

Experiencing Architecture - Exploring the Soul of the Eye

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ABSTRACT:

This paper is an attempt to understand the influence of architectural settings on people; why certain architectural experiences stay with us whereas others vanish. It is a first step in an approach towards a greater understanding of subject and as such its starting point is purely theoretical.

We proceed the investigation by exploring two perspectives on the issue: a) a phenomenological perspective, based on the book “The Poetics of Space” by the French philosopher Gaston Bachelard and b) that of neuroscience. Both of these approaches view the human experience of architecture from starting points of the relationship between our mind and our physiological experience of the world. Neither of them separate physiological experience from the intellectual experience of place. Bachelard states in the “The Poetics of Space” that the psyche is a place, and the house is an extension of that place. He opens the door to places of significance to us, something neuroscience does as well. Both perspectives emphasize the early childhood experience of architecture which they feel has a major impact on the individual and his/her later environmental experiences, though they have different arguments for how this impact occurs.

The motivation to simultaneously investigate phenomenological and neuroscience approaches to architectural experiences is in order to introduce a new perspective on architecture and its impact on us. This new perspective on architectural experience could become a new approach towards a more humanistic and supporting architecture with the user in focus. How this approach would be integrated into architectural education is beyond the scope of this article as it is a theoretical discussion that only sets out to identify a problem in the architecture. It is a first attempt to approach architectural experience in a purely theoretical aiming to investigate questions such as:

- 1 a) Are certain architectural features or aspects of architecture more stimulating than others?
- 1 b) If so, what can explain their difference in importance for our experience of architecture?
And
- 2 a) Can a neuroscience and phenomenology approach combined improve our understanding of the architectural experience?
- 2 b) If so are there any practical implications of such understanding?

CONFERENCE THEME: Alternative approaches in research methods

KEYWORDS: humanistic architecture, architectural experience, neuroscience, Bachelard, phenomenology

INTRODUCTION:

Architecture has a great impact on us as individuals as well as a society. As we go back to our childhood there are certain environments that have stayed with us and yet others are brought back to us through smell, a certain ray of light or texture or a feel of a surface. This paper attempts to investigate how we perceive architecture and why certain environments stay with us whereas others vanish. Architecture touches us – the question is then how and by what means it touches us. The issue is here approached by applying two perspectives to the architectural experience: a) *a philosophical approach based on phenomenology*, and b) *a neuroscientific approach*.

I. TWO APPROACHES—PHENOMENOLOGY & NEUROSCIENCE

The reason for approaching the subject from two such different perspectives is that they both engage in human perception of the world. Philosophy offers us a method of understanding the world and our emotions in relation to the world in a rational way. Phenomenology, the science of phenomena and existence, is a certain field within philosophy that is intimately connected to architecture. It

investigates how we perceive and evaluate the environment depending on the environment's specific characteristics — the building materials and their highly sensory properties. That this knowledge is based on experience is fundamental to phenomenology. The phenomenological investigation of architectural experience is here based on the French philosopher Gaston Bachelard's *The Poetics of Space* (1958), which is a classic in the field. This work is particularly interesting due to the dichotomy it presents concerning considerations of the scientific mind: on the one hand its rationalism and search for truth, and on the other hand its reflections involving the imagination, daydreams, and poetic ability (Buyeron, 2010).

Neuroscience offers a complementary approach in this theoretical investigation of architectural experiences as our feelings and reactions to the surrounding environment are analyzed based on the functions of the brain and its response to different stimuli. The neuroscience researcher Antonio Damasio (1994; 1999) relates emotions to our mental images of the world, which according to him are nothing but functions of the brain. Neuroscience is a big field to explore—the fact is that we know very little about how our brain and mind interact with architectural settings; we suffer from both lack of knowledge and strategies for applying neuroscience in an architectural design. We do know that the human brain is one of the most complex objects in the universe and that from a neuroscientific point of view every experience, also our architectural experiences, are the result of activities of our brain, mind, and consciousness. Consequently, experiences are to a great extent unique to the individual depending on his/her genetic inheritance and lifelong accumulation of memories (consciously as well as subconsciously), but also depending on his/ her place in the world. The fact is that what we perceive is not useful to us until we have invested meaning in it and this is the result of the aspects described above (Eberhard, 2009, p. 84). We perceive the surrounding world through our senses of vision, hearing, smell, touch, taste, and proprioception (the ability to sense the position and movement of the body and its parts). These are the established senses, however, the exact number is debated due to different definitions among neuroscientists of what a sense is— some in fact identify more than twenty different senses. Nevertheless, of all our senses vision is the most active information-processing system. This dominant role in architectural perception is drawn attention to in the title of this article: “Experiencing Architecture—Exploring the Soul of the Eye”. The title also refers to Bachelard's views on space. According to Stilgoe, Bachelard enlightens us about ordinary spaces to the point that, after reading him, our own vision is altered and we see space with “the soul of the eye” (Stilgoe in Bachelard, 1994, p. x). The dominance of vision is manifested by the fact that nearly half of the brain's cerebral cortex is used to process visual signals, which is a higher percentage than any other of our sensory systems. I choose here to exemplify the complexity of our sensory systems by describing the process of the visual system.

The visual system operates with different parallel methods since the quality of light in a space is evaluated by the lumens (the amount of light), but also by our body's homeostatic system, which is self-regulated. The perception of how bright a light is perceived to be cannot be controlled by willpower; the body's response to light is instead determined by age and by other physical and psychological circumstances of the moment. The psychological dimension of the architectural experience is clearly illustrated by the perception of light among children who are afraid of the dark—for them it is only the presence of light that is comforting. Besides this, the perception of light is also determined by the spatial circumstances and the task that we are currently performing.

1.1. CHILDHOOD EXPERIENCES OF ARCHITECTURE

The child's experience of architecture is present all through *The Poetics of Space*. By recalling the child's experiences of home Bachelard uses the house as a significant spatial type for architectural experiences. He guides us back to ourselves by introducing us to those first experiences of the house, which influence our forthcoming architectural experiences. According to Bachelard the house is the original source of our architectural experience. We need it in order to imagine; it shelters day dreaming and protects the dreamer. He describes its importance from different perspectives. The simplest hut shines in its ability to shelter us from the storms outside; it even makes the storm good and enjoyable as it reminds us of the comfortable context in which we exist. Reading Bachelard one cannot help wondering why adults do not recall attic stairs from the top looking down but instead

recall them from the bottom looking up as Stilgoe reflects on the matter (In Bachelard, 1994, p. x). In childhood the texture of materials, the memories of our fingertips, as well as the details of the architecture at an eye level have a substantial impact on our experience of environments of significance. Our memories can be traced back to our body and not merely to our mind, according to Bachelard, who finds evidence for this not only in poetry and folktale, but also in psychology and even in ornithology. Using his own method he finds support for the argument that the house is the estate of our dreams, a shelter for the picture. In a phenomenological approach, Bachelard says, architecture is not only understood through its purported origin and function, but also through lived experiences. He introduces spatial types of significance to our architectural experience; these are the attic and the cellar, and the more intimate spaces such as drawers, chests, and wardrobes. The most personal and intimate spatial types are, however, the nests, shells, corners, and miniatures. Despite the smaller scale of these latter spatial types, they hold a universal meaning to us, he claims, and touch us on a highly personal level. The final spatial type he introduces is much larger in scale; this is the intimate immensity, which he views as a philosophical category of daydream.

Neuroscience, like Bachelard, is preoccupied with the early experiences in life and their effects on us. Research has shown that these experiences have physiological effects on the brain at a cellular level (Eberhard, 2009, p. 63). This, combined with the fact that cell growth during the first three years of life is more intense than during any other period, make the impact of these on the individual even greater. The majority of brain development takes place from the 28th day after conception through about the age of five. In the next period, however, from age six until twelve, major brain development also takes place. This period, for example, is critical for learning languages, which shows in an increased glucose consumption in the occipital and temporal cortexes in the brain during this period. Both these brain areas are important for vision and hearing. It is believed that children during critical periods of brain development are more vulnerable to environmental influences such as light and sound (Eberhard, 2009, pp. 63-66). It is known that the individual's sensitivity and the development of talent within an area is influenced by both environmental and genetic factors. Although environmental factors are rarely mentioned when musical talent is discussed, research has shown that musicians have approximately a 25% larger auditory cortex (the area of the brain that processes music) than non-musicians have and the earlier they have been exposed to music the bigger the auditory area of the brain is.

1.2. THE PERCEPTION PROCESS

An area called the Parahippocampal place area (PPA) is important for our architectural experience. In experiments Epstein and Kanwisher et al. (1999) have shown that this area responds more keenly to photographs of spatial settings such as rooms, landscapes, and streets than to photographs of objects, faces, and other kinds of visual stimuli. The response is also stronger to new places and spaces than to familiar views; the hypothesis is that this is probably where information about the layout of new places and spaces are encoded in the brain. The area is formed over a long period as more and more neurons are encoded as a result of the accumulated architectural experiences and the recognition of faces. Despite these properties the PPA is not involved in the process of way-finding, which one might expect.

The process called priming improves our ability to recognize and identify similar objects and experiences, is an unconscious process. Once an experience is primed, an ensemble of well-tuned neurons will handle the perceptual task resulting in a reduction in neural activity. As a result of priming, 45% of those who have been asked to freely associate to the concept of house will, when they are shown a list of words that include the word door, say "front door" (Eberhard, 2009, p. 121). After priming, the next level in the perception process is perceptual learning in which we differentiate the features of stimuli. This is how we by experience learn how to discriminate texture, direction of motion, line orientation, and other visual attributes. This occurs gradually over time in the visual cortex as the machinery of perception is altered. Perceptual learning is highly specific to the task and it seems to change the structure of the brain. The phenomenon of perceptual learning, together with the formerly described phenomenon of the larger auditory cortex among musicians, partly explains why experts perceive things in other ways than novices do. For example, musicians experiences music

differently than non-musicians do and landscape painters perceive trees differently than others. Also, architects to some extent experience and evaluate architecture differently than non-architects. This shows overall that Winston Churchill was more right than he perhaps knew when he said: “We shape our buildings; thereafter they shape us.”¹

2. MEMORIES & EMOTIONS

Since childhood we have stored architectural experiences unique to each individual, which become an inventory of visual memories overlain by emotional and sensory content. Similar to both the music and language experiences, the architectural experience depends on the individual’s ability to form categories of learned elements, to extract statistical regularities from rhythmic and harmonic architectural sequences, to integrate incoming elements (such as windows and doors) into syntactic structures, and to extract nuanced emotional meanings from visual signals (Eberhard, 2009, pp. 1621-162). This ability to categorize depends on the process of priming and on the perceptual learning described above, which both aim to efficiently process our surrounding environment. However, as they do not evoke conscious memories of the past, these perceptual changes are mostly outside of our awareness.

The phenomenological approach to our memories and emotions in relation to architectural experience is different. In *The Poetics of Space* Bachelard sees the home, derived from the concept of the house, as the basis for all our architectural experiences. He sees it as the base of our existence, since, regardless of our life situation on a psychological level, we always need to seek refuge and solace from the dangers of the insecure world outside. He explains: “The corner becomes a negation of the Universe” (Bachelard, 1994, p. 136). The spatial types defined as *the corner* and *the nest*, with their origin in the house are both, according to Bachelard, important for the human imagination of space – corner stone for our architectural experiences. He declares: “The corner in a house, every angle in a room, every inch of secluded space in which we like to hide, or withdraw into ourselves, is a symbol of solitude for the imagination; . . . it is the germ of a room, or of a house” (Ibid.).

Neuroscience describes how our physical body in combination with the structures that regulate our lives are continuously signaling our internal state. This is mapped in our brains together with events we have experienced based on the sensory and motor structures they in turn activate. These maps are recorded in neural patterns in our brains ready to become images. The function of these maps, according to Damasio, is to relate our bodies to mental images of our relationships with objects and events, and as such they are nothing but feelings (1994; 1999). Damasio’s theory is of the greatest interest in this investigation of memories and emotions in relation to architectural experiences. Damasio talks about what he calls primary emotions, which are automatic responses to objects or environments that are perceived as threatening to us. Examples of such emotional responses, which cannot be controlled, are fear and blushing. These primary emotions are followed by secondary emotions that reflect our cognitive interaction with the object or environment that produced the initial primary emotion. Merely by remembering an event that produced primary emotions, secondary emotions can be generated such as when strong architectural experiences from childhood are revoked. These secondary emotions derive from a guided disposition held in our memory that needs the primary emotions to express themselves (Eberhard, 2009). Eberhard means that due to evolution we are hard-wired to respond positively to harmony such as consistent orderly and pleasing arrangements of parts and we seek this in architecture as well as in music and in art. If this is correct we here have one explanation as to why humans respond more positively to certain perceptions and more negatively to others. Despite the probability of this theory holding true, neuroscience will never be able to find a specific center for good or bad architectural experiences. Instead, in all human response, there is most likely a set of brain activities across the brain that work similarly—like a symphony orchestra—playing a score that yields the music of bad as well as good architectural experiences (Jim Olds in Eberhard, 2009, p. 116).

When Bachelard talks about emotions in relation to architecture he describes it as though certain emotions cannot be stopped. They arise unconsciously within us, he says, and the mere “whiff of perfume, or even the slightest odot,” can create “an entire environment” (Bachelard, 1994, p. 174). He exemplifies this by saying that for a man who lives in the woods and the fields the discovery of a

nest is always a source of fresh emotions and means that the strong emotions evoked by the nest bear the mark of sincerity (Ibid.1994, p. 96). The reason a nest evokes such strong feelings is that, like any animal shelter, it evokes well-being and our image of the house, which, according to Bachelard, is engraved in our muscles.

Information about our surrounding environment reaches us through our senses, but it is not until the information is associated with memories and emotions that the actual perceptual process takes place. It is only then our mind has associations to what we experience and recognition, i.e. when our mind locates the specific memory, that the information matters to us.

Research has shown that the manner in which we emotionally evaluate information has a great impact on us, since emotionally arousing events are remembered especially well. This is why an architectural experience of e.g. the Notre Dame Cathedral in Paris is more likely to be remembered by you if Bach is played from the great organ the first you enter it than if no music is being played (Eberhard, 2009, p. 123). Eberhard relates this phenomenon to the fact that the brain establishes future memories, the so-called *long-term potential* (LTP), by binding the neurons in the brain together for the benefit of any future activities that come along the same path. In the brains of children studying their ABC or performing music or tennis, the brain guides visual, aural, and musically strong experiences that produce series of LTPs. According to Eberhard, this phenomenon may explain why some buildings or areas with strong architectural features are memorized from the first time we saw them in photo or physically visited them. Every time we see this building or environment, or any similar building or environment, this image is reinforced and these series of LTPs are then reproduced in the brain.

This process of external stimulus through our sensory systems (e.g: the visual, the auditory, and the tactile), which is filled with emotional content, takes place in the limbic system—the “emotional center” of our brain. Neuroscience studies have shown that we experience emotions before we are consciously aware of them (Eberhard, 2009, pp. 192-193). In order to guide our behavior the limbic system provides both encouragement (a carrot) and punishment (a stick). We respond with positive emotions such as affections, love, and pleasure to stimuli that are perceived as positive, and with negative emotions and behavior towards negative stimuli such as events that threaten our well being, our survival, or our sense of fair play. This emotional learning occurs in two separate systems of the limbic system: the amygdala and the hippocampal systems, and they support non-declarative emotional memories as well as declarative memories (Squire & Kandel, 1999). Though these two systems mainly work independently they also sometimes work together.

The so-called subcortical pathway processes events that require rapid responses and in the cortico-amygdala provides information that is used for the cognitive evaluation of events and environments, which takes place prior to any rational decision being made. This process of converting non-verbal tracks in our mind into words and sentences cannot be stopped. The internal process of emotions and memories related to these leads us to the key aspect in the perception of architectural experiences and other exterior stimulus namely consciousness.

3. CONSCIOUSNESS

The experience of architecture must be understood in the context of consciousness, which in turn relies on the internal construction and the interaction between the individual and the object/environment (Eberhard, 2009). Consciousness begins as a feeling which arises when we see, hear or touch an object that is associated with personal images (Eberhard, 2009, p. 123). The concept of consciousness goes back to the French philosopher Descartes who in 1637 stated: *Cogito ergo sum*: “I think, therefore I am” or “I think, therefore I exist.” The statement recognizes the centrality of ontology (what is) and epistemology (what and how we know) in consciousness.

In the establishment of primary consciousness our short-term memory is involved, which incorporates memories from the past including a categorization of the present. The short-term memory is by Eberhard referred to as the “remembered present,” which entails that the present perceptual experience of architecture is linked to past experiences of a similar space, or a space that evokes the same feelings. It is this linking process that leads to consciousness and the result is unique for each individual. It is prioritized by our value system as it contributes to continuity in our lives by relating our memories to

the current situation, which, according to neuroscience, explains why it has been conserved during evolution. This process is by Edelman and Tononi (Edelman, 2000) called high consciousness, and it was added to our primary consciousness when we as a species acquired language; with language we had the need to think about the past, reflect on the future, and be conscious of the present. In this context it is important to know that humans are as far as we know today the only creatures that can use the mind to think about the past, contemplate the future, and be aware of being aware.

From Bachelard's point of view the architectural experiences are not fully individual as they also hold an element of universality. A phenomenological inquiry is necessary in order to understand the architectural experiences since this approach includes our "sentimental resonances by which we receive a work of art" (Bachelard, 1994, p. xxii). The architectural experience, according to Bachelard, happens through the *poetic image* defined by certain spatial types that evoke them. (For spatial types defined by Bachelard see above). He claims that: "short-lived event[s] constituted by the appearance of an unusual poetic image, react on other minds and in other hearts, despite all the barriers of common sense, all the discipline schools of thought" (Bachelard, 1994, pp. xviii-xix). Poetry is a commitment of the soul. Therefore, while studying the phenomena of the poetic image, the mind has to be incorporated since the two are indispensable to each other. All our senses are effected by the spatial types defined by Bachelard, and these types are tightly linked to our architectural experience since they emphasize the existential part of our lives. An example of this is the spatial type *miniature*, which, due to its causality of smallness, appeals to our senses. Our fascination with miniatures and other spatial types demonstrates the tight connection between the world of imagination and our senses. But also, the opposite to miniatures, the spatial type called "the intimate immensity," in his opinion, means a lot to us on an existential level. This spatial type reveals the depth of life in the vast subject of contemplation when "the exterior spectacle helps intimate grandeur unfold." (Bachelard, 1994, p. 194).

Since response to architectural experience is largely unconscious, and different environmental factors influence our perception, the perception process is highly complicated to investigate. Using the visual perception process as an example, the quality of light in a space is not only evaluated by the amount of light (lumens) that sends signals to our brain, but also by the homeostatic system of the body. The perception of brightness is not controlled by willpower in any part; instead, our physiological response to too much or too little light depends on age as well as the circumstances at the time. This is why you need less light if you are sitting quietly listening to music and reading than if you are trying to read the small print on the label of a medicine bottle (Eberhard, 2009, p. 82). There are physiological aspects to the perception of light as well. Studies of light effects in school environments have shown that light makes children both more active and more social (Küller & Lindsten, 1992). An example of the psychological dimension of visual perception is that a child who is afraid of light will find comfort merely by the presence of light alone. Architecture's effect on cognitive processes and the ability to concentrate is especially clear in terms of children with deficient sensory integration or hearing and sight impairment. As they cannot see or hear well in certain environments, specific school environments will delay their reading ability, which is a key factor for successful learning (Eberhard, 2009). In Sweden the awareness of the impact that architecture has on pedagogic settings early on led to a specific kind of school architecture, which can be recognized by the large and highly placed windows of the schools. These features of the classroom architecture provided for a good daylight illumination and minimized distractions since the pupils could not look out and see the exterior environment.

Consciousness is the key to understanding the individual's architectural experience but since the human brain, one of the most complex objects in the universe, is not fully explored today, consciousness is not entirely understood. Consciousness is unique due to its flexibility to process new information in creative ways and its ability to relatively quickly adapt to changed conditions. Discussing consciousness and the human brain one needs to be aware that the *mind* is not a synonym for the *brain*. The brain is instead an instrument in the perception process. According to Eberhard, it is the human ability to think about the past and future and to be aware of our own awareness, as described above, that is expressed in the human desire to create architecture: "No other species creates habitats or communities that are as elegant, as structurally daring, or as functionally diverse as ours (Eberhard, 2009, p. 181). This is noticeable in the fact that no other species produces building designs

like Michelangelo's according to Eberhard. The aim of this paper—to investigate the architectural experience—could very well be regarded as yet another expression of this human striving.

4. DISCUSSION

This paper argues that in order to improve the human condition it is necessary to recognize all of our sensory senses in the design process since these senses form the basis of how we experience architecture—an experience that includes our mind, soul, and body. In the architectural profession there is, however, a single-minded focus on the visual side of architecture, a focus that already suffuses architectural education. The students' projects are mainly judged by the teachers' visual perception of projects and in architecture magazines, which are read by students as well as practicing architects, projects are often mainly described by means of photos. This single-minded focus on the visual aspect of the architectural experience is further emphasized by the fact that the architectural quality of a building in architecture competitions is often assessed by the jury based on photographs alone and not on the actual experience of a building (Eberhard, 2009). To evaluate the quality of architecture only by means of the visual image, however, is like "falling in love with the photographs of a person without ever meeting him or her," according to Eberhard. To evaluate the quality of architecture by the use of only the visual image is however like "falling in love with photographs of a person without ever meeting him or her" as Eberhard says (2009, p. 78).

A thorough analysis of architectural education is essential to break the focus on the visual side of architecture in order to find different teach and design methods to achieve a more comprehensive architecture. How this can be done is however outside the scope of the paper as it is a theoretical discussion that seeks to identify a problem in architecture and not present methods of how to integrate the architectural experience in architectural design, i.e. theory, practice, and pedagogy for this. The paper should instead be regarded as a first step in a larger investigation that hopes to find methods for a more comprehensive architecture.

The power of architecture is believed to support social ideals, human needs, physical health, and spiritual aspirations. With the aim to fulfill the various dimensions of human needs that are linked to architecture, different environment-behavior methods have been applied to the profession, e.g. Evidence-based design, Post Occupational Evaluations (POE) or User need studies (Eberhard, 2009, pp. 173-179). None of these methods focus on the sensory dimension of architecture, which is a shortcoming in my opinion since the architectural experience to a great extent is a sensory one that includes all our senses and not only vision. The complexity of sensory experience, however, recognized by two such diverse fields as neuroscience and the philosophical field of phenomenology, which are both founded in lived experiences and regard our sensory experience as a key factor for our perception of the world. Both fields tie our mind and soul to our feelings and to our physiological experience of the surrounding environment.

Like Eberhard I believe that we have found a tool for the design process in neuroscience. The rapid development of neuroscience will not only help us understand the interaction between the human mind and different architectural settings, it will also offer the energy and vitality which a "new", dynamic, and highly innovative field of science holds. By combining this field with phenomenology, the risk is less for the sensual and the imaginary dimension of architecture, so well described by Bachelard, to get lost. The two approaches combined invite architects to base their work on the human experience of architecture, and this may possibly be a method to achieve a humanistic architecture, rather than on an architecture based on abstract motives that may or may not affect viewers and users of the architecture. An architecture of the imagination is an architecture that involves the whole person—body and soul—and thereby a more "real" and humanistic architecture. To stress the central role of the human psyche in this approach I want to end this paper by quoting Bachelard: "the human psyche contains nothing that is insignificant" (Bachelard, 1994, p. 135).

BIOGRAPHY

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ENDNOTES

¹The quote comes from a speech Churchill made in the House of Commons on October 28, 1944. According to author, Dr. Mardy Grothe, the original quote was: "We shape our dwellings, and afterwards our dwellings shape us." (http://wiki.answers.com/Q/When_did_Winston_Churchill_say_you_shape_your_buildings_thereafter_they_shape_us#ixzz1By4ZRx4H). Date: 2011-01-24