



## Designing 'pre-reflective' architecture

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**Abstract** To begin with, the question we should be posing when trying to understand how to proceed and think in terms of designing multi-sensory architecture is: what is the nature of perception and how we experience architecture in the first place? This necessity arises from the important occurrence in contemporary architecture - the primacy of vision and visual perception - which has been a determining influence in development of currently widely used design tools, and has been increasingly favoring the conceptual over existential, perceptually based, experience of architecture. Moreover, it continues to strengthen definition of architectural space based on the physical-mathematical spatial conception, while ignoring its anthropological, multi-sensorial dimension. The possibility to make a shift might be found in neurophenomenological approach to architecture, which advocates that a central issue in architectural design should be human experience – how we perceive and understand the built environment. The particularity of this approach lies in combining well-defined phenomenological method of investigating architectural perceptual experiences with compelling evidence-based models from fields like neuroscience, neuroaesthetics, evolutionary psychology, which aims at capturing the invariant structures of experience. Hence, the value of such conclusions can be described as twofold:

a) Firstly, it unquestionably implies that perception is always embodied and enactive, meaning that it is intrinsically multi-modal and inseparable from movement, and since as Steven Holl claims, the only real test of architecture is the enmeshed experience – the body moving through space – understanding and investigating the relations between architectural space and bodily responses, might provide the architects with a set of essential information which could constitute a database of necessary pre-conditions (but naturally, not sufficient) to be used in designing process;

b) Secondly, it informs the architects that architectural design process as a neurological activity and metaphorical thinking is always concerned with image-making, that are perceptually driven, and inherently material, textural and spatial in nature – that is, it raises awareness to be more attentive to the imperfections of the daily used architectural designing and representational tools, and their crucial discordance with phenomenal world, originating in their differently conceived natures.

It is precisely this architects' attentiveness that should be a starting point for bridging the sensorial gap in design process – 'pre-reflective' architecture assumes acquiring knowledge about the profound interdependence of architectural structures and our inherent perceptual experiences based on the nature of the phenomenal body as the true architectural subject. In turn, it provides a necessary, consistent and lived-reality based foundation upon which we can start approximating sensorial perceptions by developing and/or improving various design tools that can only on such basis be considered as to provide the architects with experiential simulations that match the lived, phenomenal reality perceptual experiences of architecture.

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## Introduction: Neurophenomenology in architecture

The main motivation to start thinking about experiencing and designing architectural spaces in terms of neurophenomenology lies in the vast body of novel research in neurosciences, and the potential it has to incite the profound rethinking of fundamental issues in architecture. To mention just a few, the crucial discoveries of mirror neurons and the related mechanism of ‘embodied simulation’, better understanding of emotion, the importance of ‘hedonic’ brain circuit and proprioception for (aesthetic) experience<sup>1</sup>, imply that all our engagements with architecture is primarily structured from our more basic corporeal responses. Most importantly, these perceptual and bodily responses precede conscious awareness – that is, they precognitively inform our response of things. In other words, these new neuroscientific insights into the truly embodied nature of human body and mind are providing evidence in direct conflict with the prevailing architectural thought – designing spaces which are to be experienced as abstract, conceptual creations, whose meaning is intended to be only consciously retrieved. Therefore, the essential idea of ‘pre-reflective’ architecture is identifying and approaching the conditions of embodied experience as the only genuine experience of architecture, by unveiling the artificiality of mind-body dichotomy and recognizing the related misconceptions in current architectural design thinking.

Through neurophenomenological investigations of architectural experience based on the nature of perception and human body, it would be possible to reveal the underlying invariant structure of such an experience – that is, a structure dependent and determined by our embodied existence. In fact, such an approach enables re-focusing of design thinking to the phenomenal body as an architectural subject, as an issue which has been largely overlooked in the last century. On the basis of neurophenomenological research, it can be claimed that there exists a particular precognitive communication between architectural work (and also, the built environment in general) and the body, and what is of immense importance for architects is that just in a matter of several instances, a pre-reflective judgment of architectural space is delivered from perceptual experience, which scarcely gets replaced or substantially improved by conscious immersion in understanding the space structure and its meaning.

In contemporary architecture a conspicuous inconsistency has been present: even though it seems evident that architectural experience and architecture on the whole is always a multi-sensory event, it is more often than not changed for conceptual experience of space, as an effect of primacy of the visual (perception) which is guiding our conception of the world, architecture, and most of the commonly used design tools, all achieved on the basis of instrumentalized and physical-mathematical representation of spatiality. Instead, what the new findings informs us with, is that the rich phenomenological legacy is not to be seen anymore just as an abstract philosophical perspective of interpreting our embodiment and relation with the environment, but as the manner of understanding the particularity and complexity of our existence as inseparably interwoven dynamic systems of the body, mind and (built) environment. Because of such neuroscientific support, as Mallgrave suggests, the environment that we inhabit is both a Husserlian ‘lived-world’ (*Lebenswelt*) by being an enactive field of our actual and simulated embodied experiences, as well as Merleau-Pontian world since our bodies are being proved to be intentional beings whose consciousness is corporeally defined by our situational responses to (understanding of) the built environment (Mallgrave, 2013). For these reasons, it is of crucial importance for architecture (and architects) to acknowledge that the spatiality of the ‘lived-world’ is a spatiality captured not by geometrical measures but by contexts of use and that our primary response to the world (which is always two-way interaction) is to the one that is perceived

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<sup>1</sup> In spite of the fact that some of these neuro-findings have been demonstrated as rather important for aesthetic appreciation of the arts, it should be noted that the paper would concentrate more on understanding the essentially embodied nature of architecture-body encounter and its crucial mechanisms than on the subsequent aesthetic dimension of architectural experience.

(meaning, formed and influenced by our embodiment) and as such it might differ extensively from the information coming from objectively constructed spatial conceptions.

The argument is structured upon the two related concerns: firstly, understanding of perception and architectural experience in the light of the new research based primarily on the human individual as an experiential (architectural) subject, and secondly, bringing attention to the embodied nature of the design process in itself, and the specificity of the architecturally-trained brains with the corresponding way of thinking and experiencing architecture, and the range of possible consequences it imposes on design. Therefore, starting from these neurophenomenological key issues, the paper intends to clarify and support the possible architectural implications and suggest the necessity (but, naturally, not the sufficiency) of approaching architectural design from this new basis, as the closest, currently available approximation of the unique architectural subject as a complex biological (and cultural) being.

### **Embodied architectural experience: 'pre-reflective' architecture-body communication**

In order to think architecture in neurophenomenological terms, it is necessary to introduce in more detail the previously mentioned, essential neuroscientific and biological concepts regarding brain and body functioning. Or, in other words, offer an architecturally interpretable definition of what means to be, to exist embodied. Significantly, such an explanation directly provides a clearer understanding of how human individuals relate through their bodies to the environment, more precisely the built, architecturally structured world, and concurrently, how such knowledge could be of use in architectural design. To facilitate the clarity and coherence of the argument, the paper will proceed by putting forward summarized understandings of three key aspects inseparably related to engagement with architectural spaces, while reminding that these insights are one of the components of extensive and complex research on brain and bodily workings, of which others can also be very valuable to our comprehension of this special body-architecture relationship. The highlighted issues are selected because of their constant presence and more or less (un)conscious employment by architects throughout architectural history. In the light of new neuro-based knowledge, the aim is to account for the cause and effect of possible interactions between the body and architectural form, and suggest that specific design intentions can always to a certain degree achieve a specific corporeal reaction, which thus, can be used as a sort of design guidelines where required or expected.

### **Embodied metaphor and emotion**

The main inadequacy of interpreting the world, and in particular, architectural experiences, in terms of mind-body division, is the belief of the necessary reflective immersion in the world for our actions and life to become meaningful. Oppositely, because of the nature of perception as enactive and embodied – that is, its inherent connection with the sense of movement and as a core agent of every act of intentionality (achieved through the body) - is already meaningful and moreover, it can only be further enriched by the circumstances and possibilities of such embodied existence. The interdependence of perception and movement is what establishes a unique basis for our ability to fuse situation, space and time into one experience, and thus, use our corporeal existence to signify and symbolize the world. This ability is exhibited through the phenomenon of embodied metaphor, as being a vital ordering principle of all our sensory processing and image making, or to put it differently, sensory perception in itself is already an act of conceptual classification and organization of our existence. As Modell explains, the metaphor is doubly embodied – first, as an unconscious neural process, and second, because metaphors are generated from bodily feelings (Modell, 2003). Since created from the sensory inputs arising within the body, these metaphors can be defined as the first, pre-selected interpretations of our corporeal existence, or primary bodily metaphors (especially interesting and relevant are the metaphors of verticality and balance). Specifically, it is through such metaphoric expressions which directly relate and emanate from the human body (especially, spatial and orientational existential

metaphors as up/down, front/back, stillness/movement etc.) that we are capable to build upon elementary qualities of perceptual experience and allow for a conceptual grasp of the non-physical, abstract meanings. For this reason, it is possible to speak of corporeal imagination, as a fundamental functional mode which allows the process of mapping bodily experiences and transferring the meaning from different sensory domains to abstract concepts (including the formation of higher-consciousness ‘products’ like language and cognition in general, and thus, the possibility of reflecting on architecture). Interestingly, the more profoundly corporeal the metaphor’s stem is, it is almost never reflected upon consciously, and yet without these primary metaphors it would be impossible to achieve coherence and meaningful wholeness of our experience. In architecture, this is what Arnheim has recognized as the effect of archetypal architectural experiences – ‘sensory’ symbols are the most powerful architectural metaphors because they originate in the embodied metaphor as a distinct source of intense and deeply meaningful architectural experiences (Arnheim, 1977). That is to say that architecture’s ability to truly bring “*the world into the most intimate contact with the body*” (Pallasmaa, 2005), and how this encounter is going to be apprehended and interpreted in the mind of the experiencing individual, depends to a large extent on bodily metaphors, arising within the body from both internal and external stimuli. Given the multi-sensorial nature of the experience, it can be implied that the first impression and/or signification of architectural environment is always a result of the intrinsic cross-modal, bodily responses to the spatial and material - the perceivable presence of an architectural work. This is in accordance with the essential feature of perception – it is our only mean by which a body participates in the world, while at the same time, the act of perception is possible only if an individual renders oneself present to something through the body (Merleau-Ponty, 1945).

Notably, it should be mentioned that emotions, by definition, are “*somatic, visceral, electrical, and chemical events*” (Mallgrave, 2013), and as such they are a bodily system of values through which humans approach and evaluate the environment. This implies that they are precognitive actions and precede a conscious understanding or interpreting of the built environment. And because we respond to our surroundings through multiple corporeal senses, neurologically connected, emotions are deeply embedded in every architectural experience from the beginning, which is opposite to the currently presupposed emotion-free response to understanding architecture and thus, its abstract ideas (Mallgrave, 2013).

### **Corporeal schema and proprioception**

One of the very insightful attestations for the indispensability of the phenomenal body as an architectural subject can be found in bodily phenomenon known as corporeal schema. It can be defined as a system of processes that constantly regulate posture and movement – sensory-motor processes that function without reflective awareness, while being indispensable support in capturing the spatial and temporal conditions of a situation as a whole (Gallagher & Zahavi, 2008; Vesely, 2004). One of the main characteristics of corporeal schema is that it involves a set of tacit performances which manage posture and movement, and because being preconscious these regulations are accomplished in a close to automatic manner (but still precisely shaped and governed by (conscious) intentionality). This allows for what is termed *experiential transparency* of the body – the fact that in much of everyday experience, the (conscious) attention is directed toward the environment or a goal-directed action that the subject is undertaking, while the attentiveness to the body itself is highly attenuated (Gallagher & Zahavi, 2008). In architectural terms, this bodily phenomenon is of particular interest, since being a possible source for understanding different behavior in relation to the frequency and duration of user experience. While experience is susceptible to change over the course of time, some of the crucial causes for possible alterations can be found in primary qualities of architectural spaces, which are as previously explained, to a large extent determined precisely through pre-reflective body-architecture interactions. Therefore, this capacity of the body to engage with architectural spaces

without conscious attention<sup>2</sup>, only adds importance to thinking neurophenomenologically about plausible effects of design decisions. As a potentially valuable illustration, it is worth noting that architecture itself has the capacity to act as experientially transparent, or in other words, to fade into the background in order to be life-enhancing, to be a silent but permanent impact in the minds and the bodies of its users, while only occasionally being consciously experienced; the architectural artifact “*as a backdrop for everyday life*” (Leatherbarrow, 2009). As a matter of fact, in recent architectural writings, such architectural works have usually been indicated as exemplary in their attentiveness to design details in terms of material, light and overall spatial, atmospheric qualities, and their main designing principle seems always to originate in the nature of the human body and multi-sensoriality of architectural experiences<sup>3</sup>.

Correspondingly, it is the commonly accepted attitude of architects', that architecture is inextricably related to movement, or, as can be summarized in Holl's words, the only real test of architecture is the enmeshed experience - that is, the experience of an ambulant observer, which is always a human body in its totality, moving through space, as the only way of understanding both the idea and phenomenal qualities of architectural work (Basulto, 2011). This architects' reasoning of long tradition, can be now confirmed and elaborated from a neurophenomenological viewpoint. What lies behind this possibility of establishing spatial ordering through movement and allowing for continuity of perceptual experience, is one of the key functional mechanisms of corporeal schema – the sense of proprioception (also often termed kinesthesia). It forms a sensory mean by which the body informs us of the position of our limbs as we move through space, and it is a rather complex physiological process which constantly affects muscle tone and tensions, head and eye movements, heart rates, blood pressure, and respiration. Thus, proprioception can be described as the only system of reference we possess which is able to endow us with a coherent understanding of our spatial situation. Simultaneously, proprioceptive awareness provides an immediate experiential access to one's own, pre-reflective, embodied self, independently of reflective thinking, which is essential for all perception since it requires co-experience of self and environment, so as to be a comprehensive informational system. In fact, the relation between perceiver and perceived is a delicate point of potential influence, because even slight changes in our bodily postures, movements, physical abilities (i.e. in our corporeal schema), can affect our proprioceptive understanding of ourselves, and even considerably alter our external spatial perception. In other words, corporeal schema is one of the most valuable design instruments an architect can use in order to achieve a desired bodily and emotional state, all according to the functional and program requirements of a certain architectural space.

A particular architectural value of this sensory mechanism is to be found in the fact that in order to organize and interpret perceptions of spaces in a unified and meaningful manner, the phenomenal body itself has an intrinsic requirement for movement. In addition, human beings are biologically and evolutionary predisposed to engage in actions responding to what is termed primary emotional affects, among which those with architectural implications are 'play' and 'seeking' (or pursuit). These are interesting notions from the aspect that they create some of the most basic underpinnings to life, because they contribute to physical and cognitive pursuing for various positive achievements, which ultimately bring existential meaning into one's life. Clearly, movement is intrinsically related to these emotional conditions, and therefore, combined

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<sup>2</sup> However, it should be borne in mind that studies have noted that brain areas devoted to acquisition of spatial characteristics of the environment, like landmarks, and locating the body's position (in particular, place- and grid-cells), are being active whether or not we are paying attention to our spatial locations.

<sup>3</sup> There is an interesting overlap of ideas about the task of architecture and the embodied nature of architectural image as a requirement for gratifying an authentically human experience – to mention just a few - the well-known atmosphere of Zumthor's architecture exposed to life (Zumthor, 1999), Pallasmaa's architecture of weak image which is contextual and responsive to life (Pallasmaa, 2011), and Nouvel's and Baudrillard's notion of invisibly present architecture, which should not be experienced constantly, but needs both to exist and be quickly forgotten in order to sustain life events (Nouvel & Baudrillard, 2002).

architecturally, the result can be a set of rather useful design tools, especially for creating spaces where a certain degree of seduction and intricacy is desirable. To exemplify, architecture of public spaces frequently utilizes these inherent traits when forming communications in the manner of winding, serpentine paths, and at the same time employing the design strategy of gradual spatial unfolding. The result is the space that through intentionally avoiding full disclosure, and providing incidental or incomplete views, invites movement and exploration. Concurrently, such involvement with architectural spaces stimulates positively the brain and gives an artistic merit to ambiguity, as a way of allowing freshness of experience and possibility of reinterpreting the meaning with every new encounter (Mallgrave, 2011; Zeki, 1999).

### **Mirror neurons and embodied simulation as new empathy**

The phenomenon of mirror neurons is one of the most influential discoveries in the field of neurosciences which has been affecting immensely various areas of knowledge concerned with human nature and behavior. Its architectural relevance lies in the fact that mirroring mechanism offers a scientific verification of an idea of empathy (as *Einfühlung*) as a way of explaining how architecture is understood through our own corporeal form and sensory-motor experiences. The specificity of mirror neurons is in the activation of the same cortical areas during both first- and third- person experience of actions, emotions, and sensations, or more simply, there is the same brain activity when both executing and observing a certain action. As a consequence of these neurons' firings or as some scientists has termed this functional mechanism – an embodied simulation, it is possible for a human individual to have a second-person perception (what might be also termed social perception), and thus have a “*direct experiential understanding of objects and the inner world of others*” (Freedberg & Gallese, 2007). Therefore, in neurophenomenological terms, empathy can be defined as an “*unconscious process in which the individual uses his own body as a template that enables him to feel into the other's experience*” (Modell, 2003), and in addition, the mirroring mechanism is what can be claimed to provide a neural explanation for intersubjectivity – an issue which should not be overlooked since architecture is ultimately a social art. With this in mind, remarkable studies of Robert Vischer, Adolf Göller, and Heinrich Wölfflin, just to mention a few, about the ways how architecture engages the observer's bodily responses, and why everybody feels the expressive power of architectural forms, can be seen as a verified assumptions, and moreover, as issues worth investigating further by employing newest neuroscientific research<sup>4</sup>.

What should be emphasized is the fact the activity of mirror neurons and related empathic mechanisms provide us not only with social cognition, but also enable us to animate the inanimate physical environment with which we come into contact. In other words, we are intrinsically equipped with the mean to apprehend and form a relationship with our built surroundings, and this connection always have multi-sensory and emotional aspect to it, and importantly, because of being a deeply embodied process, it is for the most part elaborated in a pre-reflective manner. Even though architectural experience cannot be explained entirely only in neurophenomenological terms, it is nonetheless crucial to acknowledge the new evidence of emotional and overall bodily responses persisting in every architectural encounter. For this reason, purely cognitive and disembodied approach to conceiving and understanding architecture

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<sup>4</sup> Although currently there are not too many studies directly related to architectural field, the large body of research dedicated to other arts and our engagement with the world in general, provide sufficient clues for rethinking architecture in these terms, and moreover, there should not be any doubt that architectural design and thinking will surely be affected by further investigations and can have invaluable benefits. In addition, there are a number of architectural thinkers whose theories and writings are regaining importance precisely on the account of these novel neuroscientific findings. For example, Neutra's advocacy for survival through design based on the embodied nature of the architectural subject i.e. human body, is being confirmed and supported through this new knowledge, making it a significant and contemporarily valid approach to think the future of architecture and design process (Neutra, 1954).

is merely a misapprehension, because the only possible originating point of any sort of conceptualization and abstraction lies in the phenomenal body.

### **Architect's brain and further design implications**

What is interesting to notice is that neurophenomenological insights have brought about the evidence that architects are developing during their professional training the mental capacity for experiencing and thinking about architecture which can be quite distinct comparing to the majority of architecture users. In fact, as Mallgrave suggests, architects acquire the ability to understand and create metaphors and symbolism in architecture, which are predisposed to operate as semantic references and on a highly abstract plane of thought, which is not widely accessible (Mallgrave, 2011). In addition, because of the neural connections and mapping which have adjusted itself to the specificity of professional education, there have been indications that architects also have a distinctive emotional response to architectural spaces in general, in contrast to other subjects without architectural background. Although this conclusion was to be expected, its implication is still important as long as architecture is designed in such manner so as not to be understood and experienced with the architect's brain. For this reason, there is a necessity for employing neurophenomenological approach in order to raise architects' awareness of the embodied nature of every architectural experience. The idea of designing 'pre-reflective architecture' is the appeal to acknowledge the phenomenal body as true architectural subject and thus, also the fact that any work of architecture is always experienced pre-consciously, and that this primary understanding is in most cases the only one as well.

On the other hand, what previously mentioned neurophenomenological concepts imply is that architectural design is also an embodied process – it is a neurological activity which always involves metaphorical thinking and image-making, and as such it is perceptually driven, and intrinsically material, textural, and spatial in nature. Moreover, because grounded in embodied metaphors arising from the bodily and emotional states, design thinking as a mental process does not correspond with the objective representation of space on which are based almost every daily used architectural design and representational tool. The challenging task thus, arises when two means of spatial conception encounter, usually terminating in negation of visceral nature of architect's thought by transcribing it with its conceptualized and bodiless architectural expression in accordance with instrumentalized physical-mathematical notion of space. In this sense, neurophenomenological approach to design provides the possibility for architects' awareness not only regarding the corporeal existence of architectural subject, but also in regard to the design process itself, and the ever more necessary attentiveness to its embodied essence. An interesting incentive can be found in Onians' neuroarthistory<sup>5</sup> and the idea that architects' should also be alert to the fact that every life-event and living condition wire their brains in a particular manner which thus, indirectly affects their overall design thinking. Undoubtedly, the extraordinary plasticity of the brain is the reason why it is possible to develop specific design-and-architecture-oriented minds and thus create remarkable works. But if not being sufficiently aware of its nature and workings, it might be questioned if the current prevailing reality of instrumentalized and virtual images will not alter our modes of thinking in an irreversible manner, so that our architectural brains become design insensitive to the architectural requirements of our immutable corporeality and embodied existence. Therefore, the lack or absence of such neurophenomenological awareness could result in an ever increasing discordance between the built environment articulated according to artificially conceived spatial concepts and the phenomenal world in its anthropological, multi-sensorial dimension. Conversely, by being alert to the potential of current and prospective neuroscientific findings, there will certainly be an

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<sup>5</sup> Neuroarthistory can be seen as an attempt to reconstruct the unconscious intellectual formation of the makers, users, viewers, and ultimately, those who have been writing about art, and highlight the strong impact this formation has had on the making and understanding of the artworks (Onians, 2007).

opportunity to modify or invent design tools which could provide more accurate simulations of our perceptual experiences.

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