

ATTENTION ARCHITECTURE!

A “Sensthetic” Approach to the Design of Place

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SENSORY IMBALANCE IN THE CONTEXT OF A SIMULTANEOUS WORLD

Our world imploded while we weren't looking: everywhere became right here and all the time became right now. Today, it is possible to project ourselves into a village in Arabia, or recreate the streets of Paris right where we are. Technology has fused the boundaries of space and time as we once knew it and in doing so it has created a sensory imbalance ruled by what Levin (2001) calls the Hegemony of Vision. Our eyes are able to take us to places far beyond where our bodies are. But the body and the eye were not meant to be so completely dissociated. Surely it is unnatural that the sensate nature of the world we live in be abstracted completely into the visual.

According to Kripper & Aiken (2000) the change in the sensory sensibilities can be attributed to the change in speed in society. 'As speed changes perception, our ability to know our senses and even our sensory organs adapts, and our understanding of time evolves accordingly'. It is a change that we need to recognize and reevaluate. Pallasma (2001) sums it up eloquently when he says that 'we live in a perpetual present, flattened by speed and simultaneity, and grasped by the instantaneous perceptions of the eye. The only sense that is fast enough to keep pace with the astounding increase of speed is sight. But the world of sight is threatening to turn into the flat world of the present'. (ibid: 13)

Perceptual theory in mainstream architectural thought has followed the modern bias towards the visual. Various theoreticians have addressed the importance of the other senses, but usually as a supplement to the to the visual. For example, Amos Rapoport (1967) made a case for monotonous places caused by sensory deprivation, and chaotic places, caused by sensory satiation. He

proposed the concept of optimal perceptual rates wherein the sensory environment was 'just right' and suggested that ambiguity in the 'visual' environment could achieve this. He did not, however, extend his ideas to the other senses while acknowledging their importance. His thesis on optimal perceptual rates is therefore incomplete, particularly so since this paper will argue that it is impossible to de-link one sense from another.

My doctoral research subscribes to the philosophy of embodied realism. Embodied realism discounts the idea of a reality that is divided in categories independent of the 'specific properties of human minds, brains, or bodies.' (Lakoff & Johnson, 1999) The core ontological assumption is that we are coupled to the world through our embodied interactions. Mind and body are not separate entities, rather the mind is considered as embodied.

PLACE AND ATTENTION: BEYOND THE CHECKLIST OF SENSES

The human body is limited (or liberated) by the sensation it receives. There have always been debates on how the sensory information received by the body is formed into a cohesive perception. For instance, according to Locke and Hume sensations of themselves, spontaneously and naturally, fall into an order, and become perception, while for Kant this process is determined by the inherent structure of the mind (Durant, 1953). By taking the approach of embodied realism this paper side steps the ongoing debate and concerns itself with how to address the embodied in designed place.

According to Tuan (1977) 'Place is whatever stable object that catches our attention.' (Tuan, 1977) At any

point in time 'x' we are being bombarded by a myriad of stimuli, yet we find a way to focus on what is relevant to us, and to disregard the rest. It is this higher level cognitive process of focusing on relevant sensory stimuli that is known as Attention. (Westen, 1996) As a designer, one must be concerned with (and create) what people will focus on, and what they consider relevant, i.e. what makes a designed environment 'place'. Within this concern one might think that it suffices to consider all the senses independently, and gauge their respective significance in any spatial situation. This is however a gross oversight:

Recent studies in Psychology have used behavioral and neural responses to different sense modalities (vision, audition, touch, olfaction and taste) to demonstrate a certain interdependence: touch can affect the perceived sound, sound can affect the perceived view and so on. A simple illustration is how the sound in a room seems suddenly louder when the lights are switched off. This argues for links between the different modalities (Driver et al., 1998) and a certain plasticity of the brain. (Shimojo et al. 2001) Multi-modal studies also argue for the role of proprioception (position and motion of the body in space) in how attention is divided, and the consequent effect on perception. Thus they make the argument that the senses cannot be considered as a checklist wherein each sense works independently towards the perceptual goal. The Gibsonian view that considers the senses to be active sensation seeking systems makes us reconsider the passive approach of stimuli reaching the body, to the active approach of the body (mind) as a sensation seeking organism that engages extensively with its immediate environment.

The introduction of attention as a key to addressing the multi-sensory and the kinesthetic in the human performance in place seeks to put the visual bias in its embodied context. In a sense the interest in attention is in order to 'emplace the body' and 'embody the eye' in mainstream architectural thought, in a methodical and organized manner. The value of attention is in that it is a higher-level process that organizes the sensory information that we receive. In essence, attention acts as the organizing phenomenon in a simultaneous world. It can therefore help form a grip on the issue of the temporal and simultaneous, in terms of the different senses and movement.

My research addresses the fundamental questions in place-making: What in the designed environment gets, and keeps, the attention of the users? How can this be studied, and understood? As a designer, how can this understanding be used to design places that 'engage' the user?

AN EMERGING AND SHIFTING HIERARCHY OF SENSES

In a biological sense attention is measurable by the neuron movement in the cortex. The modality that is 'attended' can be measured by the area that shows more activity. Position and motion of the body are important in such experiments. The turn of the head, the movement of the eye, the tightening of muscles, the perked ears, are all indicators of paying attention at a micro scale. In the past decade research has focused on how audition, vision and touch are coupled in ways where each attending to one modality affects the other. Not much work has been done experimentally on taste and olfaction, but within audition, vision and touch, a certain hierarchy is seen to emerge. For example, behavioral responses to tactile stimuli in a tactile relevant condition (such as a hot bath) are faster than the responses to auditory stimuli in an auditory relevant condition (such as listening to music). In fact, in the majority of the literature on cross-modal experiments (mapping the physiological and neural activity for two or more senses simultaneously), touch seems to warrant the quickest response, though it does not necessarily solicit the most activity in the brain. This just reinforces an implicit in design: make sure that the room is comfortable (if 'comfort' is the design intent) before you work on the acoustics and visual aesthetics.

While at a basic level certain hierarchies can be considered fundamental, (such as the immediacy of touch), in complex environments where many stimuli occur together, this hierarchy is constantly emerging and reforming itself. Driver et al (1998, 2002) argue for this emerging hierarchy in the 'simultaneous cross-modal interactions in terms of links between different modalities'. The task relevant modality affects other secondary modalities, which attenuate to the spatial location in terms of the relevant modality, but are less significant. In fact, there seems to be a competition for the status of relevant modality, and when the relevant modality changes the hierarchy is reformed. Imagine a theater: when we enter all our modalities are equally assaulted, with perhaps an emphasis on vision. When the show starts, the lights are dimmed and everyone is quiet, allowing us to focus our attention on the stage and 'tune-out' the irrelevant stimuli. If it is a music concert we deliberately close our eyes, allowing audition to become the relevant modality. The concert then has our complete attention, with audition as the most relevant. If the next item is a mime then we refocus on the visual, and the hierarchy has changed again.

The hierarchy of senses is not just biological, but as illustrated above, it is situational. Classen (2001) argues how the hierarchy of senses can also be understood as

sensory orders that differ across cultures, and that to understand a culture's sensory model it is not only the dominant sense that must be considered but the interplay of all the senses. It seems that interdependent biological, situational and cultural factors affect the hierarchy of senses that constantly forms and reforms itself. As designers when we think of place as performed, the emerging hierarchy of senses becomes almost a choreography that we must be tuned into. If the design can anticipate and enhance these choreographies, then the design is a success.

LOCALIZATION AND CHANGE

A central issue in attention studies is location. Experiments carried out by Driver and Spencer (1998) show that stimulus localization improves within endogenously (voluntarily) attended regions. In other words, if I am expecting to 'see' something, more of my attention is focused on vision, and less on audition. However, the attention in each modality is focused towards the same location. If I am expecting to see a bus, for example, then I am focusing on sight, more than sound. At the same time I expect the sound to come from the same location that I see the bus. The expected location (visually) is mapped with the sensed location (auditorally). The brain localizes in a cross-sensory manner. And it strives to localize. This is further substantiated by the observation by Driver (1998) that though endogenous (voluntary) attention can be split spatially (directed in opposite directions for say audio and visual), this is less efficient than directing attention to a common stimulus cross-modally. This phenomenon can also be seen between vision, touch, and proprioceptive information. (Driver et al, 1998) In fact, the tendency to localize is so strong that it causes perceptual illusions; for example, in theaters, we perceive the sound to be coming from the screen in front, while in reality the speakers are often behind us.

In designing complex environments this insight is valuable. If we design a place where the sensory input is fragmented then the user will be unable to form a cohesive image and this might reduce the impact. There are many examples of places today where there is almost a conscious effort towards de-localization. In some bars, for example, one is accustomed to watching images on a screen that are dissociated from the music that is playing, which in turn is dissociated from the staged lights and the shows up front; there is almost an effort to create 'fleeting' impressions rather than lasting memories. Our tendency is to localize all the sensory input we get into a cohesive image than can be

attended to; it is up to the designer to use this insight for desired impact.

The most critical issue in attention is that of change. We automatically respond to a change in our sensory environment, whether this is because of a change in our own position or movement, or in the sensory stimulation we are receiving from the external environment. This re-orientation ties into the hierarchy of senses, and the effort to localize, as discussed above. Thus changes act as triggers towards the organization of attention. Once triggered the dynamic process where the different modalities compete and reorganize into one fused perception can almost be thought of as negotiations. So, in fact, the senses don't simply add together, like a checklist, rather they interact with each other and act as 'negotiated additives' (where each factor impacts the other, triggered by some other factors in turn).

To summarize, the simplicity of living in a world that seems continuous and seamless comes from a fluid interaction between different plastic modalities, filtered through different intentions. A certain organization of the attentions across modalities occurs, wherein a relevant modality becomes distinct from an irrelevant modality, by being more significant. At the same time, the modalities strive towards localization in external space and thus the change in the primary modality effects a change in the secondary modalities. This organization is dynamic, interdependent, and constantly modified by the task at hand, and position of the body in space. Furthermore, the senses are not simply as receivers of various sensations, but active sensation seeking mechanisms for looking, listening, touching and so on. The incidence of stimuli is not as critical as the interaction with stimuli, a notion significant to place-design. A graphic illustration of the organization process, as interpreted at this stage of the literature survey, is as follows:

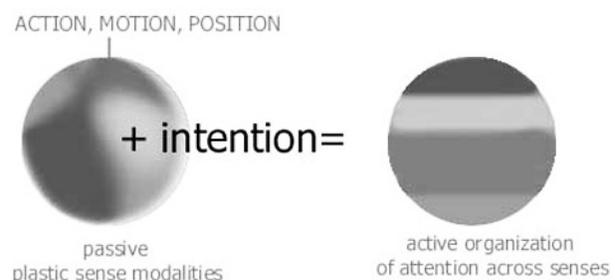


Fig. 1. Proposed Model for the Organization of Attention.

This is still an over-simplified illustration and the term intention itself is a generalization. In any experience it is difficult to pick a certain point (in time of place) to

explain a process that is only part of a larger system, and perception of which is effected by prior experiences. However, understanding the tendency of the brain to tend to fuse different sensory inputs into one cohesive image (localize), and to process some sensations more actively than others (work in hierarchies), depending on the task at hand, can be the starting point of a dynamic approach to the design of experiential places.

THE 'SENSTHETIC' OF THE SIMULTANEOUS

The premise of the 'Sensthetic' is that it is the simultaneous inter-connections and inter-dependence between the different senses (sensory) and the position and movement of the body (kinesthetic) that determine what in a Place can 'appropriately' seek, and retain, the attention of the users. To focus on the simultaneous is tricky, because in studying it, or creating it, we automatically give it a sequential dimension. The smaller, but trickier, question in research is how this simultaneity, these concurrent interconnections, these multi-perceptives, that both philosophers and psychologists adhere to, can be studied in a real-life complex environments, such that we can we can incorporate it intuitively in Design.

In my doctoral research I seek to understand the experience of the environment, in terms of the 'interdependence' between the body's different sensory modalities, its position in space, its movement through place, (and the factors that affect this interdependence), and to encapsulate this understanding in a new term in design and perception: 'SENSTHETIC'. The aim of the research is to develop a method to address the sensthetic in design, in terms of the above variables. While it is impossible to have an exhaustive understanding of all the variables, the focus will be on the 'connections', and how they can be studied, communicated, and eventually, designed.

METHOD AND PRELIMINARY MODEL FOR PLACE-STUDY

The nature of my research is cross-disciplinary: it will draw from familiar theory in different perception-oriented fields, synthesize the information, and extend it to a new domain of application: Designed Environments. The research will be carried out in three phases: phase 1 will study the body (in the environment), and the designed environment (containing the body), and develop an analytical model to address the simultaneity of the perceptual processes in the study of place. Phase

II will study the interdependence between the sensations, position and pace of the body within a controlled environment, and Phase III will involve the extension of the theories and observations to a real-life scenario by undertaking detailed case-studies.

Phase I (ongoing)

Staying within the embodied paradigm the first phase the research is founded on factors and methods, which address the research objectives. Much of the data that emerges from literature, particularly psychology, is in terms of causal relationships established by experiments in controlled conditions. This gives us an idea of the factors in question, but not a method that addresses these factors. On the other hand, concepts such as the Optic Array coined by Gibson (referring to the structure created by surfaces, textures, and contours of the environment as one moves) (Goldstein, 2002: 283) can be used, or adapted, as a method. Gibson's theory of considering the senses as active sensation seeking mechanisms provides an approach that can be adopted to the study of place in terms of the factors it addresses, and the methods with which it does so.

The understanding of interdependent and interconnected phenomena from the literature substantiates the premise, and is developed into an analytical model for the study of place. Such a model must be tangible, in terms of methods, and media that can provide the material that the method is applied to. Considering the simultaneity of the experience of place, it is important to anchor the model in an observable phenomena. User movement through place is observable. How fast a person moves, where he stops, where he turns, where he slows down, are all indicators of what he/she is paying attention to. As discussed in the beginning of this paper, movement also impacts the hierarchy of senses. Today as 3d-walkthroughs and virtual simulations get common, there is more research on the nature of movement that has been introduced into the field of design. An interesting notion in the analysis of movement is the Gibsonian notion of 'Flowfields' (Gibson, 1967) that refers to the continuous change of position (observer movement) generating characteristic patterns of image motion, that should directly indicate observer motion and thus can be used for control of locomotion.

The notion of the flowfields has been used in various simulation studies. While Gibson's flowfields are a good start point to understand the 'flow' of movement in a place, it is equally important to find a means to understand its structure. Scholars such as Thiel (1960) and Arnheim (197..) have often discussed the structure of visual movement in terms of rhythms. In the tempo-

USER MOVES THROUGH PLACE (OBSERVATION AND ANALYSIS BY RESEARCHER)	Method (Analysis) The Optic Array by Gibson (1967) (created by surfaces, textures, and contours of the environment as one moves) interpreted as a tool for the visual analysis of designed environments Interpretation of the Optic array in terms of a tonotopic (audio) and somatotopic (tactile) array	Medium (Material) Time-based media such as Video. (post-production effects such as speeding up some segments and slowing down segments, letting the video concentrate on the arrays) Time-based media such as discursive audio and the use of tactile maps that are experienced by moving the hand but cannot be scanned visually at one glance.		
	Flow of movement			
	The structure of rhythm used to develop and analytical model for movement based on Component parts, Units, the take-off point, Pauses, Density, and Stress points.	Maps for articulating the visual, audio and tactile arrays that articulate the stress points (pauses, stops, changes) and identifies the sensual loci Layering of the Articulated Arrays	Pacegraph: map of the pace at which people use a certain place.	
	Structure and rendition of movement			
USER REACTS TO PLACE (INTERACTION AND INTERPRETATION):	Mapping Open-ended Interviews Survey			
	Quality of Movement			
Table 1: PRELIMINARY MODEL FOR LAYERED MULTI-SENSORIAL ANALYSIS OF MOVEMENT THROUGH PLACE				

ral arts such as dance and music, rhythm acts as a governing factor, be it in terms of sounds, beats, tones, or actual physical movement. The understanding of rhythm, connotes a certain periodicity or pattern, which can make the term an organizational concern as well.

Using the notion of Flowfields and Rhythms, a certain format for the analysis of movement of the user through place has been developed, as illustrated in Table 1.

Phase II (in the planning stage)

The research, in its next phase, seeks to validate the concept of the Sensthetic with a linear approach to the factors within a controlled environment. The installation will focus on the sense of touch, audition and vision. A group of volunteers will be used, within the university, to react to the installation. The purpose of the installation will be to 'design' a mini-environment and 'research' the interdependence between the different sensations within this environment, where experiences are created by modulating changes in the inci-

dence of audition, vision and touch. The installation will have one thematic concept: 'relaxation', and will be anchored on body movement and posture. The research will be linear in the sense that within the broad concept, the sensations that the volunteers experience will vary from a unimodal emphasis (audio, visual or tactile) to a bimodal emphasis (audio-visual, audio-tactile, and visuo-tactile), to finally a multi-modal emphasis with the incidence of all three sensation. In keeping with the theory of localization the incidence of the stimuli introduced will be combative or supportive. In the first case one sense (e.g. audition) will combat another (e.g. vision) in terms of its location and nature (e.g.: if the sound comes from the right the object that the sound is associated with will be placed the left, or the sound will be fundamentally different in nature from the object seen). In the second case the incident stimuli will support each other and be harmonious in terms of location and nature.

The theoretical knowledge on attention and the evolved sensesthetic considerations will be used to design this environment. The user response will be collected in terms of surveys (using statistical methods), but the greater focus will be on select in-depth interviews, which will allow the analysis of dense qualitative data by using content analysis.

Phase III (in the planning stage)

While phase II is concerned with designing partly simulated, controlled, environments to refine a concept and investigate it further, phase III must extend the investigation to existing environments that are uncontrolled and simultaneous. In the last phase of the study two in-depth case studies, again within the theme of relaxation, will be undertaken. According to Robert Yin, 'a case study is an empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries within phenomenon and context are not clearly evident.' (Groat, 2002: 346) In seeking a designed environment that depends heavily on movement, within a real-life context, with the intent of relaxation, two highly sensual riverside environments have been identified as potential case-studies.

The Ghats of Benaras, an unplanned development along the Ganges river in India, are lined with temples and considered a holy site. The pealing of temple bells, the smell of incense, the intense heat or cold, and the ritual of immersing in the river itself make the Benaras Ghats a veritable assault on the senses. In contrast the Riverwalk in San Antonio is a more contained experience of leisure; a temperate multi-sensory environment aimed to make the users comfortable. A planned

development, the intention of the riverwalk is leisure for no higher purpose. Both these complex environments are examples of what Hiss (1990) would term 'simultaneous perception'

The first part of the case study will involve detailed observation of the chosen place, using the place-study model made robust in successive iterations. The second part of the study will involve in-depth interviews with people using the street. The users will be given a recording device to talk discursively into as they experience the environment. They will be asked to fill a survey similar to the one in the installation, and then participate in an open-ended interview. (Lincoln & Guba, 1985) The intent will be to find out what factors in the environment caught their attention, and engaged them, the nature of the engagement, and some of the cognitive variables, that affected this engagement The behaviour patterns of the users in both the cases will be observed, and mapped in sketches and notes. A detailed content analysis of the data collected from the interviews will be undertaken to validate, and critique, the sensesthetic premise and the analytical model. Concerns about how the senses can be mapped, how simultaneity can be recorded, etc. will be guided by sources on information design, like Tufte. (1990) Finally, the concept of Sensesthetic (as theory, approach, method, media, and an overall set of concerns) will be synthesized to add to the existing design vocabulary, allowing it to address complex, interdependent and simultaneous perceptual issues in environment design.

The sensesthetic research is still in its nascent stage, but once developed it can be used to find design solutions in fields such as healthcare, recreation and leisure, and simulation. It aims to provide a design approach that can incorporate the shifts in attention that occur when architecture becomes place. Any design field that is involved with the immersion of the human body can benefit from this research. My interest, as an architect, is to use this research for the design of places that can engage their users in an optimal manner by using a fine knowledge of the manner in which the body senses, positions and moves in a designed environment, and how this can be choreographed given the desired purpose of the place.

REFERENCES

- Arnheim, Rudolf. *The Dynamics of Architectural Form: based on 1975 Mary Duke Biddle Lectures at the Cooper Union, Berkeley.* (Chicago: University of Chicago Press, 1977).
- Classen, Constance. *Worlds of sense : exploring the senses in history and across cultures.* (New York: Routledge, 1993).

- Krippers, D and Aiken D. *I am a Bullet: Scenes from an Accelerating Culture*. (New York: Crown Publishers, 2000).
- Driver, J and Spence, C. Crossmodal Attention. *Current Opinion in Neurobiology* 8. (1998). 245-253.
- Driver, J and Spence, C. Attention and Crossmodal Construction of Space. *Trends in Cognitive Science* 2(7) (1998): 254-261.
- Durant, Will. *The Story of Philosophy*. (Pocket Books, 1953).
- Gibson, J.J. *Senses considered as Perceptual Systems*. (Houghton Mifflin Company, 1967).
- Goldstein, E.B. *Sensation and Perception* (sixth edition). (University of Pittsburg, 2002).
- Groat, L., Wang, D. *Architectural Research Methods*. (John Wiley & Sons Inc, 2002).
- Levin, D.M. *Modernity and the Hegemony of Vision*. (University of California Press, 1993).
- Hiss, Tony. *The Experience of Place*. Vintage Books; Reprint edition, October 1991.
- Lakoff J. *Philosophy in the Flesh: The Embodied Mind & Its Challenge to Western Thought*. (New York: Basic Books, 1999).
- Lincoln YS, Guba EG. *Naturalistic Inquiry*. (Newbury Park, CA: Sage Publications, Inc, 1985).
- Pallasma, Juhani. *Architecture of the Skin*. (London, Polemic Series, Academy Editions: 1996).
- Rapaport, Amos, and Kantor, Robert E. Complexity and Ambiguity in Environmental design. *Journal of the American Institute of Planners* 33(3) (1967): 210-221.
- Shedroff, Nathan. *Experience Design*. (Indianapolis: New Riders, 2001)
- Shimojo, S., Shams, L. Sensory modalities are not separate modalities: plasticity and interactions. *Current Opinion in Neurobiology*, 11(2001): 505-509.
- Thiel, Philip. *Visual Awareness and Design*. Seattle: (University of Washington Press, Seattle, 1981).
- Tuan, Yi-Fu. *Space And Place*. (University of Minnesota Press, Minnesota, 1977).
- Tufte, E.R. *Envisioning Information*. (Graphics Press, 1990).
- Westen, Drew. *Psychology: Mind, Brain and Culture*. (John Wiley and Sons, 1996).