those considered to be legally blind have some useful vision.[13] In both cases, there is no immediate visual recognition of space, so the visually impaired have to, as nineteen century French philosopher Merleau-Ponty wished, "build up the shape of the world around"[14] them using their remaining senses. This creates a grounded sense of awareness in their environment through piecing together sensory perception. Blindness never improves hearing or haptic ability, but increases the motivation to increase spatial

[10] Juhani Pallasmaa, *The Eyes of the Skin: Architecture and the Senses*, 3 ed. (New York: Wiley, 2012), 44
[11] Joy Monice Malnar and Frank Vodvarka, *Sensory Design* (Minneapolis: Univ Of Minnesota Press, 2004), 21
[12] Fondation de France/ICOM, *Museums Without Barriers: a New Deal for Disabled People* (New York: Routledge, 1992), 87
[13] Elga Joffee, *A Practical Guide to the Ada and Visual Impairment* (New York: Amer Foundation for the Blind, 1999), 11
[14] Joy Monice Malnar and Frank Vodvarka, *Sensory Design* (Minneapolis: Univ Of Minnesota Press, 2004), 25

perception using alternate senses.[15] Defining space through aural and tactile qualities in addition to the visual components will reinforce spatial awareness and ease the stress that the visually impaired endure, while navigating unknown spaces. Without spatial understanding, communication barriers can form, which prevent recognition of essential wayfinding information and limit the abilities of the visually impaired.

The senses can build a connection and an understanding of space, but in order to assure that the visually impaired are able to properly navigate through a building, certain regulations must be put into place. The Americans with Disabilities Act of 1990, has addressed code by setting requirements such as stair tread size and design, detectable warning surfaces, hallway sizes, and restrictions on protruding object height.[16] Using sensory design in conjunction with these elements of code can create inclusively designed environments for those of all visual capabilities. Disability arises when environmental barriers (social, political, physical, or sensory) prevent a person with impairments from functioning in society in the same way as an able-bodied person.[17] Widely adopted standards for clear spatial cues and design define regularity, which dismisses possible uncertainties.

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[15] Barry Blesser and Linda-Ruth Salter, *Spaces Speak, Are You Listening?: Experiencing Aural Architecture* (Cambridge: The MIT Press, 2009), 35

[16] Elga Joffee, *A Practical Guide to the Ada and Visual Impairment* (New York: Amer Foundation for the Blind, 1999), 40

[17] Ungar. "Cognative Mapping: Past Present and Future." *Cognative Mapping Without Visual Experience*, (Edited by R. Kitchin and S. Fredundschuh, 13. London: Routledge, 2000) 11

Hapticity plays a major role in non-visual perception of space, but can also enhance the spatial experience for those who are sighted. Unlike the other senses, haptic body movement enables people to modify and manipulate their environment, creating a more direct engagement with the building and occupier.[18] The physical act of touch creates a mental map for objects in space. Touch breaks down individual components to cognitively recast the whole.[19] Haptic qualities of material can create a spatial sensory construct through physical qualities (compressive, tactile, density) and sensory qualities (color, texture, pattern, and temperature).[20] Kevin Lynch, author of *Image of the City*, describes an image of a place through elements such as landmarks, paths, nodes, edges and boundaries. These principals can be applied to a haptic context by taking into consideration material characteristics and form. For example a tower can be a visual landmark, in the same way the texture on a city square can become a haptic landmark.[21] The Bauhaus encouraged exploration of textural sensitivity and taught by having design students engage with a material repetitively to create a mental pallet for an understanding of material choice.[22] Tactile sensitivity

[18] Jasmien Herssens "Haptic Design Research: A Blind Sense of Place," *Katholieke Universiteit Leuven Press* (2011): 2 http://www.aia.org/aiaucmp/groups/aia/documents/pdf/aiab087187.pdf (accessed September 10, 2012).
[19] Fondation de France/ICOM, *Museums Without Barriers: a New Deal for Disabled People* (New York: Routledge, 1992), 116
[20] Joy Monice Malnar and Frank Vodvarka, *Sensory Design* (Minneapolis: Univ Of Minnesota Press, 2004), 159
[21] Jasmien Herssens "Haptic Design Research: A Blind Sense of Place," *Katholieke Universiteit Leuven Press* (2011): 3 http://www.aia.org/aiaucmp/groups/aia/documents/pdf/aiab087187.pdf (accessed September 10, 2012).
[22] Joy Monice Malnar and Frank Vodvarka, *Sensory Design* (Minneapolis: Univ Of Minnesota Press, 2004), 145

has diminished with the availability use of computer-generated simulations of materiality in modern design software.

Touch can act as an important teaching tool for the visually impaired as well as those who are not visually impaired. It is important that those who are not fully capable of ocular perception become comfortable with tactile exploration at a young age. If they are not taught these sort of techniques then they can feel detached and uncomfortable with the world that surround them, causing social isolation. The way in which the sighted are educated does not include this kind of assessment because they are capable of perceiving architecture and sculpture with eyes alone. For the visually impaired, knowledge of haptic analysis is essential to wayfinding and comprehending their environment. In this respect the blind can teach the sighted to rediscover the volumes, outlines, and surface treatments of a space in a more direct and sensitive way.[23]

The blind can grasp the size and character of a room based off of the sound, echoes, vibration and breeze of the air.[24] These are things the sighted experience on a regular basis, but tend to ignore. “Architects of the past knew a great deal about the effects of sound and worked with it positively. Now there is a growing trend that modern designers know little about sound and are trying to reduce the amount they have to contend with it.”[25] With this, there is a transfer

[23] Fondation de France/ICOM, *Museums Without Barriers: a New Deal for Disabled People* (New York: Routledge, 1992), 133
[24] Fondation de France/ICOM, *Museums Without Barriers: a New Deal for Disabled People* (New York: Routledge, 1992), 87
[25] Joy Monice Malnar and Frank Vodvarka, *Sensory Design* (Minneapolis: Univ Of Minnesota Press, 2004), 140

from developing hi-fi soundscapes (defined and informative sound that produces clarity and understanding of an environment) to lo-fi soundscapes (aural distinctions between spaces are undefined). Now any using standardized sound walls, ACT, and even introducing unnatural environmental sounds like Muzak.[26] Interaction with sound in space engages occupants and develops a sense of spatial volume, scale, and physical orientation. Pallasmaa states that "buildings do not react to our gaze but they do return our movements and sounds." He continues on with an of example of the sound of water dripping in an ancient ruin supporting his belief that "the ear has the capacity to carve a volume into the void of complete darkness."[27] This reactive nature of sound creates an auditory dialogue between man and space. By listening, an occupant can perceive an environment through sensitivity to temporal changes in reflection, refraction, absorption and dispersion.[28] This argument shows a way in which a volume's size and scale can be understood in a non-visual manner. Unlike the static presence of a physical structure aural perception can become dynamic and adaptive through changes in sonic behaviors and sound sources. [29] To sculpt a space with sound successfully, an architect must create continuous informative auditory information, proper reverberation for conversation, and create distinguishable acoustic zones.

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[26] Joy Monice Malnar and Frank Vodvarka, *Sensory Design* (Minneapolis: Univ Of Minnesota Press, 2004), 143

[27] Juhani Pallasmaa, *The Eyes of the Skin: Architecture and the Senses*, 3 ed. (New York: Wiley, 2012), 54

[28] Barry Blesser and Linda-Ruth Salter, *Spaces Speak, Are You Listening?: Experiencing Aural Architecture* (Cambridge: The MIT Press, 2009), 16

[29] Barry Blesser and Linda-Ruth Salter, *Spaces Speak, Are You Listening?: Experiencing Aural Architecture* (Cambridge: The MIT Press, 2009), 24

Although the dominance of the eye has become extremely influential in the modern design of space and experience, there is support to incorporate the other senses. Haptic and auditory sensory perception allows for an engaging dialogue to occur between building and occupant. For the visually impaired, these senses provide crucial information that is understood through an active cognitive process. Since they are more attentive to non-visual senses, the visually impaired can be useful in designing well-built multi-sensorial environments. By pushing past the functional purpose of a building, architects can embrace the poetic nature of design and spatial experience.

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