



## Perceptual experience and its role in architectural design decision making

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**Abstract** Over-emphasis by architectural design on its conceptual dimension stems from reliance on what Juhani Pallasmaa's terms the Cartesian "retinal gaze," a way of seeing that preferences representations over sensory experience that alienate us from our environment due to the distancing of mental structures. Pallasmaa's descriptions of architectural experience instead seek emphasis on the active, multi-sensory engagement within our perception due to movement in and around buildings. This position has consonance with recently emerging models of perception (J.J. Gibson, Merleau-Ponty, Noe) that operate precisely because of the action and movement of our bodies in space – the very act of seeing, for example, is made possible due to our movement in space imparting variable reflectance from the structure of the physical world onto our eyes, thus allowing for differentiation of light patterns over time. We orient and position ourselves due to this movement and it defines the world thus. A moving body enables greater presence and openness to the world than the static moment of perception necessary to the mental representations necessary to the long trail of models of perception held over from Renaissance thinking. Yet the predominant operations of the discipline of architectural design in the present day continue to favor working in visual abstractions apart from reality, attempting to predict the experiential disposition of actual reality. How can working with these illusory representations give a clear picture of ourselves as beings-in-the-world? The problem of the designed environment is thus tied to the problem of perception.

Relationships between perceiver and environment are constructed within human perception and structure how we come to know the environment. Architectural design is highly influenced by designers' knowledge of how they think perception works, which, in turn, has consequences for design decision making. Unwittingly held assumptions about a particular model of perception cause design decisions that configure the environment consistently only with particular modes of perception. Assumptions like "mind/body dualism" and "sense-data" impact perceptual experience in everyday life. If uninspected, these conceptual models become underlying determinants of aesthetic decision making that prefigure other design determinants (i.e., materiality; detailing; parametric determinants; and finally, apprehension of meaning and substance). I believe conscious understanding of perception enables a designer to distinguish issues such as real from imagery within a more purposeful design methodology that sustains unanimity of both experience and imagination. Objectives of this paper focus on the relevance of a working understanding of models of human perception as underlying actors on cognitive frameworks for design thinking. Investigation of the foreknowledge of theories of perception on aesthetic preferences is supported by discussion of designed environments in which comprehension of perception has played a role in forming aesthetic decisions.

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This paper suggests a theoretical relationship between visual perception, design thinking, and material presences that is under regarded in the production of the architectural environment. Most human beings unknowingly operate in the world based on unexplored and simplified sets of assumptions about how visual perception correlates with human activity. As operational patterns for design activity, these sets of assumptions unwittingly form a basis for design decision making that determine such aspects as the shape, color, material surface, configuration, and detail of architecture, ultimately affecting how it is apprehended in perception. It can be reasonably concluded that most present day designers have not derived these assumptions from any elaborate point of view about perception. To the contrary, basic positions have originated in an over-simplified, philosophically dualistic model of visual perception that separates mind from matter through the mediation of imagery. The resultant separation of abstract meaning from material constructs limitations for meaningful interactions with the designed environment. These limitations are specified by an underlying model of visual perception, especially with respect to the epistemological implications of its philosophical, psychological, and scientific lineage. Models of relations to the world through perception are of ancient philosophical origin and have transformed over time into various psychological and scientific models. This paper will outline two proliferating models of perception and elucidate a position that a designer's comprehension of models of perception plays a significant but overlooked role in the making of architectural design decisions.

### **Models of Visual Perception from Mind/Body Dualism**

Contemporary philosophy and psychology both model the study of visual perception following two main currents: those positing that *abstract mechanisms* are the primary source of experience versus those proposing that experience is *concretely based* in perceptual acts. Although both models characterize human conduct as being of relations between an inner state and an outer world, their distinctions rest on how this is raised in consciousness and resolved in experience, with implications for the verity of the external world. One model of perception encourages an abstract visuality, separating the generation of meaning away from any concrete physical origin into a realm of singularly mental conceptualizations, often called *imagery*, that are distanced from and encodements for, their origins in the actual physical world. A second model of perception encourages a visuality inextricably bound up in a bodily origin, in the directly experiential, in materiality, and ultimately, for architecture, in the tangibility of actual experience.

The philosophical works of Renaissance philosopher Rene Descartes originate the frame of arguments for models of visual perception dependent upon abstraction. Descartes' writings recast the Platonic distinctions between the sensory world and the "world of forms" into a dualism of body and mind, wherein thought was held to be privileged over both world and experience. Descartes framed the act of abstraction itself as a mechanism of separation between an inner world of thought and an outer physical world. Descartes' claim that nothing could be known for certain but one's own thoughts effectively reduced one's *being* to "thinking substance," the *cogito*. The world of material things, despite its existence, for Descartes, was unknowable, except through the mediation of abstract constructs or images, or through objectivizing narratives. (Descartes, 1637)

Descartes' dualistic characterization of the visual system crystallized Renaissance era philosophy that effectively caused future models of the visual process to be considered in terms of a mechanistic optical system that focused an image on a receptive retina for subsequent interpretation by an interior thinking being. (Descartes, 1637) The chain of causality from matter to mind that was interred on accounts of perception after Descartes obtained an inscrutable threshold between interiority and exteriority. Optical imagery of the outer world focused on the retinal sense organ was where the outer world ended and where the inner world began. The retinal images was considered a meaningless profusion of light, a the inner world received only encoded transformations into mechanisms of mind. Mind as the source of visual perception thus became a

*presupposition* of mind/body dualism and justified what Descartes described as the delusory nature of sensory experience.

Descartes dualistic view of perceptual experience is illustrated within a single revealing drawing within his work, *A Discourse Concerning the Method of Rightly Directing One's Reason*. (Descartes, 1637) Following prior anatomical studies of the eyeball, Descartes' drawing contains an accurately detailed representation of the physiology of a single eyeball with detailed optical construction of light reaching the eye from an infinite exteriority of illuminated surfaces, the specific "points" of which occur for Descartes on a coordinate system of relations. The eyeball is shown as a disembodied object floating in a grey field, isolated from any ecological factors, such as relation to another eye or placement in a head. It is a mechanism, separated from the external world, floating in the mysterious grey *interiority* of the body. The optics of the eye represent a strict threshold between inside and outside with a "retinal image" presenting itself to that which happens *inside* the body. A picture of a man is drawn looking at the image on the backside of the eyeball. This man symbolizes the idea of an interpreting mind within the interiority of body, called upon to give meaning to the points of light making up retinal images. An internal analogous human-form is called, *homunculus*, meaning literally, "little man." The interiority of Descartes' *cogito* is preserved in the symbolic separation of the homunculus from sensation.

Descartes' drawing of retinal image formation with an homuncular observer conveys a simplified yet highly symbolic, dualistic, and powerfully clean model of visual perception consisting of three compelling components: 1) external physical *things* in the medium of light, 2) an optical eye producing a retinal image, and 3) a mind, or soul, acting as interpreter of retinal images. This *dualistic model of visual perception* presupposes that the eye delivers a meaningless profusion of light on the retina, the sense pattern of which we become conscious of only in terms of interpretive reconstruction. Descartes' model advocates a *primacy of the image* in an absolute separation from exteriority where interiority defines only itself and only on its own terms, abstractly and necessarily disconnected from any actual exterior.

In the centuries of investigation after Descartes', the model of visual perception represented by this drawing became an unrivaled paradigm for an epistemological separation of interior from exterior and of subject from object. The sequence of occurrences representing Cartesian dualistic visual perception are commonly delivered in elementary level biological science courses via the easy rhetoric of simple diagrams. Extrapolations of Descartes' model have also been the preferred model for scientific inquiry, with theories and experiments attempting to explain perception at the cellular scale of the nervous impulse, typically to discern how mere light energy, transformed into electro-chemical reactions, can result in a conscious grasp of one's physical surroundings. (Atkinson & Hilliard, 2009) As a simplistic paradigm, mind/body dualism has also formed the underpinnings of the production and reception of both artistic and non-artistic objects, as well as the production and experience of the designed environment. For example, Modernist production, and Post-Modern following it, has effectively dematerialized the surfaces of the physical world in favor of abstract meanings derived from the priority given in their image and interpretation over their direct experience. If a building is a "duck," as Robert Venturi would have it, it is indirectly referencing something other than its existence as a building, calling then for the experience of its very surfaces to be meaningless until rendered so by mental interpretation. By extension, the world is in-itself not of intrinsic meaning until Descartes' *cogito* has it so. The contentions of this model of perception offer great difficulties for design decision making that intends persistently direct and measurable judgments of physical dimension onto the actual world. No matter how well meaning, design cannot pre-figure the mental interpretations of individual observers. To do so would require omniscient powers over all possible meanings, whether common or cultural, historical or memorable, and would result in inevitable reductions and abstractions, which is what Venturi's "duck" asks of design.

### **An Embodied Model of Visual Perception**

Contrasting with mind/body dualism is model of visual perception that addresses the question of relationship between interiority and exteriority in experience. In acknowledging the substantiating effect of our *embodiment* on the nature of experience, unifying body and mind in perception is succinctly characterized in the following remarks from an anatomy textbook: "... to say that one 'is a soul' is not the same as saying that one is a body. One does not live within the body or in a detached world of spirit outside the functions of the organism. Life is the functioning of what is called body." (Frohse, Brodel, Schlossberg 1942) Despite Descartes' detailed picture of the body as a mechanism, mechanical activity does not give rise to living purpose. Rectifying these oppositions point to life having function and meaning derived from its own concrete nature within the world, as lived, in and through body. An embodied sentient being operates in the holistic context of the physicality of intentional activities in and about the material world and in so doing supports the development of meaningfulness necessarily inclusive of a concrete physicality. An *embodied model of visual perception* necessarily includes the concrete by distinguishing the realm of material things in terms of their relations to the purposefulness of our actions upon them. Psychological scientist, James J. Gibson's *ecological approach to visual perception* posits that we experience our surroundings directly and not through mediating stages of abstract processing by the brain or any interior state. Against a dualistic model of visual perception he described as a pictorial mode of perception where apprehension occurs "second hand," Gibson characterized what he believed is a "natural" and "first hand" perception," where "eyes evolved so as to see the world, not a picture," in an ecological relation of a sentient organism to its visual environment. (Gibson, 1967) In abandoning a retinal image model of perception, Gibson redefined the nature of the visual system around the central assumption that the physical environment is physically structured in relation to an observer and forms the *ground* against which an observer lives and moves. (Gibson, 1979, 246) Gibson characterized visual perception as operating due to and within the medium of light as a function of light reflected from material surfaces with respect to the eye position of a sentient being. The *structure* that exists in the textures, pigmentations, and configurations and arrangements of the surfaces of the physical surroundings in turn *structures the light* which reaches the eye position of an observer in an "*ambient optic array*." (Gibson, 1979, 65-92) Environmental information "*is given in the optic array*" and is "*picked up*" by the visual system and is not constructed by mind out of retinal sense-data. Observer movement, then, gives rise to stability or change in the ambient optical array to expose "invariant" aspects of the optical structure that are directly reflected from their environmental sources as an observer changes position. This optical information thus affords direct perception of the environment without mental interpretation of sensory stimulus and directly "specifies" the material features of the environment (e.g., surface quality, position, size, shape, texture) for the perceiver as well as the position and size of the observer relative to the environment. Properties such as size constancy, spatial orientation, and distance occur without "visual thinking". (Gibson, 1979, 65-92) Thus, perception directly confers our being within the surroundings, in constant univocal relation to its environmental character.

Gibson's perspective resembles the phenomenological philosophy of Maurice Merleau-Ponty's "theory of the body," an approach that characterizes our embodiment as endowing our consciousness with a physical intersubjectivity within the actual occurrence of the perceptual act itself. Merleau-Ponty held that, through embodiment, the act of perception is the locus of orientation toward the world, characterized as the "corporeal scheme." Merleau-Ponty posits that, as an embodied consciousness, we are always already in the world due to our corporeal scheme situating itself according to the immediacy of engagement in "tasks-at-hand" as embedded in the particulars of the physical surroundings. As a being, we are not hermetically removed from concrete experience of the world and body. Rather, body IS the world as "inhabited" and lived in space. Body is "body-subject," the locus of our innate and acquired capacities and orientation toward the world in an on-going discovery of relations. The world is not "objective," rather my

embodied experience is *that through which there comes to be a world* for me. (Merleau-Ponty, 1945)

Gibson's and Merleau-Ponty's positions model perception not as the mind's view of the world but as an innate awareness of operating physically through embodiment *within* the world. Where Cartesian models deny the world in favor of its representation to mind, the world in an embodied model, exists precisely because of body's presence in and operating in the world. Embodied models of visual perception imply that the perception of the material existence of things is *innately meaningful* because of particular characteristics of that very world, rather than perception being meaningless until interpreted in mind. This meaning is thus directly bound into embodiment through direct perceptual description of the extant spatial materiality of our surroundings.

### **Design Decisions Effected by Models of Visual Perception**

An architectural designer unknowingly acting from a dualistic model of visual perception embrace the idea of *image and interpretation* as the primary basis of perceptual apprehension and predisposes an architecture prejudiced to a particular configuration, or *visuality*, dependent upon reception primarily through abstracted mental operations such as rationality, signification, codification, association, etc. Meaningfulness is developed from these operations only through the acceptance of a subjective context at the expense of immediate experience, resulting in an architecture of indirect references or allusions to externalities other than the actual presence of the architecture itself. As assemblage of out rightly readable cues functioning for superficial, pictorial apprehension, this is an architecture of superficial, "*easy symbolism*." (Judd, 1989, 187) Interpreting pictorial cues in the world is held out as a "language" of signs that develop meaning not in the perceptual act but in a necessary deferral to later interpretation. (Lobell, 1988, 206) Architecture configured for reception as an interpretation of signs requires a mental "reading" of these signs in its visual structure without regard, or even disregard for, its actual physical substance. The attendant cultural narrative is required to be a part of a perceiver's internal knowledge base as the chief measure of any meaningfulness because an individual's perceptual relation to his or her immediate surroundings through embodiment has been excluded as inconsequential and insignificant to experience. Such is the province of architecture following a Cartesian model of perception.

Resisting direct perception with reliance on interpretation can muddle experience. For example, the physicality of Charles Moore's New Orleans's Piazza de Italia lacks correspondence with its intended imagery. Intentional reference to the mass and solidity of Roman buildings portends a similar requirement of materials and workmanship, which Moore's design failed to accomplish. Correspondence of the physicality of the Piazza de Italia with its imagery in experience requires an abstract "reading" – leaving only speculative interpretation that its superficial painted surfaces intend a narrative commentary on the part of the designer pointing out the inauthenticity of an imitation Rome. The subjective interpretation required of the lacking of direct architectural meaning in experience obfuscates direct apprehension in perception as its far less substantial replacement. Almost any Post-Modern architecture fits this description.

The structure of any system of architectural knowledge assumes an underlying epistemological position, especially regarding the nature of visual perception as the locus of relation between interiority and exteriority. I contend that most design activity occurs outside any awareness of a particular attitude toward the question of perception. The preponderance of image-heavy buildings finds the question of perception more commonly addressed by architects in blind acceptance of the value of architecture measured simply as a cultural artifact, resulting in a building's "meaningfulness" being located primarily within culturally determined symbolism. There is no denying that our minds and their concomitant abstract structures exist. Symbolism, whatever the source, is an intrinsic aspect of experience. However, the experience of symbolic and representational meanings designed into the built environment in disassociation from any concrete materiality threatens to loosen our apprehension of our own physicality and move our

lives into realms of abstraction contrary to our well-being. What is demanded of architecture by dualistic perceptual models cannot be physically realized without continued denial of Nature.

In contrast with dualistic models, a model of visual perception generated from the perspective of embodiment is bound to the concreteness of the world. Through embodiment, mind-body is unified within a moment-to-moment specificity of the material surroundings, predisposing an architecture meaningful within a contingent materiality that substantiates experience in the moment-to-moment judgments of our actions rather than from externalities. Architectural meaningfulness has traditionally been derived from abstract conventions such as canons, rationality, signification, and through a mirroring of society's power structures. Inherent in these abstract structures is an obfuscation of the primary situation that is each embodied individual. As abstraction increases in stature, the body, our embodiment - our Nature - occupies a diminished position in inverse relation until we, as individuals, can identify with only those minuscule aspects of the actual world that may have slipped through the filter of cultural convention. Shifting measures of value toward the cultural imposes on the individual being a sense of diminished connectedness with the actuality of the world, a meaning more profound than the apprehension of represented meanings. An element of the concrete must exist within perception for architecture to become viably affirmed as "real," in experience, that is, for its representational symbolism to become substantive. Within the formation of our Being, the primacy of perception is *always already* established as a link between an individual observer and his or her environment in the concreteness of the world. When that world is configured in such a way as to demand abstracted apprehension apart from its concreteness, our living moment-to-moment experience becomes disembodied and diminished in fullness. Likewise, a world devoid of abstractions would provoke only an automatic, bodily response and would allow no conceptual or reflective connectedness. By achieving a more tenable relatedness in the direct participation achieved through an embodied perceptual model, one can be in possession of the physical surroundings within a *living wholeness* of reciprocal, creative relations between the perceiver and the world. Against the shifting values imposed by an underlying dualistic approach, architecture designed to afford the full participation of human actions addresses its perceptual primacy and thereby establishes a more substantive presence.

Architectural design predicated on a definition of perceptual experience following philosophical arguments that prioritize ocular sensation result in a displacement of the whole of experience (disconnecting from Being) with an abstract reduction to an *image* of a building or space. It is from this perspective that Juhani Pallasmaa accuses architectural design of an "*over emphasis on conceptual dimensions*" that supplants the fullness of experience. (Pallasmaa, 1994) Re-prioritization of the dimensions of experience into a visual emphasis follows a tradition of a hierarchical logic that sensory experience is trumped by mental interpretations of the symbolic, photographic, conceptual, graphic, literary, or intellectual sort. These descriptions of architecture emphasize the abstract, static character of buildings over a more natural, active, multi-sensory movement and action of our bodies in space that collaborate with architecture to direct, give scale to and frame our "*actions, perceptions, and thoughts.*" (Pallasmaa, 2005, 60) We orient and position ourselves due to this movement and thus, it defines the world. In Pallasmaa's characterization, it is this realm that should be the concern of architectural design. But how to realize this in design?

### **Substantiating Abstraction in Architecture**

An underlying model of embodied perception in design asks for consideration of the shape of the *experience* of architecture instead of the shape of the architecture alone. An underlying dualistic model of visual perception, on the other hand, asks that we consider only the shape of abstract ideas and interpretations. In both models our actions are based on consideration of our experience. However, embodied perception considers experience based on reflective interpretations within a spatial and temporal shared immediacy with bodily experience arising

from direct contact with our surroundings. From a dualistic perspective our reflective interpretation is cast in abstractions with meanings dependent on elusive externalities of cultural subjectivity. Recognizing that neither abstraction nor the concreteness of the body can occur discretely, the experience of architecture must necessarily involve the relation of the abstract to the concrete.

The visibility of architecture brought about in design from an embodied approach to visual perception reveals the relation of the individual to the culture is masked and distorted by dualism. In an embodied model the presence of the individual is the central axis of depth in experience, centering meaningfulness in an ontological primacy. On this basis, the aesthetic agenda of architecture becomes the expression of the "collective" only on the *contingency* of the "individual." For this to be evident through the experience of architecture, a level of design refinement must be achieved through a material basis for representation in which acts of careful making, emphasizing concreteness, are an essential and cogent material basis for abstractions. However, differing degrees of abstraction comprise the dimensions of experience, suggesting a possible approach to architectural design in which specific acts of construction can reveal relations between more abstract and more concrete levels of experience. (Irwin, 1979, 217-27) If the components of the experience of buildings are considered simultaneously abstract *and* concrete, as they are in embodied perceptual experience, the emergence of the meaning of both individual (direct) and cultural (abstract) levels can be accomplished in the depiction of abstract content supported by specific materials and methods of craftsmanship within the visibility of techniques of making.

Generally, an underlying epistemological model of embodiment in design anticipates, *almost automatically*, the perceptual apprehension of any abstract content *in balance* with a corresponding presence of materiality. Louis Kahn's Kimbell Art Museum offers one such example of relation of abstract to concrete in architectural experience. In the experience of the Kimbell, this harmony becomes evident through a reduction of the representational references to only that which has a substructure in the material presence of the constructed material surfaces. This balance is manifest at both distant and detailed scales chiefly through methods of workmanship that develop the individual materials in a discreet joinery, thereby manifesting any fictive apprehension within one's actual experience of the building itself. The detail of making that is evident in its material surfaces and its clear joinery has as its purpose the achievement of a holistic object that as a composition limits referential abstractions in the engagement of the observer to the material detail itself. This treatment of surfaces fosters a visibility of reciprocal relations between abstractions and their concrete substructure, providing within the experience of the building, a deep, holistic engagement.

It is in the execution of detail that architecture can most easily fail to give substance to the symbolic roles called for in the abstract intentionalities of its design. Delivering architecture as symbolic is not simply a matter of procuring an abstract image. Symbolism must be sustained on the level of the perception of its materiality or it will, by appealing only to abstraction, call into question its relation to the individual, and hence, muddle any relation to the cultural. If the visual surfaces of architecture present the conditions of the substance of their own visibility, then it behooves architectural design to more consciously consider the nature of perception as a foundation of design decision making. Architecture in full accordance with our nature as perceiving beings seems more desirable than an unconsciously accepted model of visual perception that drives our built surroundings more and more toward capricious culturally bound abstractions. If perception is embodied, and multi-sensory, as Pallasmaa suggests, and as the work of Louis Kahn and other anonymous architects exemplify, then architecture can realize its material basis, and we as inhabitants, can look to architecture for a more natural groundedness of our presence on earth.

While essay may be biased toward the occupants of architecture as participating observers as a possible basis of a theoretical approach regarding the production of architecture, it nevertheless

calls forth more careful construction of the material aspects of abstract representations in architectural design, not as an adjunct component, but as essential to architecture's coherent and complete reception. It must be recognized that observation and production are not mutually exclusive but are instead inseparable actors upon one another. A material's essence is given a potential for visibility by design decision making or it is subverted by degree, by the actions taken upon it in its material formulation as an element of our physical surroundings. Failing to account for the physicality of abstraction in the design equation of architecture can, and frequently does, lead to the unsuccessful execution of an otherwise reasonable project. Material reality is the intrinsic life of architecture as a medium of expression and not a peripheral but a central consideration when it is designed and built. The very act of embodied perception is the guarantor of the interaction between the made and the experienced. What we design and build may very well depend on how we think we see. Careful consideration of perception in design decision making can clarify distinctions between architecture as image-making versus architecture as *experience-making* and thus overcome "over emphasis on conceptual dimensions" unsupported by, and unrelated to, material presences.

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