

# Psychophysical Response to Architecture

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## Abstract

This brief essay articulates the dialectic relation between persons as psychophysical beings and architecture as a physical-cultural environment. The essay argues that architecture should not be solely based on the formal qualities of space but should also take account of, and make room for the heterogeneity of personal and cultural experiences that adapt to and accommodate the physical dimension of architecture. Concepts such as proximal space, as defined by E. T. Hall, become all the more important in conceptualizing such a dialectic relation.

Keywords: *aesthetic response, spatial cognition, sensotype, and proxemic behavior*

## Introduction

How knowledge is attained, whether through pure reason or as a product of experience or whether it is attained through an interaction of categories of mind applied to sense data, constitutes the basic epistemological question which underlines the studies of knowledge. A person's representation of an environment or a building has been argued to be a function of his transactions in that environment or in particular parts of it. Mankind is continuously adjusting and readjusting to his physical environment, shaping the mold which shapes him. The fact is that no organism can be understood in isolation from its habitat, and there is a sense that all psychology is environmental psychology.

But civilized man is different from other species in that he constructs and controls his own environment. This is acquired by experience and is transmitted through his culture. This has been increased by developed technology. Accordingly, people interact with their environments and they have done this effectively by developing subtle sensitivities to a variety of environmental aspects. They have also developed a pattern of conceptualizations of the relationships between environments and the activities which take place within them. In many cases they modify their behavioral patterns to have satisfaction by making modifications of their existing environment. However, it is observed that there are differences between people related to their culture and upbringing. This may affect their behavioral, cognitive, and affective reactions to the environment

From the Prehistoric Age to the beginning of the 14<sup>th</sup> Century, whether be it in a cave or in a house for Man, there was one commonly needed object: fire; not necessarily through choice, but by necessity. The use of electricity takes a similar line with imitation of glowing logs and coal. The primary intention of fire was to give off heat but the responses were learning and association modes. Since then, other sources have been developed and have moved into a different physical dimension, a visual one, and provided a supplement to central heating for making the home nice to live in, and cozy. Instead of contemplation and looking to the fire, it is now replaced by looking and listening to the television which has become the focal point in a place. The difference

between the fireplace and the television is that the latter enhances conversation while the other retards it! However, a focus as such may indeed make a place attractive especially if it is in the level of the eyes of a seated person, away from the eating zone.

The architect makes decisions that have impact on the user based on his personal experience. However there are wide differences among individual responses about environments. For instance, apartments which are initially finished identically are subsequently finished and decorated according to individual responses after they dwell in them. Accordingly, the designer must have a deeper understanding of different individual needs. This can be easily obtained by asking clients about their environments. For the designer to cope with the gamut of people's differences, he has to provide flexibility. The behavioral sciences can assist the designer in providing for the broadest range of differences as he resolves the design requirements into a successful solution. However, scholarly research in psychology has indicated that there are wide gaps between preferences and behavior that remain mysterious. For example, people in poor quality housing are more likely to experience mental illness and to be high in neuroticism.

### **The Influence of the built environment on behavior**

Rehousing from a decaying residential area was found to be of little effect because relocation to good housing does not necessarily break the cultural pattern of delinquency. Some aspects of the built environment such as overcrowding, lack of basic facilities such as personal use of toilets, bathrooms and furniture composition can have an influence on mental health.

It was found that there are correlations between in-immigration, housing conditions and psychiatric admission. The time between migrating to the area, and the emergence of symptoms proved to be that the longer the time which elapses between migration and appearance of symptoms, the stronger the possibility that stress factors could be involved. Usually, within three months of coming into the new city residents started to become ill.

Following this initial period the rate of breakdown is evenly distributed over time. In early cases of breakdown a majority of patients experience housing stress variables. If housing stress does lead to the emergence of psychiatric breakdown, then the existence of such stress should be associated with powerful mental health in those individuals who have never had a psychiatric illness.

There have been some accounts of life in high flats which suggested that there exists a tower block neurosis eight times as high as that in the house dweller. This is attributed to the cramped space and greater isolation of residents in apartments removed from the ground. Environmental studies did not find any direct link between expressed unhappiness, and living in high rise blocks. It seems that those unhappy living off the ground had a strong dislike of flat life at a high density in general and wished to move to a house with a garden, irrespective of the building form or height they lived at. People have the desire for a house with garden where they could relax and play privately with their children on condition that it is tightly secured as found in gated compounds, to avail themselves from the neurotic symptoms.

## Environment Cognition

The evolutionarily adaptive large-scale environment cognition seems to appear at an early stage in the development of the human organism. Man has two hemispheres of the brain: the left hemisphere to control language, writing and other linear or non-dimensional process, while the right hemisphere controls perception, fantasy, spatial knowledge, as well as other gestalt and dimensional processes. Bogen et al refer to the left hemisphere as oppositional. Thus, the spatial and environmental cognition tends to be oppositional in early life, and that the effect of formal schooling is to cause a certain shift in mode. What results, in adulthood, is much more difficult to specify.

**A/P (appositional/propositional) ratio:** (1) Social role (2) formal education and environmental experience. Social role is usually indexed by sex, ethnic group membership and socio-economic status; formal education indexed by years of schooling; and environmental experience indexed by where and how often one travels, and by what mode. We need to know about different conceptions of environments by different kinds of people, having different age group members. In search for universals, both architects and psychologists often commit the same error of treating people as though all were the same.

We need to know more about the earliest stages of spatial learning, about the nature of spatial exploration prior to the commencement of walking not at where the child goes. Bower (1966) has shown that certain perceptual constancies appear in the first few months of life. Environmental cognition may begin very soon thereafter.

## Spatial Interactive Cognition

Fundamental spatial cognition, that is, the basic geometric properties of objects and space passes through three principle stages: 1) *Intuitive or preoperational space* wherein the child has some internalized representations of the external world and can begin to mentally operate on these representations. These first representations of space merely evoke and replicate memories of previously manipulated or perceived objects, and the operations, far from being systematic, are intuitively performed and not coordinated into a general understanding of the properties of space.

2) *Concrete operational space*, wherein the child is no longer totally dependent of images of former actions on space, and where spatial thought, therefore, is transformed into systematic, reversible operations. These operations are still concrete that is, they still depend on real or symbolically present objects. 3) *Formal operational space*, wherein the building adolescent disengages spatial operations from real actions or the actual presence of objects and space.

The three levels of spatial representation characterize developmental variations in the cognitive behavior of the same person. Performance is a result of interaction of categories of mind applied to sense-data. A person's representation of an environment and of particular parts of that environment is a function of one's transactions in that environment. There are significant relations between degrees of familiarity and the level of representation and performance on the cognitive tasks, or at least of a phenomenal awareness of the world inside our heads. Thus, it is possible to conceptualize environmental cognition of interactional-constructivist terms and to derive hypotheses

which shed some light on the developmental analysis of this phenomenon, but developmental analyses are not limited to changes over time but are also applicable to the analysis of contemporaneous events, variations within the same person.

### **Environmental Responses**

The study of Appleyard (1969) identifies movement, contour, size, shape and surface as the significant attributes of physical form which lead buildings to be remembered. Nevertheless, as much as components of appearance are important, equally important are the responses which are linked both in imagination and perception than other elements.

Attention to what is seen is a natural and obvious aspect of environmental responses. Perceptual selection, environmental quality, form and space diversity; all have been invented to avoid saying 'aesthetic'. Architectural psychologists, having identified the importance of aesthetic factors to their subjects, should devote their further investigations to other aspects of evaluation, such as room friendliness (Canter, 1972). To continue to define the boundary between art and science, given our very different philosophy of science and knowledge of psychology, is unsound. Nevertheless, those who define themselves as artists may well consider, as Wordsworth and Coleridge did also, that science is a proper subject for art, but not that art is a proper subject for science. It seems that aesthetic psychology may be on the verge of a theoretical breakthrough. In this emerging situation architectural psychology is faced with the need to study aesthetic factors in depth.

One might point out that the behavioral sciences, generally, and architectural psychology, in particular, have recognized the need to study the characteristics of different populations; determining both what is common and what is distinctive to them. The objective approach to changes of style and fashion has traditionally been by way of art, history and the techniques of stylistic analysis (Rashevsky, 1968).

Whatever the force of the philosophical arguments, aesthetic studies within environmental psychology will remain unconvincing unless, and until, they can give an account of affairs better than that offered by more conventional qualitative descriptions. So far, they have stopped short of giving such an account.

### **Bridging between cognition and response**

At present the problem of the dimensions of aesthetic response and the physical parameters of the environment upon which they depend is waiting fuller exploration from two directions. Applied environmental psychology and pure psychology, each have something to contribute. Architectural psychology has made use of the convenient and powerful tool of semantic differential analysis. Despite its usefulness, this technique has a disturbing resemblance to the report obtained from Goldsmith's blind men: "There were six men of Hindustan of Philosophic mind, who went to view the Elephant but all of them were blind". They seize, literally, on various features of the elephant, its legs, trunk, and tail and so on, and then come to blows over what the elephant is really like. Their investigations revealed many things about the elephant, but "elephant-ness" eluded them. This deficiency of semantic differential in dealing with structure was early brought out by Allport (1955) that it can be overcome, but with considerable labor as demonstrated by the studies of Wools and of Lowenthal and Riel.

A similar criticism is made by Berlyne and his colleagues who have established the importance of judged complexity to preference (Berlyne et al, 1968). Berlyne's brief formulation that the complexity of a pattern increases with the number of independently selected elements; while the number of elements being constant, complexity is reduced by the presence of similarities or interdependencies among elements (Berlyne 1972), at once stimulates some of the obvious questions. What determines the number of independently selected elements? What, in this context, is similarity? Is an interdependency the same as a symmetry, and if not, what is it?

The fact that answers to these questions, that readily suggest themselves, does not give us an empirically determined connection between our concepts of what these things mean in an evaluative or experiential context and what they mean as applied to constructed categories like judged complexity. In fact, it is only by further experimental work, applying these categories both analytically, in explaining and adopting the features of existing environments, and also constructively, in attempting to use them in design of new environments that it will be possible to understand them adequately. At present there seem to be some difficulties in such applications.

What is needed is a bridge which will link pure and applied aesthetic psychology. Many of the materials of such a bridge will have to come from the perception psychologists, who are grinding away at the similarly intractable problems of the dimensionality of form. The complexity of the subject forbids a meaningful summary.

### **Conclusion: The importance of aesthetics**

E. T. HALL (1966), the Anthropologist, claims that not only does the way we use space have a communitary value but that different cultures inhabit different sensory worlds. Wober (1966) has devised the word "sensotype" to describe this. Sensory refers to the pattern of relative importance of the different senses by which a child learns to perceive the world. Thus in one culture visual stimuli may be the most important, in other cultures more importance may be attached to auditory, tactile, proprioceptive, or olfactory stimuli. If our proxemic behavior is built around our "sensotype", which has a large learned component, then it follows that we also learn our proxemic behavior.

The subject of aesthetics may be more important and provide a more valuable perspective for environmental psychologists than at first appears. Kant among the philosophers first emphasized that now we generally accept structuring or patterning as a feature of all human activity and study aesthetics directly; as Kant realized, we engage in aesthetic contemplation. In studying aesthetics therefore, we study the very stuff of mind, the most central subject of psychology, including aesthetic psychology.

Each of us has many different worlds inside our heads, and that these notions of the world are constructed in the context of a series of ongoing transactions between ourselves and the environment. Following Kant and Cassirer, as well as Piaget and Werner, knowledge is neither given a priori before experience or through pure reason independent of experience, nor is it strictly a product of experience through reinforcement of stimuli impinging on a passive person. Rather it is argued that in as much as there is no way for us to know the nature of reality except through the minds of persons, it is impossible to

separate what is known from what is real. Reality can only be known through the efforts of particular minds, and is the product of an active construction of thought.

All knowledge is influenced by experience. Knowledge is the product of the active process of human understanding applied to sense-experience. Behavior is a dynamic interaction between internal organism factors (genetic and biological, values, goals, intentions and knowledge) and external situational demand, social, cultural and historical factors (Wagner, Kaplan and Cohen, 1973). Thus, behavioral transactions with the environment are mediated in part by the individual's knowledge, or cognitive representations of the total environment–behavior situation.