Shifts in Perception through Tactile Sensations

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Abstract

The bias that vision holds architecture all of the other senses. In Greek antiquity, optical refinements were implemented to create the illusion that a structure was visually perfect. The hegemonic eye, with its ability to absorb information faster than any other sense, has allowed designers to create buildings that “look” good, but might not necessarily “feel” good. Pallasmaa counters that “touch is a parent of our eyes, ears, nose and mouth.” Tactile sensations can affect a person’s social behavior, self-perception, enjoyment and comfort within a building. They not only refer to one’s sense of touch through material contact, but also sensations through atmospheric conditions. Three dimensional space can be deceiving through our lens of vision. However, the tactile and haptic sensations that we experience do not misguide us. It is important to explore how tactility can be leveraged to enhance our perception of space, while diminishing the ocular-centric bias that we hold today.

A thermae bath or natatorium leverages materiality to alter atmospheric and tactile conditions as a means of affecting one’s comfort. This provokes us to ask questions such as; “how does the foot interact with the floor?” and “how does the body react to changes in temperature?” Can edge and surface conditions become altered at multiple scales to potentially change one’s perception of space? Atmospheric conditions within a thermae vary greatly. Some spaces may be hot, while some are cold. Some may be humid while others dry. The advantage of a space like this is that the method by which one “touches” space is in solid, liquid and gas form. These three states of matter provide us with an opportunity to alter certain functions within a building to serve new purposes.

One approach might be to implement materials at different scales to suggest different programmatic functions. Could a material at one scale suggest a boundary condition around the edge of the bath, while a different but similarly scaled material invite one to sit upon it? Could a material at a certain scale provide stability for the foot when walking on a slippery surface, whereas at a different scale that material might serve as a warm entity for one to lay upon, assisting in drying off? The extrapolation of this idea demands that studies be done both at the material and programmatic level. The exploration of a material through different shifts in scale would allow one to experiment and allocate a certain programmatic function to each object being scaled.

The goal of this research is to develop a space that does not rely on one’s sense of sight as a major sensory component. The thermal bath is a program of pure function. It is focused on touch and one’s skin coming into direct contact with very warm or very cold elements. By transmuting materials and their scale, I hope to learn how one’s perception of space could become enhanced, or even completely changed purely through tactile sensations.

Tension between the Senses

Our modern day sense of spatiality and sensory reality has been dominated through our lens of vision. A number of philosophers and theoreticians have become concerned with the hegemony of the eye and the tension it causes between our other senses.[1] David Michael Levin once stated:

'I think it is appropriate to challenge the hegemony of vision in the ocularcentrism of our culture. And I think we need to examine very critically the character of vision that predominates today in our world. We urgently need a diagnosis of the psychosocial pathology of everyday seeing -- and a critical understanding of ourselves, as visionary beings'.[2]

This 'ocularcentrism' in today's culture suppresses the senses that are necessary for our understanding of our spatial existence. Architecture in modernity projects retinal images for the purposes of immediate persuasion instead of creating embodied representations of the world. Flatness of surfaces and materials, uniformity of illumination, as well as the elimination of micro-climatic differences, further reinforce the tiresome and soporific uniformity of experience.[3] Advances in technology have allowed us to become so efficient with our use of conditions within a structure that there is a universal scarcity of sensory experiences within architecture.

Every interaction that one has with the environment employs the use of all of the senses. Pallasmaa stated that 'all the senses including vision, are extensions of the sense of touch: the senses are specializations of the skin, and all sensory experiences are related to tactility.'[4] Touch is the first sense to develop within a person and it is essential to us in our ability to both gather information and when manipulating the environment. If this is the case then why has vision become such a dominant sense in both architecture and Western culture in general? One argument is that vision has the capacity to absorb information at an unbelievably fast pace. Ashley Montagu believes that the 'western consciousness' is starting to realize that other senses are being neglected:

'We in the Western world are beginning to discover our neglected senses. This growing awareness represents something of an overdue insurgency against the painful deprivation of sensory experience we have suffered in our technologized world'.[5]

These neglected senses, specifically our haptic modality of touch, engage and unite us with spaces instead of creating a detachment and controlling view of it. According to Pallasmaa, 'architecture is usually understood as a visual syntax, but it can also be conceived through a sequence of human situations and encounters. Authentic architectural experiences derive from real or ideated bodily confrontations rather than visually observed entities.' [3] These bodily confrontations are only experienced by way of touch. The 'touch' of sight can inform how one views a space from a distance, but in order to truly understand the conditions within a space, the tactile sense needs to be implemented to allow us to have new sensory experiences that are more intimate with the body.

Physiology of Touch

Pallasmaa stated that touch is the 'sensory mode which integrates our experiences of the world and ourselves. It is a parent of our eyes, ears, nose and mouth' [4] This 'sensory mode' can better be described as one where sensations are aroused through the stimulation of receptors in the skin by forces of pressure, warmth, cold and pain.[6] Some attributes associated with touch are roughness, warmth, cold, pressure, size, location and

weight. The localization and density of these sensations guide us in mapping out what parts of the human body respond to external stimuli most in an environment.

Early Eastern civilizations such as China and Japan practiced 'energy methods' of touch that all involved the stimulation of body points to move energy throughout the body. Practitioners had discovered a series of meridians, or sensory channels, within the body (See Figure 1). These channels and systems have corresponding points on the surface of the skin, which can be pressed or punctured to affect the workings of internal organs or enhance pain tolerance.[7] 'Meridians' can be described as roadmaps that allow energy to both enter and exit the body. Acupressure, also known 'shiatsu' or 'finger pressure', employs prolonged pressure by the fingers that move along the meridian lines to reduce stress and slow the heart rate. Reflexology, which is another energy method, involves massaging methods that transmit energy from a point that is touched across a network of nerves to other parts of the body.[7] For example, touching a certain part of the heel affects the lower back. The feet and hands are considered the connection to the rest of the body (See Figure 2). These effects of touch had not previously been scientifically proven until recently.

Much of what the early Eastern cultures practiced and believed in were precursors to modern scientist's research. E.H. Weber, an influential physiologist in Leipzig, developed the 'compass' test which he used to determine the smallest discriminable distance between two points of contact on the skin. The application of these methods led to important findings

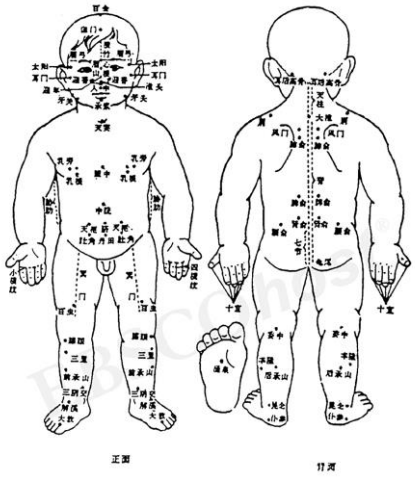

Figure 1 Ancient Chinese drawing of the meridians or sensory channels throughout the body.

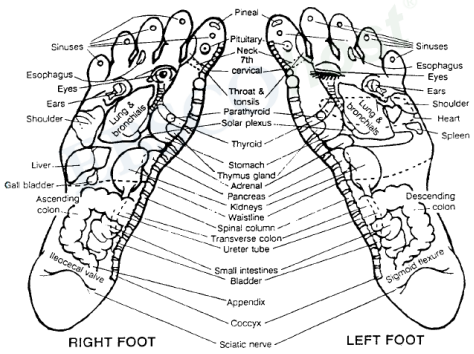

Figure 2 Ancient Chinese drawing of the pressure points on the feet.

regarding the spacial acuity of the skin.[5] It revealed that there was a large variation of spacial acuity throughout the body. This is important when determining which areas of the skin are most sensitive to touch. Those areas that display a particularly high resolution of spacial acuity are the fingertips, face, lips and tongue. Whereas the back, upper arm and leg have a very low sensitivity to touch.

The establishment of 'sensory spots', based off of Weber's research, was discovered by a series of physiologists; Blix, Goldscheider and Donaldson, all in a three year span. A sensory spot is a tiny area of the skin that elicits a sensation when touched by a needle (pain), a hair (pressure), or by the tip of a temperature controlled device (warmth or cold). This technique led to the construction of punctiform maps of the skin based on the four different types of touch.[5]

Among the different types of touch, the body is most sensitive to changes in warmth and cold. It is much more responsive to cold temperatures than warm. When proper care is exercised, the degree of heat that can be applied to the skins surface can exceed 340°F without any adverse effects.[6] This is due to the fact that there are many more cold spots than warm spots on the skin, which enables us to be less sensitive to heat. The body has about 29 times as many cold as warm spots on the surface of the forearm (See figure 3). These spots of interaction affect us at a psychological level when hot and cold is applied to them. The continuous application of moist heat acts as a relaxant to the surface of the body whereas when cold is applied persistently to any part of the body it acts as a very powerful depressant. [6]

Psychology of Touch

Touch is both the first sense to develop and a critical means of information acquisition. It remains the most underappreciated sense in behavioral research despite its importance to both our intrapersonal and interpersonal lives.[8] There are two types of touch that impact us at a psychological level. Those being passive and active touch. Active touch allows us to gather information about a particular object. For example, if one touches a coin, they can measure the depth of its grooves and its surface conditions. Passive touch enables us to

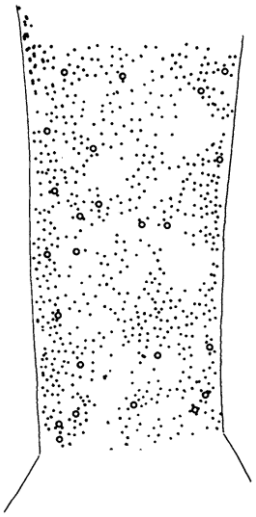

Figure 3 Map of warm and cold spots over an area of the forearm; small dots = cold spots, open circles = warm spots

touch objects from a distance. For instance, if one brushes a coin with a feather. This act would only allow one to feel the grooves through the feather but it would not allow one to explore any of the other valuable characteristics of the object itself.[9]

Similar to Krueger, Ackerman, Nocera and Bargh were interested in the three dimensions of haptic experience. Those being weight, texture and hardness. These three factors have the ability to nonconsciously influence judgements and decisions about unrelated events, situations and objects.[8] It is important to understand why our sense of touch might influence judgements or direct our impressions about objects being touched or untouched. Ackerman, Nocera and Bargh describe what is called the 'scaffold' for the development of conceptual knowledge. Physical-to-mental scaffolding is reflected through the use of shared linguistic descriptors, such as metaphors.[8] This is why a texture being rough or smooth is metaphorically associated with idioms such as; 'having a rough day' and using 'coarse language'.

In a series of experiments, Ackerman, Nocera and Bargh studied the effects of

rough and smooth textures on people and their social coordination. The first experiment employed the use of a rough and soft puzzle that participants were told to solve. The results indicated that the participants that completed the rough puzzle rated the interaction as less coordinated (more difficult and harsh) than did participants who completed the smooth puzzle. Participants that were classified as prosocial/cooperative chose to complete the smooth puzzle 70.6% of the time. Those who were classified as individualistic chose to complete the rough puzzle 75% of the time.[8]

The last two experiments tested haptic experiences with hardness. In one study, participants were told to sit on either a hard or smooth chair while completing a series of tasks. First, they were to negotiate with an 'employee' on the price of a car. It was discovered that those who sat in the hard chairs judged the employee to be more stable and less emotional. The second study dealt with a re-negotiation of prices. It was expected that those who sat in the hard chair would be less willing to change their offer price. This was in fact the case. Among participants who made a second offer, hard chairs indeed produced less change in offer price. This experiment proved that hardness does in fact produce perceptions of strictness, rigidity, and stability, reducing change from one's initial decisions, even when the touch experience is passive in nature.[8] This series of studies suggested that our haptic mindset can be triggered over all areas of the body. It is not just limited to the hands and feet. Could simply changing the texture of a space affect how one interacts with others within it?

Physiology and Psychology of Touch within Architecture

It has been made clear that both the physiological and psychological relationships between tactility and people cause one to experience space in different ways. Can these factors be leveraged to the benefit of our architectural experience? If the human body is most sensitive to external stimuli in the form of hot and cold, then could one start to alter the atmospheric conditions to control how one feels within a space? Phillippe Rahm has experimented with spaces that play with notions of interior atmospheres where one is no longer occupying a surface, but an atmosphere. Can the consideration of texture enable us to create spaces that affect one both physiologically and psychologically through smooth and rough surfaces? At one scale can the surface have the ability to affect how one moves through a space through the tactile experience within their feet? The eastern civilizations spoke of these meridians that allow us to affect certain parts of the body through the stimulation of other parts. Ackerman, Nocera and Bargh contest that one can indeed affect the way one perceives space through changes in hardness and texture. At another scale can hardness and texture be utilized to affect ones mood and how they 'feel' within a space? These shifts of perception through tactile sensations would allow use to experience architecture in entirely new ways.

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