

## INTRODUCTION

This research is a comparison of two psychological theories of visual perception, Gestalt Theory and an Ecological Theory developed by J. J. Gibson, with two theories of architectural composition, theories developed by the Ecole des Beaux-Arts and theories of the Modern Movement in architecture.

The objective of the research is to clarify the relation between the psychology of perception and building composition, and thereby to affect how architects are educated and practice. This is not the first time architectural theory has been evaluated and rethought based on advances in science. It will become clear, in the main body of the research, that each architectural theory analyzed here has relied, to some extent, on contemporary theories in science and other fields. However, the architectural theories of the Ecole des Beaux-Arts and of the Modern Movement, which dominate architectural practice and education, have not attempted to reconcile their outlooks with current advances in science. This research is to discover whether these theories of architectural composition are supported by current theories in visual perception, and if not, whether the theories of visual perception suggest a reordering of priorities in the design theories or a rejection of the theories.

These are relevant questions in architectural education and practice because compositional design theories have the objective of ordering built form to express an idea as well as to create a usable and meaningful environment. The psychology of perception is the science of how objects, ideas and situations are perceived. It would seem logical then, that any design theory committed to communication through formal manipulation would exhibit congruence with the capabilities of the receiving mechanism, in this case, the human observer. These capabilities are scientifically defined in the psychology of perception.

Since the way information is ordered by human observers is to some extent biologically determined, it would seem that any discrepancy between how information is received and the intended method of communication would be rectified by adjusting the transmission, or in this case, compositional theory. As will be seen later, this statement does not describe the only course of action. The human perceptual system has great flexibility in adapting to theoretical constructs, including compositional and spatial ones, regardless of their scientific validity.

Thus, while the prime objective of this research is clearly the comparison of theories to find compatibilities, the ramifications of the subtle interactions of the two perspectives are of equal interest.

## The Context of Theory

Theories in Psychology and Architecture vary greatly in their implied or stated scope of applicability from absolute to varying degrees of predictability within a context. This makes them difficult to compare. It is important to this work to specify these ranges of applicability; a conflict will occur when one theory claims absolute applicability while a contrasting one suggests extreme relativity to a context.

The field of environment-behavior research has suggested a strong relation between culture and perception, that perception is highly influenced by cultural predilection. Thus the range of any theory of perception would be limited to a specific culture and its social belief systems. This stance seems the most relative one and suggests a high probability for conflict with architectural theories.

Psychology has a range of theories, from ones close to the environment-behavior concepts to ones more concerned with the structure of perception. These latter theories assume a consistency in the human perceptual system that is cross-cultural. Although there is a level of relativity in the arousal of the system, this is at a narrower range than cultural determinants. It is these theories that are more compatible with architectural theories.

Architectural theories have a tendency to assume that they are absolute and irrefutable. Theories of composition and symbology are considered to apply cross-culturally. The exception is the formation of a building program, generally assumed to be culture-bound and context-specific.

Architectural historians codify architectural theory. Juan Bonta has done an important analysis of some 20th century architectural historians and has shown conclusively that their analysis of buildings is internally consistent with their analysis of other buildings, but can contrast dramatically with other contemporary historians' interpretations.<sup>1</sup> He concludes that historical writing is relative to the individual's tastes which are part of his culture and training. This would suggest that there is no consistent interpretation of architectural form that is cross-culturally accepted.

For this work to be useful then, the assumption must be made that there is an underlying structure to vision and that to some extent this affects perception of architectural form. This does not deny the importance of culture in how perception occurs. It may be the case that both processes work simultaneously and that in any particular circumstance, perception has components of both interpretations.

In architectural education and practice, the issues of cultural relativity of form interpretation and the role of learning in this interpretation evoke profound questions. All theories maintain that culture is primarily transmitted through learning. The question is, at what point is it valid to assume a cultural norm as a basis of design and to forego the potential of continued education of the viewer. If it is appropriate to learn culture, is it not appropriate to let it evolve and help it where possible? The danger is, of course, that because architecture addresses so many people with varying cultural backgrounds and lasts longer than phases in a culture, it will always attract criticism and reinterpretation.<sup>2</sup> If these interpretations are out of the control of the architect because of the variety of viewers and the evolution of interpretation over time, is there a simpler layer of interpretation based on the structure of vision that is available for architectural manipulation, and is it important? The assumptions in this research are that such a structure exists and that it is important. Expressing the relative importance of this structure is an underlying objective of the work.

#### The Selection of Theories

The selection of the Gestalt and Ecological theories in the psychology of perception was based on several criteria. The primary criterion is that the theories are currently considered valid in their field. Although both theories have their detractors, they are generally supported by large sub-groups within psychology. They represent major competing conceptual frameworks in contemporary psychology. In addition, these two have been chosen from among other general theories because they emphasize the importance of visual perception and therefore seem most compatible with theories of architectural composition. The relation between Gestalt theory and architecture has been explored recently by Arnheim, Jules and Prak, and the impact of Ecological theory on design has been outlined by Lang.<sup>3</sup> A third criterion is that the theories state clear structures for vision that have implications for composition that are not entirely culture-specific.

The architectural theories of the Ecole des Beaux-Arts and the Modern Movement were selected for similar reasons. They contrast, and yet they are the primary theories in contemporary architectural education. In practice, the Modern Movement can not be considered dead, and Post-Modernism seems to begin with a classical compositional base which is then exaggerated in several dimensions for recognition and symbolic reasons. Although there are several other compositional theories, these two cover the broadest spectrum in education and practice, and underly or have been the genesis of a number of newer theories.

In both fields, theory is continually evolving. In psychology, this is generally an additive process that strengthens the initial conceptualizations. Divergent conceptualizations tend to produce new theories. In architecture, the evolution of a theory is more complex and less linear; in many instances, new conceptualizations modify parts of old theories while not entirely eclipsing them. Therefore, it is important, particularly in the architectural field, to define a theory at a particular phase of its evolution.

This analysis and comparison is not an attempt to trace meticulously the derivation of the theories presented. It is not to study the incubation of an idea but to examine it in some fuller form. Therefore, this work will concentrate on each theory in its developed form, when it had greatest influence on people in the field and its major challenges and/or evolutionary change had yet to take place.

With the exception of the Beaux-Arts, the theories at the selected time of evolution are championed by their principle innovators. The Modern Movement is represented by the ideas of Gropius at the Bauhaus and later in the United States, by LeCorbusier and Aalto in Europe and by Wright in the United States. Gestalt theory is presented through the eyes of its initiators, Wertheimer, Koffka and Kohler, and the Ecological theory by J.J. Gibson in the present. The Beaux-Arts has been evolving since the age of Pericles. Since the Greek texts and monuments have been destroyed, Vitruvius has been the only direct interpreter of that world. Alberti then interpreted Vitruvius and Roman building, as did Palladio. The Beaux-Arts grew from all these basic texts and from what various theoreticians could observe from ruins remaining from antiquity. As a singular conceptual framework it last stood alone in France around 1850 just before Labrousse, Garnier, and Viollet-le-Duc brought major challenges to it. It is in this form that Beaux-Arts theory will be considered in this work.

#### The Relation Between the General Structure of Theories in Architecture and Psychology

Common to both types of theories are the assumptions that there is order in the environment and that humans perceive that order. However, the scope of theories in psychology are greater than theories in architecture; architectural theories generally are limited to the creation and perception of order in buildings or landscapes, while psychological theories are concerned with the entire range of environment and human behavior.

The basic difference between the psychological and the architectural theories concerns their goals. Architectural theory is prescriptive; it focuses on what should be done. Psychology, as a pure science, is descriptive of how and why

people behave; it can be useful in predicting behavior. In this light architectural theory strives for a utopian condition while psychology simply attempts to identify the reality of the present.

In any study relating two divergent fields to each other it is important to clarify the differences in approach to problem identification and solution. This identification pinpoints the conceptual differences between the fields which may underlie the primary conflicts found in more detailed analysis. For architecture and psychology the differences can be identified in a comparison of their definitions of what they observe, to what they attribute observed relationships, and how they verify their observations.

Psychology is the study of perception, thought and behavior in relation to physical, social and conceptual environments. Psychology observes people and the environment to identify relationships between the two. The correlations between a change in the environment or mind and changes in behavior or thought are the basis for theory. An ordering of these correlations and the explanation of the significance of this ordering is a theory.

In addition to correlations between the behavior of man and changes in the environment, this science requires a concept for the initiation of action or thought. The conceptual framework for this initiation is generally one of satisfaction or equilibrium. If a biological, social, conceptual need is strong enough, it provides the underlying motivation for action until it is satisfied. The satisfaction of a motivational force returns the organism to an equilibrium. Verification of observations and theories in psychology is done through the application of the scientific method. While the theories used in this research are commonly considered theories of visual perception, their originators feel that they are comprehensive theories that have been developed and tested furthest in the area of visual perception.

Architectural design is the determination of the function, form, orientation, structure, space, material and construction of buildings. Design theory is a rationale for architectural design as well as a system for evaluating and interpreting architecture. A theory may or may not address all the issues of architectural design; most do not. Although architectural theorists observe the same things as psychologists, ie. both people and the environment, the framework is more specifically related to buildings and landscapes, and the behaviors or thought patterns are predominantly those of other theorists or architects. The reference system for architectural theorists includes architecture and architects, with minimal interaction with the society at large. Architectural theory assumes that a

change in the physical environment will cause a predictable response in behavior and thought.

As in psychology, architectural theory needs an underlying concept for satisfaction with an environment. Architectural theorists usually relate satisfaction with usability of an environment and beauty which is said to derive to some extent from perceived order and social symbolism. This type of satisfaction can be considered a subset of the psychological definition of satisfaction of motivational needs. The underlying assumption in architectural theory is that people need visual and symbolic order and that there is satisfaction in both creating order and perceiving it.

In some instances, architects verify their observations and interpretations scientifically, but the more common methods are through personal experience of environments and on precedents set in philosophy and architectural theory.

#### The Research Method

The research method is a literature search. The architectural compositional theories will be presented in four parts to facilitate comparison with each other and the psychological theories. These parts are Geometry, Development of Hierarchy within a composition, Mood or Tone of a composition, and explicit Symbol Systems.

Geometry refers to patterning of architectural plans, elevations, sections and solid form, which usually, but not always, follow regular geometric shapes. In this instance, geometry is not an abstract mathematical science of points, lines and planes, but instead deals with the selection and allocation of building elements in patterns that relate to each other. Hierarchy in architectural composition is the order in which the importance of various architectural forms are ranked and related in their context. Hierarchies are based on ideas of sequencing, proportionality and symbolism. Mood or Tone of a composition is difficult to define. It is intended to identify feelings that are not amenable to verbalization and are not verbalized in the process of experiencing them. It covers feelings of well-being that are perceived sensorially, such as the smell of a breeze on a spring day as one overlooks a familiar valley. Explicit Symbols are forms that are intended to represent a clear concept. For example, a bell tower of a church is an explicit symbol of church. The word explicit is utilized here because, from some psychological viewpoints everything has symbolic content including moods and tones, whereas others prefer to limit the meaning of symbols to a more infrequent mental activity. The choice of this separation is made to clarify differing architectural intentions and should not be considered an evaluation of psychological theories.

Geometry and Hierarchy within a geometric pattern have sometimes been called formal design principles, but they are simply coordinating systems in space. A formal system also includes both general and specific symbol systems, the latter two parts of this analysis format.

Footnotes

1 Juan Pablo Bonta, Architecture and its Interpretation, (New York: Rizzoli International Publications, Inc. 1979).

2 Good analysis of architectural criticism can be found in:

Wayne Attoe, Architecture and Critical Imagination, (Chichester and elsewhere: John Wiley, 1978) and in:

Juan Pablo Bonta, Architecture and its Interpretation.

3 Rudolf Arnheim, The Dynamics of Architectural Form, (Berkeley: University of California Press, 1977).

Frederick Jules, Form/Space and the Language of Architecture, (Milwaukee: Publications in Architecture and Urban Planning, Center for Architecture and Urban Planning Research, University of Wisconsin-Milwaukee, 1974).

Niels Prak, The Visual Perception of the Built Environment, (Delft: Delft University Press, 1977).

Jon Lang, "Theories of Perception and 'Formal' Design," in Designing for Human Behavior, ed. Jon Lang et al. (Stroudsburg, PA: Dowden, Hutchinson & Ross, 1974), pp. 98-110.