AESTHETIC EVALUATION OF ALTERNATIVE HOUSING

A METHODOLOGICAL DEVELOPMENT

By

YEUN SOOK LEE

Bachelor of Science
Yonsei University
Seoul, Korea
1977

Master of Science
Yonsei University
Seoul, Korea
1979

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- A METHODOLOGICAL DEVELOPMENT

Thesis Approved:

Margaret Weber
Thesis Co-Adviser

Bruce Gatt
Thesis Co-Adviser

Carl Hall

Beverly Crabtree

C M Taylor

Norman N Durham
Dean of the Graduate College

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CHAPTER I

INTRODUCTION

In recent years, the energy crisis has fostered a great deal of interest and creative activity in new forms of housing. Two major types of dwellings which have been identified as definite alternatives are solar and earth sheltered housing. In addition to the potential energy savings of such housing there are the benefits of greater protection and durability as well as environmental enhancement (The Underground Space Center, 1981).

Solar energy is a vast and relatively untapped energy source, available to all but, as yet, used by only a few. The technology, however, for solar energy utilization is becoming increasingly available (Chahroudi, 1978; Clauliaguet, 1977; Cook, 1976; Duffie, 1979; The Encyclopedia Britannica, 1972; Howe, 1979; Lof, 1979; Solar Energy Handbook, 1979; Yellott, 1978). According to the National Technological Institute of Science (NTIS) review of previous surveys, attitudes toward the idea of solar energy are favorable (Farhar, 1979). Although less than one percent of the population have purchased solar systems, the majority of Americans appear to support federal efforts to develop solar energy and incentive programs to encourage its use.

Housing, as a basic human dwelling place, has had increasing problems, especially for low and moderate income people. The Housing Acts of 1949, 1968, 1974, and 1979 indicate one of the objectives is "to

provide a decent home and a suitable living environment for every American family" (Housing Act, 1979). The energy crisis shed light on a new dimension of solving housing problems. Housing is important to all of us, but it is especially important to low income persons (Montgomery, 1976). The Southern Regional Project 141 proposal (1979) points out that housing problems exist mainly with low income families. Findings are as follows:

> Low quality is concentrated in the South. Despite considerable improvement in the quantity and quality of rural housing during the years 1950-1975, fully one-half of the nation's 4 million units of substandard housing was still found in rural areas (Bird and Kampe, 1977) even though the rural areas accounted for only 33 percent of the nation's housing inventory. According to another estimate, approximately 13 million of the nation's 63 million households suffered from one or more forms of housing deprivation and more than 4 million of these were in the South (p. 1).

To provide rural families with a better housing environment, and thereby to increase the quality of life, all possible alternatives need to be utilized.

The evaluation of the quality of living environments is being emphasized in the United States. The emerging field of environmental psychology has yielded writings from many disciplines which have illuminated and stimulated questions about aesthetic perception and meaning. Moreover, aesthetic aspects are becoming a major concern in the environmental design research field (Berleant, 1982; Findlay and Field, 1982; Greenbie, 1982; Kaplan, 1982; Lang, 1982; Saccopoulos, 1982; Talbot, 1982).

The term "aesthetic" has appeared in many of the federal and local guidelines for project planning (U. S. Environmental Protection Agency, 1973) as well as in various types of research. As a result, there has

been an increasing need for the planner and researcher to be able to make rational decisions in cases where the aesthetic factors must be considered concurrently with social, technical, economic, and ecological factors (U. S. Environmental Protection Agency, 1973). Once a house is built to meet family needs, it, in turn, should be evaluated according to behavioral, psychological, economical, and aesthetical aspects. The economic and behavioral approaches to investigating the quality of life have been supported by numerous studies while the aesthetic approach has rarely been studied.

In House Form and Culture, Rapoport (1969) suggests that homes are not built primarily to fulfill essential physical requirements but rather to satisfy psychological needs. He further contends that in America the ideal home is not functional but aesthetic.

Cook (1976) emphasizes solar aesthetics and incentives. He contends, the appearances of solar buildings are revealing of their intentions and incentives, in other words, building appearances suggest building motivation. The importance of the aesthetic aspects of the solar house has been mentioned, however, he did not allude to the urgency of developing an evaluation instrument to assess the aesthetic quality of a solar house.

Ethnographic research and practical architectural manuals for the earth sheltered house have been developed (The Underground Space Center, 1979, 1981; Gropp, 1978; Sterling, 1981; Wade, 1977). However, there is very little research reported addressing perceptions of the psychological effects of underground houses which would include the aesthetic effects (Volkman, 1981).

One's quality of life is directly related to the happiness of human

beings. Of all types of happiness, the happiness of contentment is relatively best (Strasser, 1977). Aesthetics, an indispensible aspect for the quality of human life, has long been considered one of the best ways to achieve the happiness of contentment.

In summary, it was hoped 1. that this research would be used as a basis for a practical commitment to evaluating housing alternatives for the quality of life of rural families to raise the standard of human life and 2. that the aesthetic aspect of alternative housing could be used as an incentive for disseminating alternative housing, along with the economic incentive. To accomplish this, it was necessary to develop and validate a methodology, including the instrument and the process of using it, to measure the aesthetic qualities of housing environments.

Purposes and Objectives

This study involved an aesthetic dimension of alternative housing which would be useful to housing professionals in management of issues for: 1. distribution of alternative housing throughout the United States, 2. alleviation of energy problems through energy efficient alternative housing types, and 3. quality of life questions pertaining to low- and moderate-income families seeking housing in rural areas. The purposes of this study were:

1. To develop a methodology which measures the aesthetic qualities of housing environments.
2. To validate the developed methodology by testing existing theories.
3. To evaluate aesthetic qualities of alternative energy

efficient housing environments with the developed method.

Four specific objectives were developed to guide this study. The objectives were:

1. To develop a methodology including the instrument and the procedure of using it, which measures the aesthetic qualities of housing environment.
2. To test the developed methodology using conceptual frameworks derived from already established theories.
3. To measure and evaluate the aesthetic quality of alternative housing in comparison with the results of measuring the aesthetic quality of conventional housing.
4. To provide practical information and recommendations on the aesthetics of alternative housing to practitioners, researchers, and theorists in the area of aesthetics and housing.

Research Strategies

The consecutive research strategies including research questions, declarative hypotheses, and null hypotheses were formulated in relation to the specific objectives of this study. Since hypotheses could be stated only after several research questions were answered, specific hypotheses were stated after the relevant research questions were answered. The research questions raised at the beginning of this study are arranged under each objective.

Objective One:

Research Question 1. What are the most representative descriptors to measure the aesthetic quality of housing

environment?

Research Question 2. What aspects within the aesthetic domain are explained by those descriptors, in other words, what is the factor structure or pattern among the descriptors?

Research Question 3. How can the aesthetic quality be measured using those descriptors?

Objective Two:

Research Question 4. Are there any firmly established theories which can provide a conceptual framework for testing the developed methodology?

Research Question 5. What are the possible propositions to support and expand the power of these theories which can be tested using the developed methodology?

Objective Three:

Research Question 6. What are the profiles of the ideal and present aesthetic housing environment for the total respondents, people living in conventional housing, and people living in alternative housing, respectively?

Research Question 7. Are there any differences among people living in different housing types in satisfaction with the total dwelling, interest in the aesthetic quality of the house, satisfaction with the aesthetic quality of the house, perceived objective aesthetic quality of the house, and scores of the aesthetic quality measured by the developed methodology?

Research Question 8. What and how many descriptors meet the

desire for ideal aesthetic housing environment in case of the total respondents, people living in conventional housing, and people living in alternative housing?

Objective Four:

Research Question 9. What descriptors are significantly different in describing the ideal housing environment among people living in conventional and alternative housing such as solar and earth sheltered housing?

Research Question 10. What descriptors are significantly different in describing the present housing environment among people living in conventional and alternative housing such as solar and earth sheltered housing?

Research Question 11. What descriptors are perceived significantly different in terms of the importance of meaningfulness among people living in conventional housing, and alternative housing such as solar and earth sheltered housing?

Assumptions and Limitations

In the preparation for this study, the following assumptions were made. It was assumed that responses of participating families are the indicators of their opinions and perceptions. The study was limited to a relatively convenient area to be compatible with available funds and time. Subjects for this study were limited to household head or spouse.

Definition of Terms

In order that an accurate understanding and interpretation of the

study might be assured, it was necessary to define the following terms:

1. Conventional home - a housing unit designed for one family, surrounded on all four sides by land, and built using standard construction techniques.
2. Passive solar home - a housing unit using a passive solar system which operates on natural physical forces such as thermal convection, wind, gravity, and other natural physical phenomenons, without utilizing any auxillary power for distribution or operation of the system.
3. Active solar home - a housing unit using active solar (heating) systems which commonly consist of solar collection panels, plus a storage medium to hold the heat collected during the day, and a set of automatic controls that monitor and regulate both heat collection and delivery between the storage medium and the living space.
4. Earth sheltered home - a housing unit using the earth to reduce both heating and cooling requirements. The superior energy performance associated with earth sheltering is due in part to the use of earth berms, which provide protection from wind, thus reducing infiltration. Moreover, the surfaces of the structure are exposed to more moderate temperatures below grade than occur on the surface. In addition, the berms of earth create a seasonal time lag, resulting in warmer winter and cooler summer temperatures.

These definitions were taken or modified from publications in the

housing area following an extensive review of current literature.

Organization of the Study

Considering that this research includes essentially three different, and consecutive studies, i.e., developing methodology, testing the developed methodology, and aesthetic evaluation of alternative housing, this study was organized into six chapters. Chapter I provides (1) an introduction to the problem, (2) a statement of purposes and specific objectives, (3) the research strategies, (4) recognition of assumptions and limitations, and (5) definitions of terms pertinent to the study. Chapter II is a review of literature relevant to the aesthetic evaluation of alternative housing environments, including (1) aesthetics, (2) aesthetics in environmental study, (3) research precedent on the measurement of qualities of built environments, and (4) energy efficient housing alternatives. Chapter III describes the research methodology and procedures used in developing the preliminary instrument. Each of two pilot studies is described in detail in terms of the purpose, methods, and results. Chapter IV describes the research methodology and procedures used to test the preliminary instrument for the purpose of developing the final instrument, and to test the final instrument and its use in terms of its reasonably congruent results with two already established theories. The purpose, testing models, methods including instrument description, population and sample selection, collection and analysis of data, and results are described. Chapter V describes the whole procedure used to evaluate quality of alternative housing. The purpose, methods, findings and discussion, and conclusions are included in detail. Chapter VI

summarizes the study in relation to its objectives, and further interprets the results. Conclusions and recommendations are proposed.

Summary

In light of the increasing energy problem and demand for better housing, various types of energy efficient alternative housing have been developed and their ultimate economic advantages have been emphasized by energy efficient housing developers. Unexpectedly the economic incentives have not functioned powerfully enough to be used in disseminating alternative housing. Therefore, it was the purpose of this study to find additional aesthetic incentives which could be used along with the economic incentives to disseminate energy efficient alternative housing throughout the southern part of the United States. To achieve valid and accurate results in relation to the purpose, it was necessary to develop the methodology and test the developed methodology, including the instrument and the process of using it, to measure the aesthetic qualities of housing environments.

CHAPTER II

REVIEW OF LITERATURE

Considering that this study deals with the aesthetic quality of alternative housing environment, this chapter includes four sections as follows: (1) aesthetics, (2) aesthetics in an holistic environmental perspective, (3) research precedent on the measurement of qualities of built environments, and (4) energy efficient housing alternatives. For the aesthetic section, five aspects were reviewed: (1) definition, (2) three aspects of aesthetics, (3) aesthetic value, (4) evaluation of an object and evaluating factors, and (5) definition of aesthetic terms. To understand aesthetics in the context of the whole environment, the third section was recategorized into two subtitles: (1) two holistic environmental perspectives, and (2) aesthetics as an environmental issue. The third section, research precedent on the measurement of qualities of built environments was again divided into (1) support for research developing measurement of aesthetic quality of environments, (2) descriptors developed until now and the relevant environments, and (3) methods to measure the environmental quality.

Aesthetics

Definition

There is a considerable difference of opinions regarding the

definition of aesthetics. Among the various definitions, "The science of beauty and ugliness" seems best suited for the study of housing environment (Langeld, 1920, p. 34). Lee (1938) also emphasizes the presence of the words beauty and ugliness in an aesthetic definition, since aesthetics actually covers both aspects.

There are wide divergences of opinions concerning the aesthetic experience, yet beauty is all around us in things both natural and artificial (Sircello, 1975). Therefore, the appreciation of beauty is an everyday occurrence for everyone, but it is little understood even by those to whom it occurs most frequently (Lee, 1938).

Three Aspects of Aesthetics

In order to understand "aesthetics", three aspects are to be kept in mind: the philosophical, the psychological, and the objective (Langfeld, 1920). Philosophy supplies the general principles underlying aesthetics in the same manner as it does in other sciences. Psychology analyzes the behavior of the observer in so far as the peculiar adjustment called "aesthetic" is concerned. The objective side analyzes the arrangement and qualities of the object with a view to their effect upon the adjustment (Langfeld, 1920).

As a first step, aesthetics, as a branch of philosophy, is important because it is the attempt to understand one particular portion of experience and the nature of the value apprehended in that experience. The aesthetic experience is the experience of an aesthetic value which is more akin to the affective experience than to the intellectual; so it is a feeling, not knowledge. The experience is not a kind of knowledge, but it is possible to have knowledge about it. The

apprehension of an aesthetic value is not a judgment, but it is possible to make judgments concerning it. It can be thus evaluated (Lee, 1938).

The original functions of the aesthetic study are to understand the experience and to explain human behavior, which are philosophical and psychological, respectively. The major purpose of this study, however, is to analyze and evaluate aesthetic qualities of objects, thereby to apply the results.

Aesthetic Value

The aesthetic value arises in a certain relation between an individual and his environment. This relation arises from the fact that the individual seeks or avoids contact with particular parts of his environment, and it finds its expression in an attitude of the individual. Some people call this relation "interest", others "desire" (Lee, 1938, pp. 13-15). Hence, any value is a function of two variables: the attitude or interest of the individual and the environmental object of this attitude. The attitude and object are essential to each other; the relation between them is an internal relationship, and it is in this relationship that a value becomes realized (Lee, 1938).

Lee defined the aesthetic attitude as ". . . the attitude of complete occupation with perceptual data considered in their own nature, not as signifying or resulting in anything else" (Lee, 1938, p. 19). Hence, he distinguished perceptual intuition from perception of fact which is cognitive and intellectual, and considered only perceptual intuition in the aesthetic attitude. Perceptual intuition is the direct

awareness of that organization of data immediately apprehended through the senses or in sense imagery. Perception of fact uses this intuited data as signs and symbols, but this is beyond intuition (Lee, 1938).

Values can be classified also according to their structure, and this gives the distinction between intrinsic and instrumental values. The ordinary elucidation of the distinction between them is that an intrinsic value is valuable as an end in itself, but an instrumental value takes its value from the fact that it is a means to a valuable end (Lee, 1938). An intrinsic value is such that the evaluating factor is within the experience itself. An instrumental value is such that the evaluating factor lies outside the actual immediate experience. Lee also distinguished all aesthetic value as intrinsic value (1938). Therefore, perceptual intuition leads to intrinsic value, while perception of fact leads to instrumental value.

The majority of aestheticians, however, have included the "utility" concept in their definitions, which corresponds to "perception of fact" (Langfeld, 1920, p. 2). We really value most things for what we can do with them, for the benefit we derive from them. This "utility" concept seems very practical to an environmental study. Santayana (1936) describes the utility as follows:

> Utility is itself its essence of beauty, that is, that our consciousness of the practical advantages of certain forms is the ground of our aesthetic admiration of them. . . . to be beautiful because . . . , the house because it is convenient to live in (p. 119).

Aesthetic object is a unity of two factors: the content, or that which is embodied, and the body in which it appears. The whole is called "embodiment". The character as a whole or unit varies 1. with the nature of the parts, 2. with the relative importance given to one

part or to another, and perhaps 3. with the thoroughness or lack of thoroughness of their fusion. These are, formally, three possibilities, not necessarily mutually exclusive. The relative importance given to content or to body will affect the kind of aesthetic whole. This will partly depend upon the nature of the parts, partly upon the viewers' interests (Reid, 1954).

Figure 1 shows the summary of the relationship between aesthetic object, aesthetic attitude, and aesthetic value. Briefly, the aesthetic value is a function of the attitude or interest of the individual and the environmental object of this attitude. Through the attitude, the value of an object can be realized. An aesthetic object is a unity of two factors: the content and the body. Aesthetic attitude, often called interest or preference, includes two aspects: perceptual intuition of affective state, which leads to the intrinsic value, and perception of fact of cognitive state, which leads to the instrumental value of an object. These two aspects of attitude cause an object to have an aesthetic value which can be either pleasant or unpleasant.

For example, the aesthetic value of a house is a function of the attitude or interest of a person and the characteristics of a house, which include both mere physical shape and qualities, and feelings in it. If an individual's attitude is mainly based on perceptual intuition of affective state, for example, if he likes a house with big windows without specific reasons, that attitude leads to the instrumental aesthetic value of the house. The aesthetic value of the house can be either pleasant or unpleasant. On the basis of the direction and intensity of this condition, it can be evaluated.

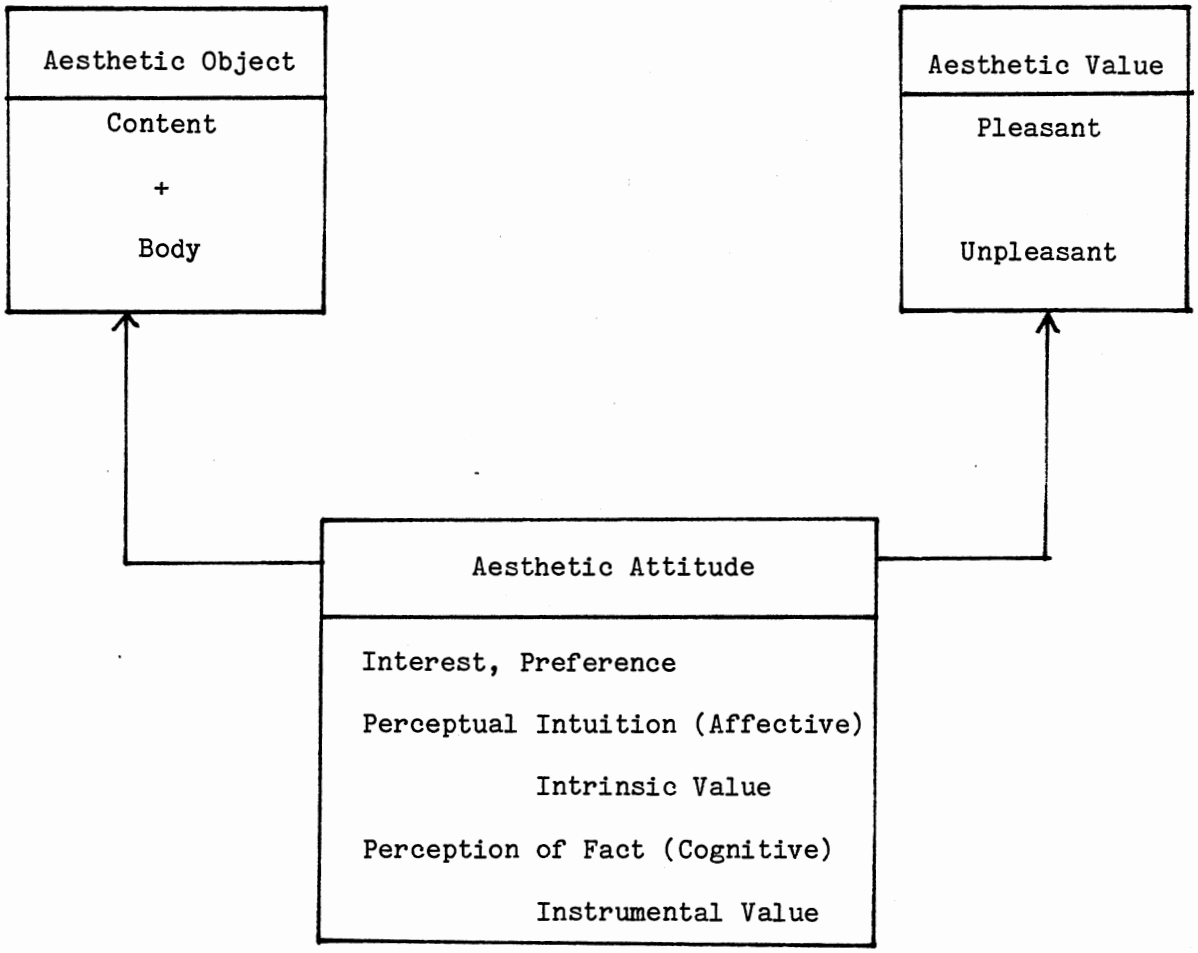


Figure 1. Internal Structure of the Aesthetic Value Developed by the Researcher

Evaluation of an Object (and Evaluating Factor)

An evaluation of an object is a judgment concerning the value of that object. Aesthetics where it may be concerned with evaluations is concerned with them only because they are about actual values (Lee, 1938).

Both polarity and intensity of values are explained by a measure for the comparison of values. Value is polar because there are positive values and negative values. The polarity is expressed in the common antitheses of beauty and ugliness and good and evil. Values also differ in intensity which is a datum, and a theoretic principle for the measure of the intensity needs to be found. The intelligibility of intensity and polarity depends upon comparison; therefore, if one can find a factor by reference to which values can be compared and measured in terms of one another, one can explain the data of intensity and polarity. It then becomes apparent what place they have in relation to all the other parts of the aesthetic experience (Lee 1938).

Pleasantness is that affective state of consciousness, the conditions of which tend to be repeated or held or kept or continued, while unpleasantness is that affective state of consciousness, the conditions of which tend to be avoided (Lee, 1938). The function of the organism is life, and the affective state that accompanies this which it tends to keep or continue is pleasantness. The fact that pleasantness is the only adequate evaluating factor is apparent from the fact that it is the only reason for maintaining the aesthetic attitude. In short, pleasure is the evaluating factor for aesthetic value: the more pleasure, the more positive value; the less pleasure, the less value.

In the history of aesthetics, the pleasure of the aesthetic experience has been variously called satisfaction, agreeableness, or delight. Any of these terms is suitable if it is used to denote the fundamental affective state (Lee, 1938).

Pleasure is the evaluating factor which explains the intensity of aesthetic value; but the scale of intensity is not the same as a standard of preference even though more intense values may be preferred. In order to account for preference, it is necessary to take into consideration the reasons why one has the pleasure that leads him to prefer some things to others. Furthermore, once a standard of preference is established, it itself is a factor in determining future pleasures and displeasures. A standard of taste is the measure of preference of aesthetic value (Lee, 1938). David Hume describes the innocent and unavoidable quality of preferences. He said that preferences can never reasonably be the object of dispute, because there is no standard by which they can be decided (Lee, 1938). However, preference research provides information concerning the affective relation people have towards certain kinds of environments. The guidance of the organism's moment to moment behavior is substantially influenced by affect. For example, the selection of a house is influenced by the "attractiveness" of the stimulus patterns. Attractiveness, in turn, is analyzed in terms of the interest and pleasure elicited by the particular pattern.

Definition of Aesthetic Terms

Many terms which are necessary for aesthetic study have been used differently, consciously or unconsciously. To understand the review of

literature, several terms and the relationships among them need to be defined. Figure 2 has been developed by the researcher to conceptualize those terms.

The term "sensation" means the conscious response to the stimulation of a sense organ or nerve receptor. Perception involves selection among sensations, combination, organization and sometimes supplementation from the imagination. Sensation is amorphous; perception is of form. The object of the aesthetic attitude is that which can be perceived. Sensations are the content of perceptions. Sensations are content for perceptual intuitions which, in turn, may be content for perceptions of fact.

There are two kinds of perception: perception of fact and pure perception, or perceptual intuition. Perception of fact is cognitive and intellectual. It involves the activity of the understanding. Perceptual intuition is the direct awareness of the organization of data immediately apprehended through the senses or in sense imagery.

The difference between the pleasure of bodily feeling and the pleasure of beauty is the difference between private and subjective pleasure and common and rather objective pleasure (Lee, 1938). According to Santayana's (1936) definition of beauty, beauty is objectified pleasure.

Sensation is the content of perception, and emotions are caused by perception. Consequently, the aesthetic experience is usually emotional and this emotion is relevant to aesthetic value, but it is not an essential or definite character (Lee, 1938).

The term "feeling" refers to affective states when used both in the

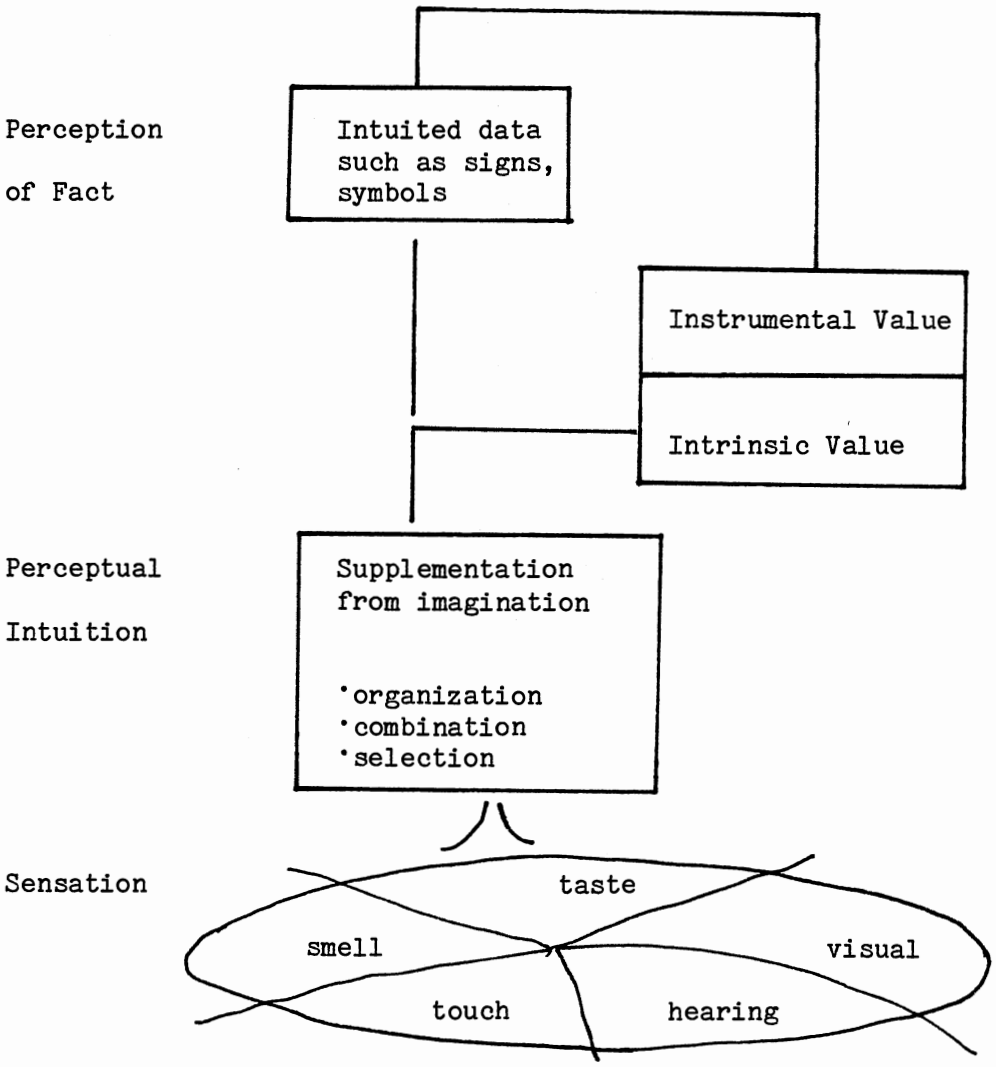


Figure 2. Relationship Among Perception, Sensation, and Value Developed by the Researcher

sense of emotion and in the hedonic sense (Lee, 1938).

Aesthetics in an Holistic Environmental Perspective

To understand the relationship between environmental quality and aesthetic dimension, Morrison's (1975) two analytical frameworks which allow the conceptualization of the wholeness, the complexity and the interdependency between man and his environments are reviewed below. Whenever an environmental problem is raised, the first thing to figure out is where the problem belongs within an holistic environmental perspective.

Two Holistic Environmental Perspectives

Ecology is the unifying, integrative approach that makes intelligible the degree of relationship between a living organism and its environment. The ecological perspective indicates the range and scope of possible human environed units that can come under consideration. Figure 3 is the perspective of environment by Morrison. The environment is defined formally as being "that which environs surroundings; specifically, the aggregate of all the external conditions and influences affecting the life and development of an organism, etc., human behavior, society, etc." (Webster's Dictionary).

Environment. The natural environment reflects both physical and biological materials and energies. Raw and unmodified materials of the natural environment are the resources which people use to produce their own environment. The natural energies not only directly affect humans

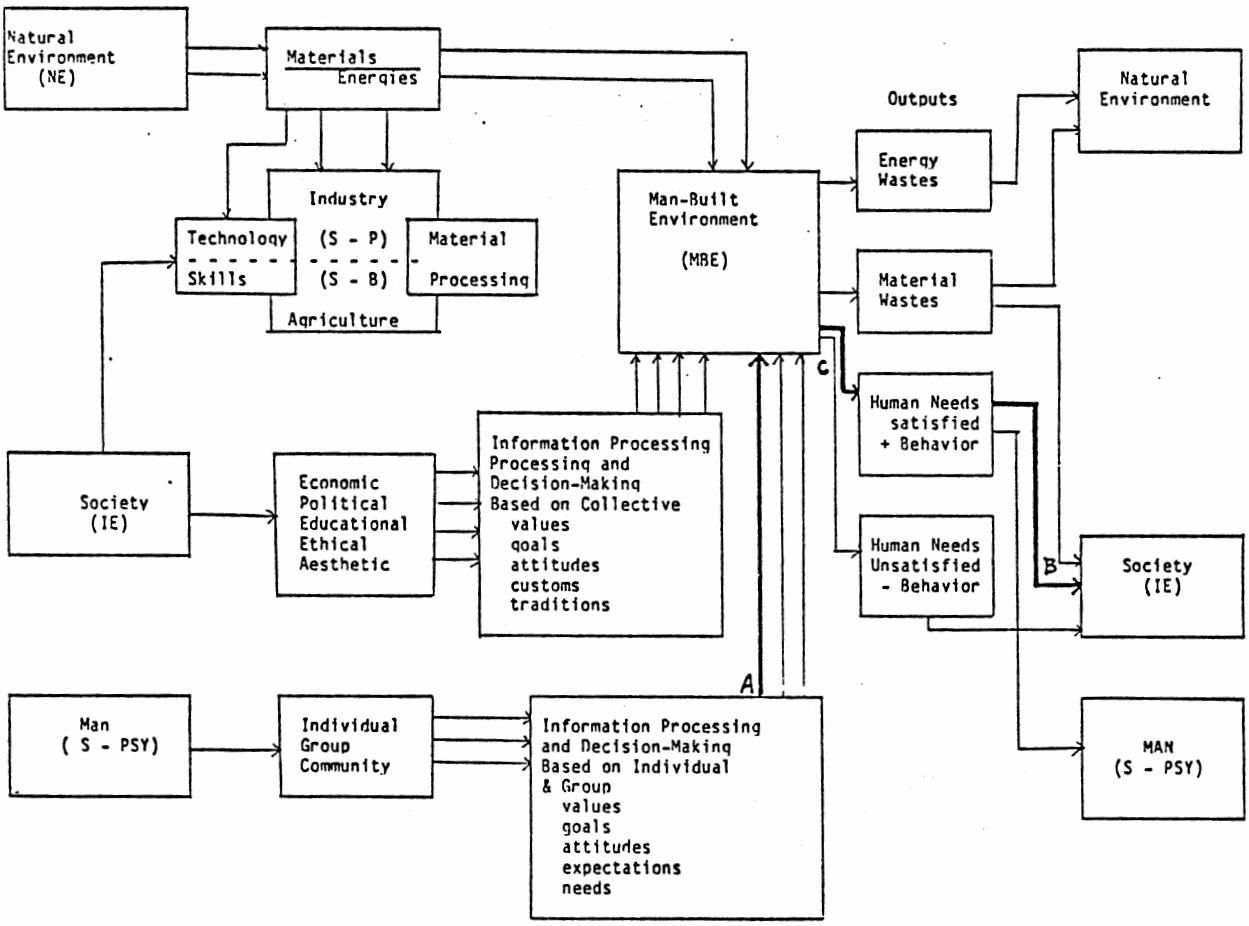


Figure 3. Environment (Morrison, 1975)

and their built environment, but also become modified as the power sources which support the complex built environmental systems.

The man-built environment represents the transformation of the natural physical and biological environments which occur in the process of people adapting nature to their needs. The two major aspects of the man-built environment follow: 1. the socio-physical environment which generally includes the physical or inorganic materials which are transformed to meet human needs; and 2. the socio-biological environment which consists of the plants and animals bred or cultivated as the basis for food, clothing and shelter. Thus, the man-built environment is physiologically prosthetic; it supports behavioral goals through maintenance of required physiological states, and is behaviorally prosthetic in that it intentionally configures behavioral topographies. Therefore, the built environment affects the physiological-biological, as well as the socio-psychological life of man.

In the behavioral environments, the socio-psychological environment brings the processed information and the decision-making which, to some degree, affects the eventual shape and form of the man-built environment and reflect the satisfaction or non-satisfaction of the built-environment to meet human needs. Fulfilling human needs is the criterion for evaluating the success or failure of the natural and man-built environment. The institutional environments have the following general characteristics: economic, political, educational, ethical and aesthetic. They are organized around or are defined in terms of problems or the collective means by which people make adjustments to their environments. The general quality of natural environment and the

built environment is regulated largely from the institutional environment.

Flow Patterns through the Environments: Input and Output. The upper half of the model depicts the nature of the materials and energy flows, inputs and outputs, from the natural environment through the built environment, and back to the natural environment.

The lower half of the model indicates the information and decision-making flows which are more in the nature of behavioral elements in contrast to the physical elements. These inputs are from the institutions of society, as well as from individuals, groups, and communities. The institutions of society have a great deal of direct control and influence over both the behavioral environments and the man-built environment. Institutions reflect the collective values and attitudes of man and society. The output from the man-built environment is the ability of that environment to satisfy human needs.

Interrelationships. Figure 4 shows interrelationships proposed by Morrison (1974). Interrelationships between people and their built environment include human effects on the built environment and, in turn, environmental effects on people (physical, biological, social, psychological, cultural). This is an area of consumption rather than production and includes information and decision-making processes from the behavioral environment. These processes are based on values, attitudes and expectations, customs and traditions as well as on collective management and control. This environmental/behavior interface has recently gained a great deal of attention, witnessed by

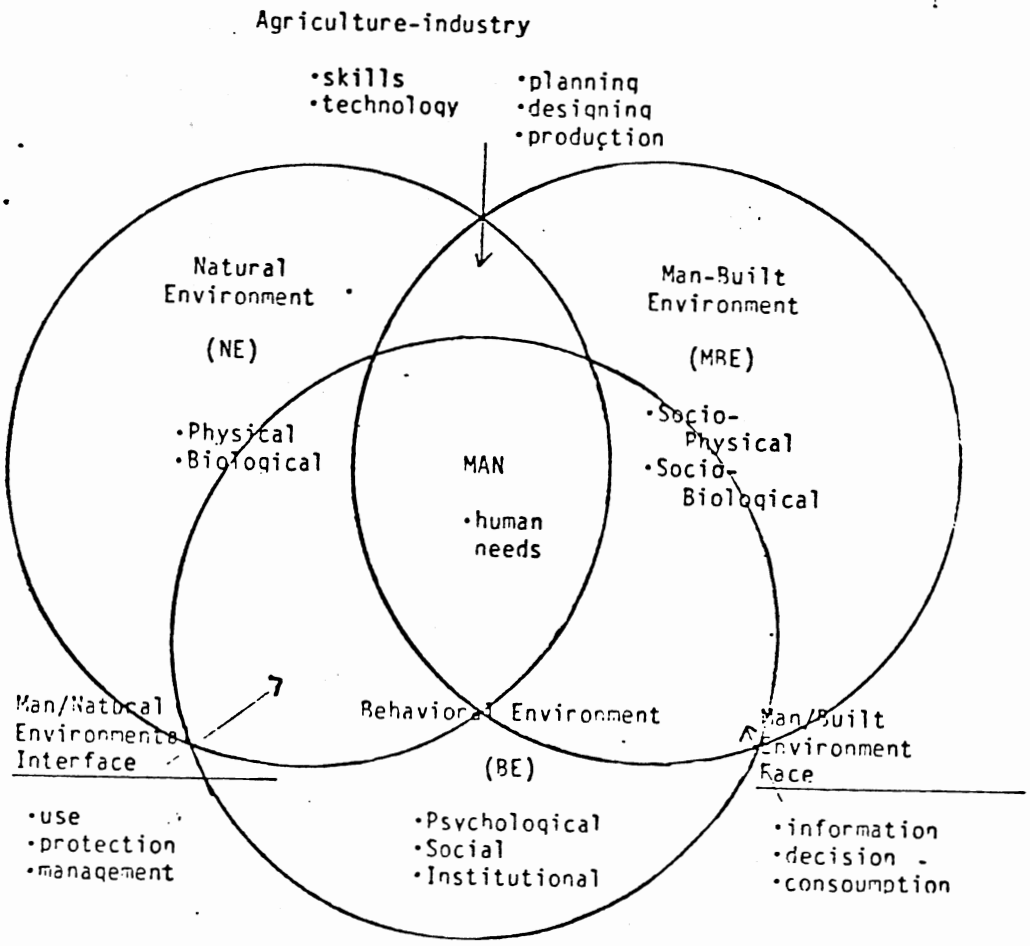


Figure 4. Environmental Interface (Morrison, 1975)

the development of several approaches to the study of person/environment relationships. The general aim of this approach is to understand the interaction between human life and various levels of built environment. The natural and built environmental interrelationships include all the natural environments which are transformed for the built-environment to meet human needs, through skills, technology, planning, designing, and production.

The interrelationships between people and their natural environment are concerned mainly with the use and abuse of nature. The particular emphasis at this interface is on the conservation and preservation of the natural environment for use by those in leisure time pursuits.

Aesthetics as an Environmental Issue

The complete human ecological perspective described earlier provides a broad and holistic view of a total system, its parts, their linkages, interdependencies and inextricable ties. Within this perspective, the stage of distribution of alternative housing types is described in relation to the aesthetic dimension.

The emerging field of environmental psychology yields writings from many disciplines which illuminate and stimulate questions about aesthetic perception and meaning (Stoeckeler, 1977). The aesthetic aspect of the housing environment in relation to the "ideal house of America", in the Housing Act (1979), has attracted researchers' interests. At the same time, studies of some psychologists have revealed both interest and effort in giving objectively to an aesthetic concept (Beebe-Center, 1932; Eysench, 1961).

Because of continuous social issues, such as energy, housing and quality of life, various energy efficient housing types have been produced by individuals, groups, or governments. This production results from a combination of values, goals, attitudes, and needs of those interested in these kinds of housing (see A in Figure 3). At present, the stage of distribution of alternative housing types is minimal. This might be due to the fact that, although alternative housing was developed mainly because of economic considerations, it lacks the strong incentives that might encourage people to select these types over conventional housing. Therefore, it may be possible to spread alternative housing through aesthetic appeals to individuals and society as a whole. For this reason, an aesthetic evaluation of present housing alternatives is necessary to establish a valid data base to be used as a reference by housing professionals. In this way, the collective aesthetic value of society will be the ultimate beneficiary (see B in Figure 3).

Therefore "C" in Figure 3 indicates the process of aesthetic evaluation of present alternative housing, which may lead to a collective value (see the thickened line flow in Figure 3).

Research Precedent on the Measurement of Qualities of Built Environments

An extensive survey of the literature through both computer cross search using several data bases in the fields of social science, education, humanities, art, and psychology and library search was completed. It revealed an amazing paucity of directly relevant studies

in the problem of measurement of aesthetic quality of man's nearest built environment, housing. The scarcity of articles is surprising on several counts: 1. so popular a concept as the impact of man's nearest environment on human behavior has not been researched in greater detail; 2. with increasing knowledge of the effects of environmental factors on behavior, competent researchers have not investigated the field with greater thoroughness; 3. with the rise of operant techniques for measuring various environmental factors, so few attempts have been made to describe the perceptual range of human beings living in the house; 4. with the great need for information about housing types for continuous housing development to provide humans with a better quality of life, the aesthetic quality of the house has not been studied scientifically.

Therefore, this researcher has collected materials of previous research on the general problem of the measurement of environments, where the concepts of the major purpose of this study belong. The materials reviewed were then categorized under three headings: 1. support for research on developing measurement of aesthetic quality of environments; 2. descriptors developed until now and the relevant environments; and 3. methods used to measure the environmental quality.

Support for Research Developing Measurement of Aesthetic Quality of Environments

After the literature review in his dissertation, Collins (1968) suggested four large categories of research tactics in the field of environmental psychology: 1. research involving the perception of small, two-dimensional figures; 2. research investigating the social

and interpersonal impact of various architectural considerations; 3. research involving studies of a more theoretical nature (these studies are typically designed to specify operational and measurement procedures for identifying the impact of the environment on behavior, and commonly utilize checklist, sematic differential and factor analysis); and 4. research on problems encountered in measuring environmental aesthetics, the need for such measurements, and proposed hierarchies of need considerations when making decisions involving architectural-environmental considerations. He also found that, generally, the state of the art was still on the 'think' level. Considering the fact that researchers were well aware of the impact of the environment on human behavior, few reliable and valid studies of environmental perception across large numbers of people have been conducted for a sufficient body of knowledge. But only in the last ten years or so have researchers begun seriously to investigate the impact of the immediate architectural environment directly on the individual or small numbers of individuals (Collins, 1969).

Heath (1968) emphasized the need for research in the aesthetic field as follows:

> . . . The idea of measurement in the aesthetic field is not a popular one . . . in fact, in all those cases which we regard as private. It is when aesthetic questions become part of the public domain, affect the economics of public administration, and become questions of political debate that we require objective measures to settle differences of opinion . . . this kind of situation occurs to some extent in architectural and product design, to a larger extent in large scale environmental design (p. 17).

Sanoff (1968) also supported the need for developing research on evaluating the aesthetic quality of design in the following statements:

> . . . Good design is an essential factor in the production of most artifacts. In the minds of users and developers, however, design is usually equated with style, but style has little to do with the essential livability of an environment. A measure of good design is overall efficiency and economic value combined with a high level of amenity and aesthetic quality. The design process by which this is achieved is based upon understanding the needs of the users of these designed environments.
>
> There is also general consensus that the process of designing involved analysis of the situation wherein lies the problem synthesis of possible solutions: and evaluation of which solution is most acceptable for implementation . . . It is time, therefore, that the architect conduct his own surveys into how people use their environment, what they like and dislike about it, and what kind of environment they would prefer (pp. 2-3).

Berenson (1967) emphasized this responsibility in his article "Sensory Architecture" as following:

> . . . If we are to be responsible for the total environment, the human response to this environment must inspire the search for truth about what this physical world actually is (p. 21).

Through the review of literature, therefore, the significance of the purpose of this research was supported.

Descriptors Developed Until Now and the Relevant Environments

Certainly any interaction with the environment by human beings is dependent on the perception of the environment. A persistent problem faced by environmental designers and behavioral scientists is the lack of common language for describing the environment. If people are to design various environmental situations and measure their impact on behavior, then a common language for design consideration and for their behavioral consequences is expedient (Collins, 1969).

In assessing responses to an environment, it is essential that the

content of the measuring instrument be relevant to the environmental display under consideration. Without such relevance, there is no basis upon which to evaluate the capacity of the environment to render reliable and valid data. Several researchers have contributed to this aspect. Vielhauer (1965) elicited adjectives describing architectural interior spaces from general college students, architecture students, and from architectural and interior design magazines. The terms, in bipolar form, were rated on their appropriateness for describing most environments. One hundred twenty-five adjectives were chosen from a total of 197, based upon their ability to describe six specific environments which were arbitrarily selected by her. Those environments were interiors of the library of a house, a church, an airport, a kitchen, an office, and a bathroom. Using a pictorial form, the number was reduced again to 66. The criteria for selecting the 66 adjective pairs from 125 was high communality for each of the six environments together. Craik (1966) produced an Environmental Display Adjective Checklist which was generated by the group of trained designers. This checklist emerged from a dictionary search by a group of graduate design students of entries A through K in Webster's New Collegiate Dictionary. They did not complete the search of L through Z. The resulting pool of items yielded 169 checklist entries to describe the physical environment, both in terms of its physicalistic attributes and its mood-affective attributes. Lowenthal and Riel (1972) have presented 25 pairs of descriptive adjectives which they have found to be generally applicable or relevant across various exterior environmental displays such as urban walks. Sanoff (1974) identified attributes for the exterior of a building, using an ad hoc list drawn from the terms most

frequently used by designers in their judgments and descriptions of the environment. Since the initial list was identified by professionals, the final selection was based on previous findings as well as probabilistic assumptions that the selection of less ambiguous words would be an important factor in determining the subject's reaction to the adjectives. Twenty-six pairs of words were then used to describe the exterior of residential settings. Calvin et al. (1972) investigated the descriptors for landscape using color slides of various kinds of landscapes with psychology graduate students. In this way, 25 bipolar scales were obtained. All of these efforts are examples of the evolution and development in this area over the past fifteen years, particularly in the use of factor analysis techniques. To investigate the behavioral-environmental interface, Collins (1968) later identified and used a pool of items obtained from the Craik Environmental Display Adjective Checklist, Vielhauer's research, and an extensive descriptor search among 102 students. Preanalysis of this item pool reduced the final list to 142 polar pairs of descriptive adjectives to be used as predictors. To achieve the purpose, he presupposed that interactions between perception and behavior must be quantifiable. On the basis of the above research, several articles have been produced (Seaton and Collins, 1972; Hershberger, 1971, 1975). However, Danford and Williams (1975) pointed out a problem in the following statement:

> . . . Some agreements are beginning to emerge as to relevant content for various measurement instruments, particularly for descriptive (as opposed to affective) responses. However, the well-known phenomenon of factor-analytic research producing factors overly unique to the particular display presented, population sampled, and so forth continues to plague the field. Consequently, with virtually every researcher employing a somewhat different content, comparability of

results is being sacrificed (p. 488).

For the reasons of time, money, efficiency, and ease of analysis, investigations and evaluations of human responses to environmental arrays have often used simulations (e.g., photographic slides) of the environments rather than the actual environments. Realizing that the use of simulations raises the question of validity, investigators have compared responses elicited by simulations to responses elicited by the actual environments in order to demonstrate the convergent validity of the simulation technique (Danford and Williams, 1975).

Assessing the effects of physical environments on user populations has proved to be an incredibly complex task. Because of difficulties related to matters of expense, time and complexity when dealing with real physical spaces, many of the research studies on the behavioral effects of architectural design have been restricted to actual case studies of single or limited architectural settings (Seaton and Collins, 1972).

In the quest to identify veridical simulation media, the selection of measurement techniques for recording the responses elicited by the display is often made in a manner of expediency. Researchers previously mentioned have proposed measurement techniques. Yet no one as yet has adequately examined the more crucial issue of the validity of measurement techniques (Danford and Williams, 1975).

Therefore, descriptors for different dimensions of environment such as interior of residence, interior of other built environments, exterior of residential building, and landscape have been developed, respectively, by different researchers. Most of them used the simulated environment display to elicit or describe specific environments rather

than the real environments. Therefore the validity of measurements has been questioned. Yet no one has clearly answered the question of the validity (Danford and Williams, 1975; Starr, 1978). In addition, there has been confusion in terms of using the word "aesthetic". Most researchers have used the word arbitrarily, not on the basis of theoretical definition. Hershberger (1971) used "aesthetic" to indicate a factor dimension which included the "unique-common" descriptor and distinguished the dimension from space, organization, coloring, size, and shape dimensions which needed to be theoretically included in aesthetic dimension on the basis of the review of literature on aesthetics by this researcher. Heath (1968), in his article "Problems of Measurement in Environmental Aesthetics" discussed the needs for measurement and various scales including psychophysic and aesthetic, for dimension of the visual field. Therefore, the term "aesthetics" needs to be theoretically used in a correct way.

Methods to Measure the Environmental Quality

In addition to the matter of instrument content discussed above, the question of the form is equally important in considering human responsiveness. Despite numerous admonitions, researchers in the man-environment field have maintained their unbridled enthusiasm for single method research - particularly the Semantic Differential or variants thereof (Danford and Williams, 1975). The use of the Semantic Differential, an instrument designed to measure the meaning of concepts, involves several assumptions about metric properties of the individual bipolar scales of which it is composed, such as equal intervals.

Historically, this Semantic Differential has been used with factor analysis techniques. The application of factor analytic techniques to the assigned scores involves assumption concerning the location of the scale origins, such as the zero at the same place on each scale. Messick (1969) proved this through his research and concluded that the scaling properties implied by the Semantic Differential procedures have some basis other than mere assumption. Canter's summary of his studies using the Semantic Differential Scale and factor analysis was introduced in Collins' (1969) dissertation as follows:

> . . . The semantic differential has great potential for use in research in architectural psychology, but initially it is important to establish what the underlying dimensions are in an architectural context, as none of Osgood's studies have dealt with buildings. To this end a series of studies have been conducted using a variety of scales, buildings, aspects of buildings and subjects. The resulting factor analyses have been found to be far less closely related to Osgood than had been anticipated. Only two have been clearly defined, an evaluation dimension highly loaded with such adjectives as pleasant and impressive, and a comfort dimension highly located on comfortable, cramped and the like (p. 15).

Since the tremendous work to develop this scale by Osgood (Osgood, 1969; Osgood and Suci, 1969; Osgood et al., 1969), the Semantic Differential has been gradually adapted in the research on the man and built environment interaction, and has now become an indispensible part of the research methodology in the field. For the better understanding of these two key concepts in the methodology of research in this field, a brief overview of these concepts was provided.

The Semantic Differential, as a question format, has similar advantages to the Likert format. It, too, creates a standardization of answer categories, and creates a balance between positive and negative answers (Babbie, 1979). Osgood and Suci (1969) described the logic of

the Semantic Differential in detail. It was summarized by Osgood and Suci (1969) as follows:

> The process of description or judgment can be conceived as the allocation of a concept to an experiental continuum, definable by a pair of polar terms . . . The greater the intensity of particular assertions, the more extreme becomes the allocation toward one or the other of the polar terms. . . . Many different experiental continua, or ways in which meanings can vary, are essentially equivalent and hence may be represented by a single dimension. A limited number of such continua can be used to define a semantic space within which the meaning of any concept can be specified (pp. 42-43).

The purpose of the factor analytic work is to devise a scaling instrument which gives representation to the major dimensions along which meaningful reactions or judgments vary. It is used to discover patterns among the variations in values of several variables. This works essentially through the generation of artificial dimensions (factors) that correlate highly with several of the real variables and that are independent of one another (Babbie, 1979). The generation of factors has no reference to the meaning of variables, only their empirical associations. Two criteria are taken into account: 1. a factor must explain a relatively large portion of the variance found in the study variables; and 2. every factor must be more or less indepen dent of every other factor (Babbie, 1979). There are a number of advantages in factor analysis. First, it is an efficient method of discovering predominant patterns among a large number of variables. Second, factor analysis presents data in a form that can be interpreted by the reader or researcher (Babbie, 1979). There are also two major disadvantages. First, factors are generated without any regard to substantive meaning. Second, factor analysis is often criticized on basic philosophical grounds. By recalling a statement that to be

legitimate, a hypothesis must be disconfirmable, if one is unable to specify the conditions under which the hypothesis would be disproved, the hypothesis is in reality either a tautology or useless. In a sense, factor analysis suffers this defect. No matter what data are input, factor analysis produces a solution in the form of factors (Babbie, 1979).

Energy Efficient Housing Alternatives

In recent years several houses have been constructed with facilities for solar heating. Solar heating for space and people, as well as for domestic and process hot water, is now relatively widely used. The worldwide energy crisis has now made such systems economical in locations where, in previous years, they could not compete with fossil fuels. With the end of the era of low-priced oil and gas, and the restrictions now placed on coal burning because of environmental considerations, solar systems with electric backup equipment are now being used for domestic, institutional, and industrial applications (Yellott, 1978).

The use of solar energy for heating houses is attractive both because it reduces substantially the consumption of dwindling supplies of fossil fuels, and because it reduces air pollution caused by the burning of such fuels. Space heating now consumes about 30 percent of the fuel used annually in the United States and an even larger percentage in the less developed industrialized countries. Not all of this fuel can be saved since the vagaries of weather are such that fuel heat must be used during extended sunless periods. Experience with a limited number of houses indicates that from 75 to 90 percent of the

heat requirement can be met by solar energy (Howe, 1979). Moreover, given reasonable incentives, solar energy could provide between a fifth and a quarter of the nation's energy requirements by the turn of the century (Stobaugh, 1979).

Furthermore, advantages of solar energy have received more attention in surveys than disadvantages (Farhar, 1979). With these as examples, widespread use of solar heating and, eventually, cooling systems has been projected to become a reality in the near future. One function of the National Center for Appropriate Technology (NCAT) is to stimulate the development of simple, low-cost approaches to solar energy utilization (Hamilton, 1978). Because rising energy costs continue to have their greatest impact on people with low or fixed incomes, NCAT is particularly concerned with the development and evaluation of solar techniques which are relevant to this segment of our society (Hamilton, 1978).

There are three primary applications, however, already in use, which help to delineate the size of specific markets. They are solar energy for water heating, space heating, and space cooling (Solar Energy Handbook, 1979). The greatest public interest in solar energy has been directed toward its use in heating and cooling buildings. Residential and commercial solar applications may be divided into two types: active systems, which rely on solar collector panels, and passive design, by which a building is designed, situated, and oriented so as to receive and store heat from the sun during the winter, and also to keep sunlight out and thereby keep the interior cool during the summer (Academic America Encyclopedia, 1980). During the last few years, barriers and incentive studies on application of solar heating and cooling have been

directed primarily at implementation of an "active" system (Hamilton, 1978).

Although the concept of using the orientation of buildings and architecture to accept warmth from the sun in winter while denying entrance to excessive sunshine in summer is very ancient, there has been little interest in passive systems. Many versions of this concept, however, are now in various stages of design and construction in Arizona and elsewhere (Yellott, 1978). Many architects are now designing new houses and retrofitting older houses to passively use the sun and other environmental factors to reduce energy cost (Bainbridge, 1979; Frank, 1980; Gropp, 1978; Yellott, 1978), and the public is getting involved in passive solar concept for their houses (Bainbridge, 1979; Hamilton, 1982; Holland, 1982; Ken, 1975; Keyes, 1979; Lees, 1981; Passive Solar Remodeling, 1981; Shindelar, 1981; Stepler, 1981). Because of the advantages of solar energy systems, especially passive solar systems, these alternatives are already being tried throughout the country (Farhar, 1979).

Interest in the use of earth sheltered housing has expanded greatly in recent years. Prior to 1973, the few isolated earth sheltered houses in the United States had been built for primarily aesthetic reasons. Since then, due to the greater awareness of the environment and the need for energy conservation, the number of earth sheltered houses has increased rapidly (The Underground Space Center, 1981).

As the use of underground buildings for dwellings becomes more common, it becomes increasingly important that the perceptions of their potential users be considered in design (Volkman, 1981). In the Environmental Design Research Association (EDRA 12, 1981), two main

issues were mentioned for the evaluation of earth sheltered or underground environments: 1. the use of post-occupancy evaluation as a means of better understanding response to underground environments, and 2. the energy myths and realities of earth sheltered environments. It was also mentioned that the discussion of earth sheltered environments emphasized housing (EDRA 12, 1981).

Summary

This chapter reviewed the relevant literature including aesthetics, aesthetics in an holistic environmental perspective, research precedent on the measurement of qualities of built environments, and energy efficient housing alternatives. The theoretical and practical aspects of aesthetics were emphasized and some relevant previous research was described in detail, and finally general characteristics of alternative housing were reviewed.

CHAPTER III

DEVELOPMENT OF PRELIMINARY INSTRUMENT

The purposes of this study were:

1. To develop a methodology to measure the aesthetic qualities of housing environments.
2. To validate the developed methodology by testing existing theories.
3. To evaluate aesthetic qualities of alternative energy efficient housing environments with the developed instrument.

In relation to the second specific objective, a research question was developed: "What are the possible propositions to support and/or expand the power of the selected theories which can be tested using the developed methodology?" On the basis of the review of literature, the aesthetic perception ability was recognized as an answer for the specific research question above. To know the effect of one's aesthetic perception ability on the satisfaction with the aesthetic quality of a house, it was necessary to be tested. To include the aesthetic perception ability variable for testing purposes, pilot study I was completed to select the least number of representative items for measuring one's aesthetic perception ability.

In relation to the second objective, another research question was developed: "What are the most representative descriptors to measure the

aesthetic quality of housing environments?" Through the literature search, a large number of descriptors was initially selected by the researcher. To reduce the number of descriptors giving them the construct validity, pilot study II was necessary. Therefore, this chapter presents the research methodology and procedures used in preparing and developing the preliminary instrument. For each of the two phases, the purpose, methods, and results are described in detail.

Pilot Study I

One of the biggest temptations in environmental research is the tendency to link personality variables, attitudes, and other values to architectural and environmental stimuli. Coincidentally, in aesthetic theory, the aesthetic value came from both aesthetic objects and aesthetic attitudes (see the review of literature or conceptual framework for hypothesis). Therefore it was necessary and valuable to introduce a personality trait variable to obtain more precise research results.

Unfortunately, there has been little research in environmental studies which have used personal trait variables. Bechtel's (1975) review of research points to the inadequacy of the instruments being used to measure personal traits. Thus, research using personal traits in environmental study is warranted. This research investigates the aesthetic responses of residents to their housing environment, considering the fact that the aesthetic perception ability of an individual may produce different aesthetic evaluation results.

An on-line computer cross search was made to obtain existing instruments which have been used to test aesthetic perception ability.

The data bases explored in this computer search included applied science and technology, science, social science, and humanities. Three aesthetic-related tests were found: Meier's Art Judgment test (1942); Meier's aesthetic perception test (1967); and Grave's Design Judgment Test (1964). Of these three, Meier's Art Judgment test (also called Meier's Aesthetic Perception Test I) was selected on the basis of its appropriateness to this study.

In the Art Judgment test by Meier, materials have been devised on the basis of works of established merit. Each item contains some principle or principles of aesthetics. The principle has been singled out in each work for manipulation so that the subject is presented with two versions which are almost identical, but one has the functioning of the principle impaired. One principle of aesthetics is more or less better than the other. The problem is hence to discern the one version wherein the principle functions to make for a greater aesthetic value. The record sheet informs the subjects regarding what aspect of the composition change has affected some principle, but the principle is not named (Appendix A). The subject is to respond to the separate versions as a whole. In this sense, the test is as much a test of appreciation as it is a test of ability (Meier, 1942). Validity and reliability are given to this test. The item selection was determined by agreement of

1. a favorable critical reaction on the part of the 25 experts, and
2. a 60 to 90 percent preference for the item on the part of the 1,081 subjects, ranging in age from 11 years to past middle life and representing various degrees of scholastic achievement. Correlations were made by Meier (1942) on five samplings of subjects numbering from

70 to 150 (total subjects 520) which yielded reliability coefficients of approximately the same values, 0.70 to 0.84.

Purpose

Because of the large size of the original test (100 items), it was necessary to select several representative items to be included in a questionnaire. Therefore, the purpose of the first pilot study was to select 14 items with the highest correlation coefficients from the original items for testing. As a shortened version, this number was considered appropriate to represent 100 original items statistically.

Methods

Subjects. Forty-six undergraduate students majoring in design and 40 students majoring in non-design at Oklahoma State University served as subjects. The instrument was tested during the fall semester of 1982.

Results

The Pearson's product moment correlation coefficients were computed using the data from the 86 students. Since it was logically assumed that the aesthetic perception abilities of design major students and non-design major students were different, it was considered appropriate to use data from both groups of students. The first 14 items were selected to represent the 100 original items of the test. These items are shown in Table I. Among the 100 items, only 47 items were significant at $\alpha = 0.10$. This means even though Meier (1942) previously provided reliability coefficients of approximately 0.70 to 0.84, this

TABLE I

THE RESULT OF PILOT STUDY I: ART JUDGMENT TEST CORRELATION COEFFICIENTS BETWEEN EACH ITEM AND TOTAL SCORES

Number	Item Number[a]	Correlation Coefficients
1	1	0.39***
2	6	0.32***
3	24	0.38***
4	26	0.32***
5	32	0.35***
6	32	0.35***
7	39	0.32***
8	45	0.40***
9	57	0.31***
10	60	0.35***
11	84	0.31***
12	86	0.39***
13	97	0.33***
14	100	0.36***

***Significant at α = 0.01 level.

[a]Item number refers to the page number of the Meier's Art Judgment Test. Each page contains a pair of pictures (see Appendix A).

data did not provide enough evidence to show that all 100 items really contribute to measure the aesthetic perception ability of students. Considering the fact that aesthetic perception ability can be explained largely by affective domain and an individual's preference, it is not easy to always have high correlation coefficients. Since Meier's reliability coefficients were also based on five samples of subjects numbering from 70 to 150, further testing of this instrument is definitely needed as a standardized test. However, the shortened version of 14 items selected on the basis of pilot study I was used confidently to distinguish groups with high and low aesthetic perception ability.

Pilot Study II

The initial search to obtain a pool of aesthetic descriptors was completed through a review of literature. No research was found on the holistic approach of searching aesthetic descriptors for housing environments. Therefore descriptors identified for different environments, i.e. interior, exterior and landscape, developed by different researchers were pooled by the researcher.

Vielhauer (1965) elicited 66 descriptors, based upon their ability to describe six specific interior environments: library of a house, church, airport, kitchen, office, and bathroom. Considering the fact that this was the only study which attempted to find descriptors for several interior environments, including three interiors of a house described above, those 66 descriptors were considered appropriate as interior descriptors for housing environments. For exterior descriptors, Sanoff's (1974) 26 pairs of words were used. 25 pairs of

words developed by Calvin et al. (1972) were also included for landscape descriptors.

Therefore, the uniqueness of this study lies in its attempt to investigate aesthetic descriptors for a housing environment in an holistic manner, using a minimum number of adjectives. Bechtel (1975) supports this approach, pointing out two important factors for the development of an environmental study: first there is a great need to develop a questionnaire that is specific to the type of environment being studied, and second, the questionnaire must deal with the full range of possible responses to the environment.

Purposes

The descriptors from different areas of housing environment studies (interior, exterior, and landscape) were selected on the basis of the researcher's judgment. Being organized holistically for a housing environment, the essential aesthetic components incorporated all three parts. The three components were reviewed and modified on the basis of aesthetic theory. Because of the uncertainty of descriptors for a specific environment, and the use of ambiguous and possibly unnecessary words, a pilot study was necessary to determine the aesthetic descriptors.

Therefore the purposes of this phase were 1. to reduce the number of descriptors for the preliminary instrument by using factor analysis, 2. to provide the construct validity for the preliminary instrument, and 3. to have a preliminary profile of aesthetic descriptors for the ideal housing environment.

Method

Instrument. An instrument was developed that explores four distinct areas: demographic information about the subjects; the descriptors of the ideal aesthetic interior of housing environments; the descriptors of the ideal aesthetic exterior of housing environments; and the descriptors of the ideal aesthetic landscape of housing environments. The reason that 'ideal' was used instead of 'present' housing environments as the common concept for all descriptors, was based on the assumption that the term 'ideal' elicits the broader range of descriptors than the term 'present'. The ideal descriptors for housing environments comes from one's experiences in relation to his satisfaction, and from his image which has not been realized but could make him happy in the long run when realized. For example, the descriptor, 'functional' can be expressed as an ideal descriptor by people who are satisfied with the functional design aspects of their houses, or by people who are not satisfied with non-functional design aspects of their houses. For some people, the descriptor 'functional' is neither negative or positive, but when the descriptor is suggested, their potential criterion for ideal aesthetic environment may be realized. Therefore, in order to include the important, common descriptors to measure the present house environment of people, and in order to figure out some preliminary profiles of the ideal aesthetic housing environment, the concept 'ideal' was used.

The demographic information section included items such as sex, age, and one's marital status. The descriptors of the ideal aesthetic interiors of houses included 63 items with three duplicated items for

testing internal reliability. The descriptors of the ideal aesthetic exteriors of houses included 30 items with three duplicated items for testing internal reliability. The descriptors of the ideal landscapes around houses included 22 items with two duplicated items for testing internal reliability. Therefore, based on the review of previous research, a total of 105 descriptors were used. The scales used with these descriptors were seven point semantic differential scales. After each scale, a space for a question mark was provided for people to respond with the ambiguous and unfamiliar descriptors. This instrument is shown in Appendix B.

Reliability and Validity. Content validity, the representativeness of the content (the substance, the matter, the topics) of this instrument (Kerlinger, 1973) was established with the help of 11 professionals in related subject areas (two in housing, five in design, one in art, one in psychology, one in research evaluation, and one in statistics). On the basis of agreements of these professionals' opinions, parts of the instrument were changed in terms of more common and easily expressed descriptors of the aesthetic object, and, the more effective organization of the instrument. The developed instrument for the Pilot Study II is included in Appendix B. The internal consistency of the instrument was checked by use of Chi-square statistics on the 10 duplicated descriptors. Because of the sensitivity of the aesthetic descriptors and the tendency toward the end of the scale caused by the concept 'ideal', Chi-square statistics were necessary to figure out the data distribution for the duplicated variables. All the calculated Chi-square coefficients were significant at α = 0.01 level.

Subjects. The same subjects as in Pilot Study I were used in this study. Since a majority of the students were not married, a random number of 30 married people living in Stillwater were also selected in order to obtain more valid information regarding one's ideal aesthetic housing environment. Since this sample was not a representative group of a certain population, in other words, it was purposive sampling, it could not provide results which a researcher could generalize to any population. However, it was considered sufficient to gain information about general responses to the developed scales.

Results

All the descriptors were analyzed using factor analysis within each dimension (interior, exterior, landscape). It was considered appropriate to use factor analysis within each dimension, since at this stage, the main interest was what the sum of representative factors for interiors, exteriors, and landscapes, respectively. Therefore, the number of descriptors was reduced within each dimension. As a result, 63 pairs of descriptors were selected from the 105 pairs tested. The number of interior descriptors was reduced from 58 to 35. The number of exterior descriptors was reduced from 26 to 15. The number of landscape descriptors was reduced from 20 to 13. All the selected descriptors and major factors are included in Tables II, III, and IV.

The initial information about profiles of ideal aesthetic housing environments was obtained. As expected, some descriptors gathered toward one end of the scale while others had a tendency to gather around the center of the scale. Obviously the first group which had a

TABLE II

THE FACTORIAL COMPOSITION OF THE ITEMS FOR INTERIOR DESCRIPTORS - A RESULT OF THE PILOT STUDY II

Factor Dimension	Adjective Descriptors	Factor Loading
Factor 1	Uncluttered-Cluttered	0.61
	Well Ventilated-Stuffy	0.62
	Clean-Dirty	0.64
	Comfortable Temperature -Uncomfortable Temperature	0.70
	Pleasant-Unpleasant	0.60
	Well Planned-Poorly Planned	0.65
	Convenient-Inconvenient	0.72
	Orderly-Chaotic	0.80
Factor 2	Complex-Simple	0.50
	Wide-Narrow*	0.41
	Fashionable-Unfashionable	0.38
	Full-Empty	0.86
	New-Old	0.43
Factor 3	Unusual-Usual	0.81
	Distinctive-Ordinary	0.79
	Traditional-Contemporary	-0.59
Factor 4	Adequate Size-Inadequate Size	0.84
	Functional-Nonfunctional	0.41
	Well Balanced-Poorly Balanced*	0.40
	Efficient-Inefficient	0.41
	Inviting-Repelling	0.70
	Good Color-Bad Color	0.73
Factor 5	Appealing-Unappealing	0.70
	Well Scaled-Poorly Scaled	0.49
	Colorful-Colorless	0.75
	Comfortable-Uncomfortable	0.55
Factor 6	Wide-Narrow*	0.51
	Multiple Purpose-Single Purpose	0.76
	Well Balanced-Poorly Balanced*	0.62
	Bright-Dull	0.50

TABLE II (Continued)

Factor Dimension	Adjective Descriptors	Factor Loading
Factor 7	Attractive-Unattractive	0.77
	Good Lighting-Poor Lighting	0.83
Factor 8	Useful-Useless	0.57
	Flexible-Inflexible	0.78
Factor 9	Good Line-Bad Line	0.54
	Elegant-Plain	0.73
	Large-Small	0.55

*Descriptors which belong to two factors.

35 descriptors reduced from 58 using factor analysis.

TABLE III

THE FACTORIAL COMPOSITION OF THE ITEMS FOR EXTERIOR DESCRIPTORS - A RESULT OF THE PILOT STUDY II

Factor Dimension	Adjective Descriptors	Factor Loading
Factor 1	Novel-Common	0.63
	Satisfactory-Frustrating	0.85
	Ordered-Disordered	0.68
	Beautiful-Ugly	0.63
	Pleasant-Unpleasant	0.79
Factor 2	Bold-Unobstrusive	0.79
	High-Low	0.69
	Exciting-Calm	0.72
Factor 3	Symmetric-Asymmetric	0.66
	United-Varied	0.70
	Uniform-Divergent	0.74
Factor 4	Smooth-Rough	0.77
	Soft-Hard	0.82
Factor 5	Relaxed-Tense	0.76
	Intimate-Distant	0.81

15 descriptors reduced from 26 using factor analysis.

TABLE IV

THE FACTORIAL COMPOSITION OF THE ITEMS FOR LANDSCAPE DESCRIPTORS - A RESULT OF THE PILOT STUDY II

Factor Dimension	Adjective Descriptors	Factor Loading
Factor 1	Fertile-Barren	0.62
	Warm-Cold	0.85
Factor 2	Tranquil-Turbulent	0.79
	Complex-Simple	-0.64
Factor 3	Wild-Tame	0.69
	Primitive-Civilized	0.82
	Delicate-Rugged	-0.76
Factor 4	Full-Empty	0.72
	Colorful-Colorless	0.81
Factor 5	Pleasant-Unpleasant	0.77
	Alive-Dead	0.71
Factor 6	Restful-Disturbing	0.75
	Quiet-Loud	0.65

13 descriptors reduced from 20 using factor analysis.

definitive evaluative meaning had lower standard deviation than the second group which were mainly descriptors of subjective preferences. Figures 5, 6, and 7 show the profile of ideal aesthetic housing environment based on this data. The means and standard deviations are shown in Appendix C. Thus the reduction of the number of descriptors and construct validity were achieved. As a result of using factor analysis, the selected 63 items were representative of the original 103 items. The third purpose, a preliminary profile of aesthetic descriptors for the ideal housing environment, was also attained. The profile indicates both the average degree of evaluative descriptors more precisely, and points out the objectified subjective preference.

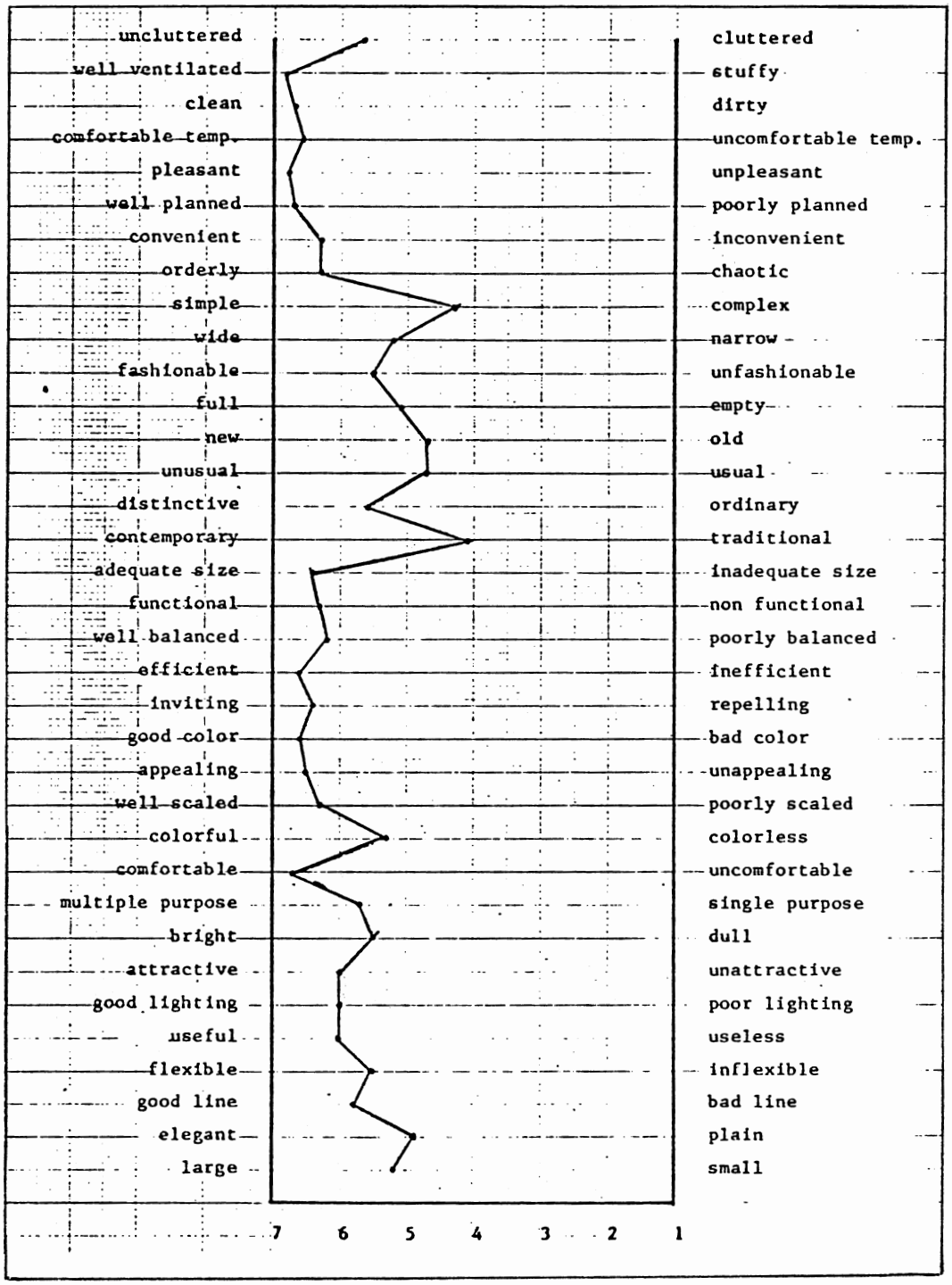


Figure 5. Descriptors for Ideal Aesthetic Interior of a House - A Result of the Pilot Study II

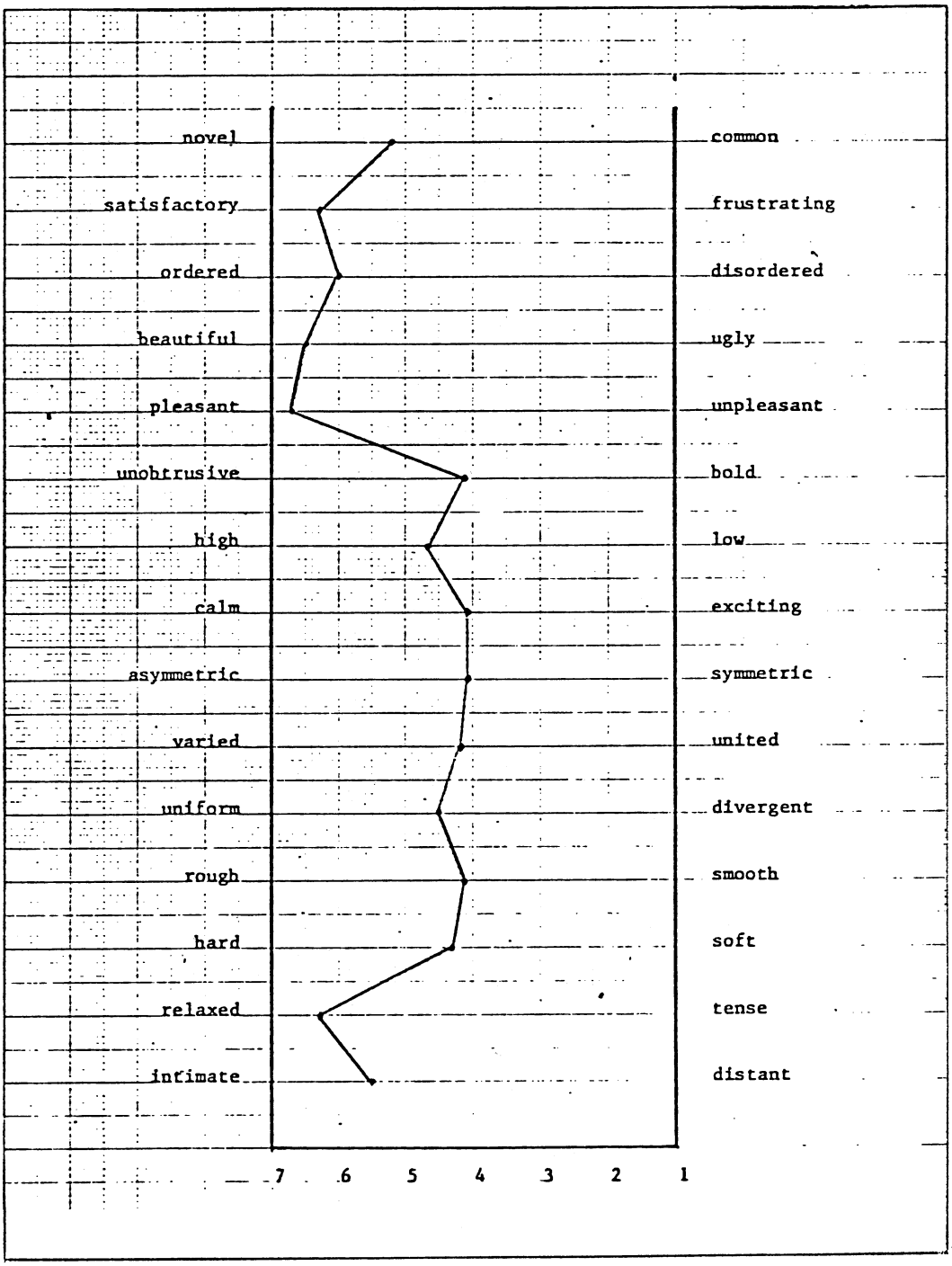


Figure 6. Descriptors for Ideal Aesthetic Exterior of a House - A Result of the Pilot Study II

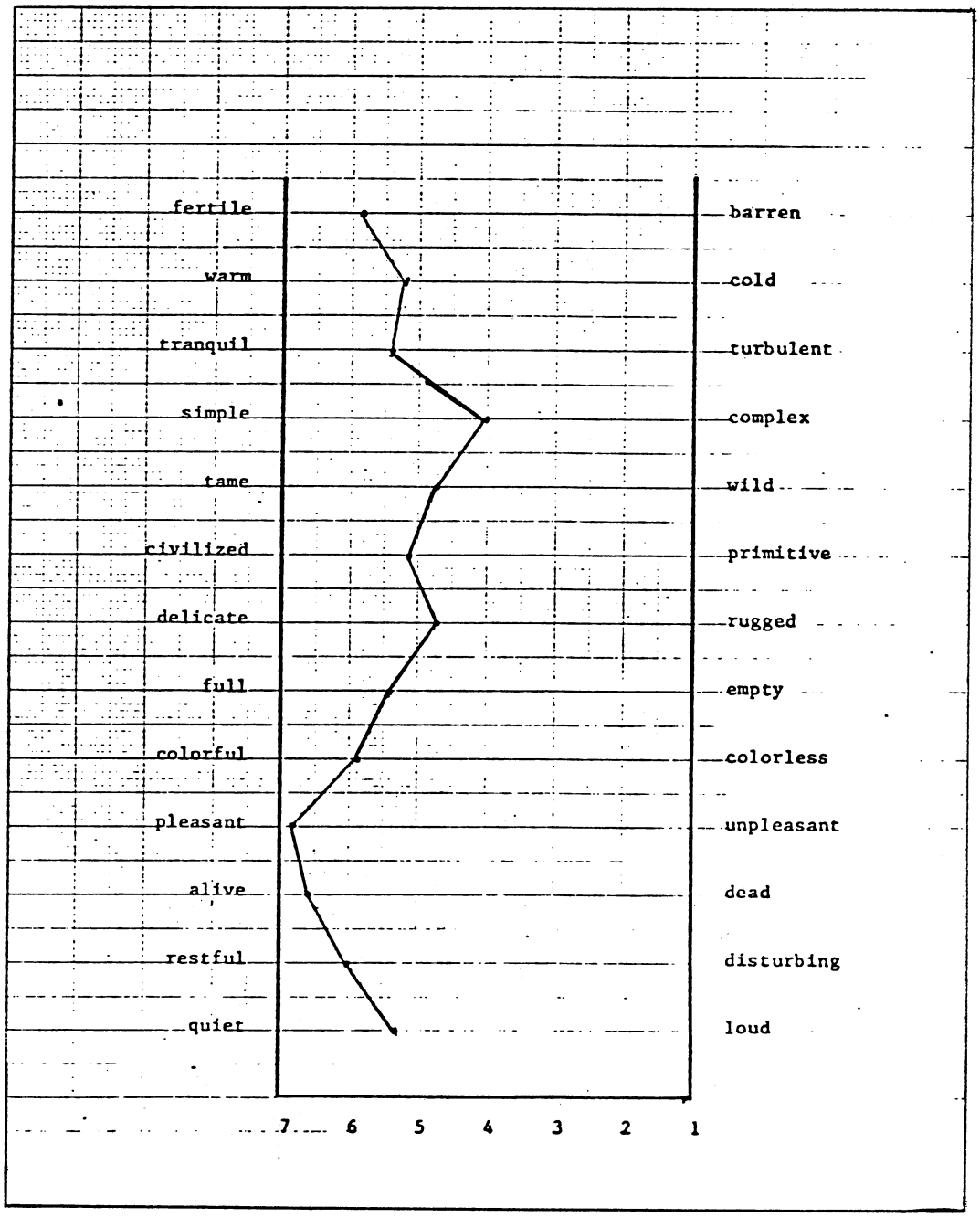


Figure 7. Descriptors for Ideal Aesthetic Landscape Around a House - A Result of the Pilot Study II

CHAPTER IV

TESTING OF INSTRUMENT

The main body of this research was exploratory in nature. The purpose of exploratory research is "to discover significant variables in the field situation, to discover relations among variables and to lay the groundwork for later, more systematic and rigorous testing of hypotheses" (Kerlinger, 1973, p. 406). The exploratory nature was achieved mostly through the review of literature, and pilot study II. An extensive literature search was completed to find initial and general environmental descriptors. Pilot study II, using the instrument with content validity established by the help of eleven professionals in related areas, was conducted to select environmental descriptors for aesthetic housing environment. In terms of selecting the descriptors, a non-representative group of students and married people in Stillwater, Oklahoma was used as subjects, and factor analysis was used. Hence, because of the non-representative group, a larger number of descriptors, that is, 63 out of 105 items, was selected. It was necessary to factor analyze these selected 63 items, using a representative group of a certain population, to obtain a smaller number of representative descriptors for aesthetic housing environment.

Data for this study were collected in Oklahoma as part of the research project, S-141, "Housing for Low- and Moderate-Income Families", conducted by the Southern Regional Housing Technical

Committee. The current study is a part of Objective A in the larger study and involves the psychological responses of Oklahoma families to their homes. More specifically, the purposes of this study were 1. to develop an instrument that would measure the perceived aesthetic qualities of housing environment among Oklahomans living in energy efficient alternative housing, i.e., solar and earth sheltered dwellings, and in conventional housing; and 2. to measure and compare the perceived aesthetic qualities of the different housing types mentioned above. The preliminary instrument used was developed by the researcher based upon a review of literature and pilot studies.

In this chapter, the testing methodology and procedures used in developing the final instrument to measure the aesthetic quality of housing environment are described. More specifically, this chapter includes (1) the purpose, (2) testing models, (3) methodology including instrument, population and sample selection, collection and analysis of data, and (4) results of testing the instrument. Even though the description of the instrument was included in the main instrument for the larger study S-141 project, only parts of the data obtained from the instrument were used for testing purpose.

Purpose

The purposes of testing the instrument were established as follows:

1. To determine the representative descriptors to measure the aesthetic quality of housing environment.
2. To test the finally developed methodology using two conceptual frameworks advanced from the existing theories.

Testing Model

The conceptual frameworks to test the finally developed instrument were derived from the existing theories. Two models directly show the propositions postulated by this researcher. More specific hypotheses were stated from these frameworks.

Up to this point, factor analysis has provided the construct validity for the developed instrument from the initial pool of descriptors. It gives the validity in relation to the initially pooled items. It seems reasonable to believe that there might be errors in the initial pool of descriptors determined by previous researchers, on which this study was based, or in screening descriptors for aesthetic housing descriptors from the pool, or in the analysis of data to measure the aesthetic quality of a house. Therefore the developed instrument was tested using several propositions within conceptual frameworks which were derived from the existing theories.

The Conceptual Framework For Testing The Relationship Among (1) The Discrepancy In Ideal and Present Aesthetic Environment, (2) The Satisfaction With The Aesthetic Quality, and (3) With The Total Dwelling

This conceptual framework was derived from the 'discrepancy theory', a formal theory in job satisfaction in the field of organizational behavior. Smith et al. (1969) postulated that job satisfaction is best explained by a discrepancy between the work

motivation of jobholders and the incentives offered to them by the organization. Similar explanations are offered by inducements-contributions theory (March and Simon, 1958), and cognitive dissonance theory (Festinger, 1957). These positions postulate that job satisfaction levels are related to the perceived difference between what is expected or desired as fair and reasonable return (individual motivation) and what is actually experienced in the job situation (organizational incentives) (Hoy and Miskel, 1982). Elaborating on these concepts for aesthetics in housing, the researcher hypothesized that as long as people live in the housing environment, the discrepancy between ideal and present housing descriptions yields satisfaction with the aesthetic quality of dwelling and further with the total dwelling.

Essentially, there might be two kinds of methods to measure the aesthetic quality of a house. One is to ask people directly, "How satisfied are you with the aesthetic quality of your house?", and the other is to estimate the aesthetic quality indirectly by asking people to describe their ideal and present aesthetic housing environments. The first method gives an answer which includes all the separate aesthetic qualities, and there is a great possibility that people may not understand the meaning of the word 'aesthetic'. In other words, it is too subjective, and too difficult to use the results for practical application. The second method (discrepancy method) might give a more accurate and clear answer for practical purposes. Therefore, the results from the discrepancy method are not necessarily congruent with the ones from the first method. The relationship needs to be positive, however, since both methods measure something very similar. The choice of the method to measure the aesthetic quality of the house would be

totally dependent upon the researchers and their purposes.

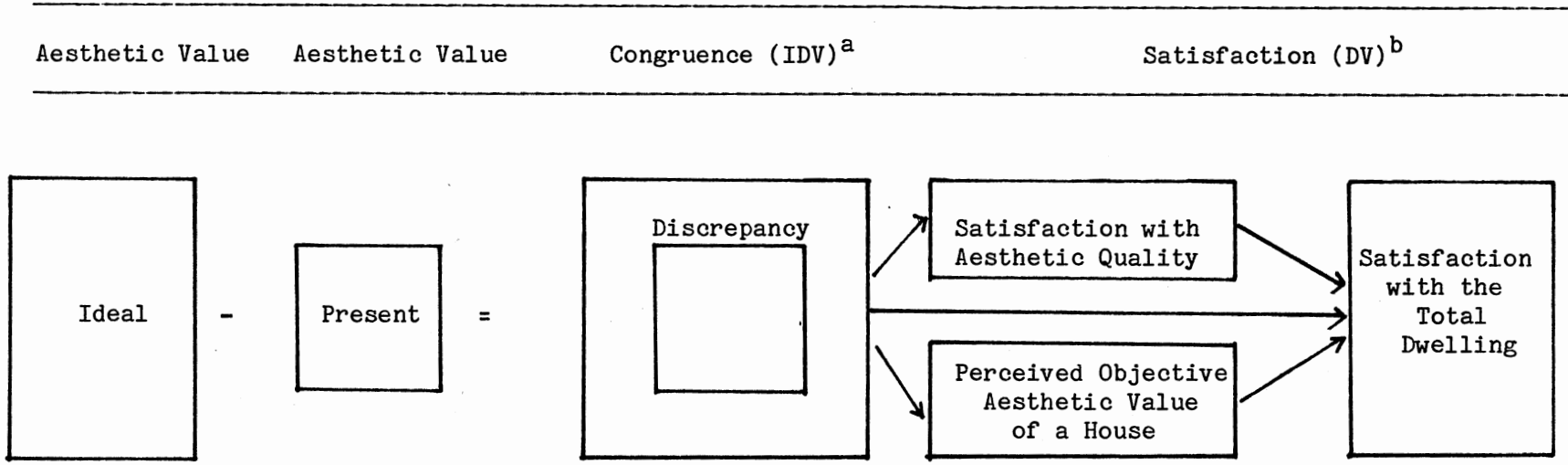
The aesthetic value refers to the perceived positive or negative value, worth, or attractiveness that an individual ascribes to potential satisfaction with the aesthetic object. Because of subjectivity of aesthetic criterion, and variability of housing type characteristics, it seemed reasonable to use discrepancy scores between an individual's ideal and present housing environments, instead of establishing a certain strict scoring system to measure the aesthetic quality. On the basis of the methodology of using discrepancy scores, a conceptual framework was made (Figure 8). It proposes a direct positive relationship between an individual's satisfaction level with the aesthetic value of the house and with the total dwelling, and the degree of congruence between the ideal housing environment and the perceived present housing environment. If the ideal aesthetic value is achieved in the present house, no dissonance exists and satisfaction with the aesthetic quality and with the total dwelling is high. If the ideal aesthetic value is not achieved in the present house, a discrepancy exists which leads to dissatisfaction.

On the basis of Figure 8, two null hypotheses were stated.

Ho1: There is no significant difference in the discrepancy scores between aesthetically satisfied and aesthetically unsatisfied people with their housing environments.

Ho2: There is no significant difference in the discrepancy scores between the groups with high and low objective aesthetic value as perceived by themselves.

In case of rejection of the two null hypotheses, six more



[a]Indepdendent Variable

[b]Dependent Variable

Figure 8. Model for Discrepancy Hypothesis of Satisfaction with the Aesthetic Quality of the House and Further with the Total Dwelling

declarative hypotheses were stated.

Ha3: The higher an individual's discrepancy score, the less satisfied the individual is with the aesthetic quality of the house.

Ha4: The higher an individual's discrepancy score, the lower the individual's perceived objective value of the house.

Ha5: The higher an individual's discrepancy score, the less satisfied the individual is with the total dwelling.

Ha6: The more an individual is satisfied with the aesthetic quality of a house, the more satisfied the individual is with the total dwelling.

Ha7: The higher the perceived objective aesthetic value of a house, the more the owner is satisfied with the aesthetic quality of the house.

Ha8: The higher the perceived objective aesthetic value of a house, the more the owner is satisfied with the total dwelling.

If the first two null hypotheses are rejected, then discrepancy scores have a power to differentiate people who are highly satisfied with the aesthetic quality and with the total dwelling, from people who are less satisfied. In other words, the method can be proven as valid to measure the aesthetic quality of a house.

If the declarative hypotheses three through five are accepted, it shows how much the discrepancy scores are influential in determining one's satisfaction with the aesthetic quality and with the total dwelling, and how much the degree of satisfaction with the aesthetic quality explains the degree of satisfaction with the total dwelling. If

the declarative hypotheses seven and eight are accepted, it also shows how much the perceived objective aesthetic value of a house explains one's satisfaction with the aesthetic quality and with the total dwelling.

The Conceptual Framework For Testing the Effects of Interest and Aesthetic Perception Ability in Predicing The Satisfaction With The Aesthetic Quality and With The Total Dwelling

Figure 9 shows the conceptual framework. This is based on the 'aesthetic theory', which states that aesthetic value is evaluated as pleasant or unpleasant partly based upon peoples' interest and attitudes. Here the aesthetic value was replaced by the discrepancy between ideal and present houses, and the evaluating factor, pleasantness, was replaced by satisfaction. What is emphasized here are the intervening functions of interest and/or attitude variables. In this study, interest and aesthetic perception ability were tested to find whether or not they function as intervening variables. To measure one's aesthetic perception ability, a simplified version of Meier's Art Judgment Test was used. This was developed during the pilot I stage.

There are two possible locations where interest and aesthetic perception ability are effected. One may happen before the discrepancy is perceived; the other may happen after the discrepancy is perceived. For example, people who are interested in the aesthetic quality might make an effort to reduce the discrepancy scores, and people who

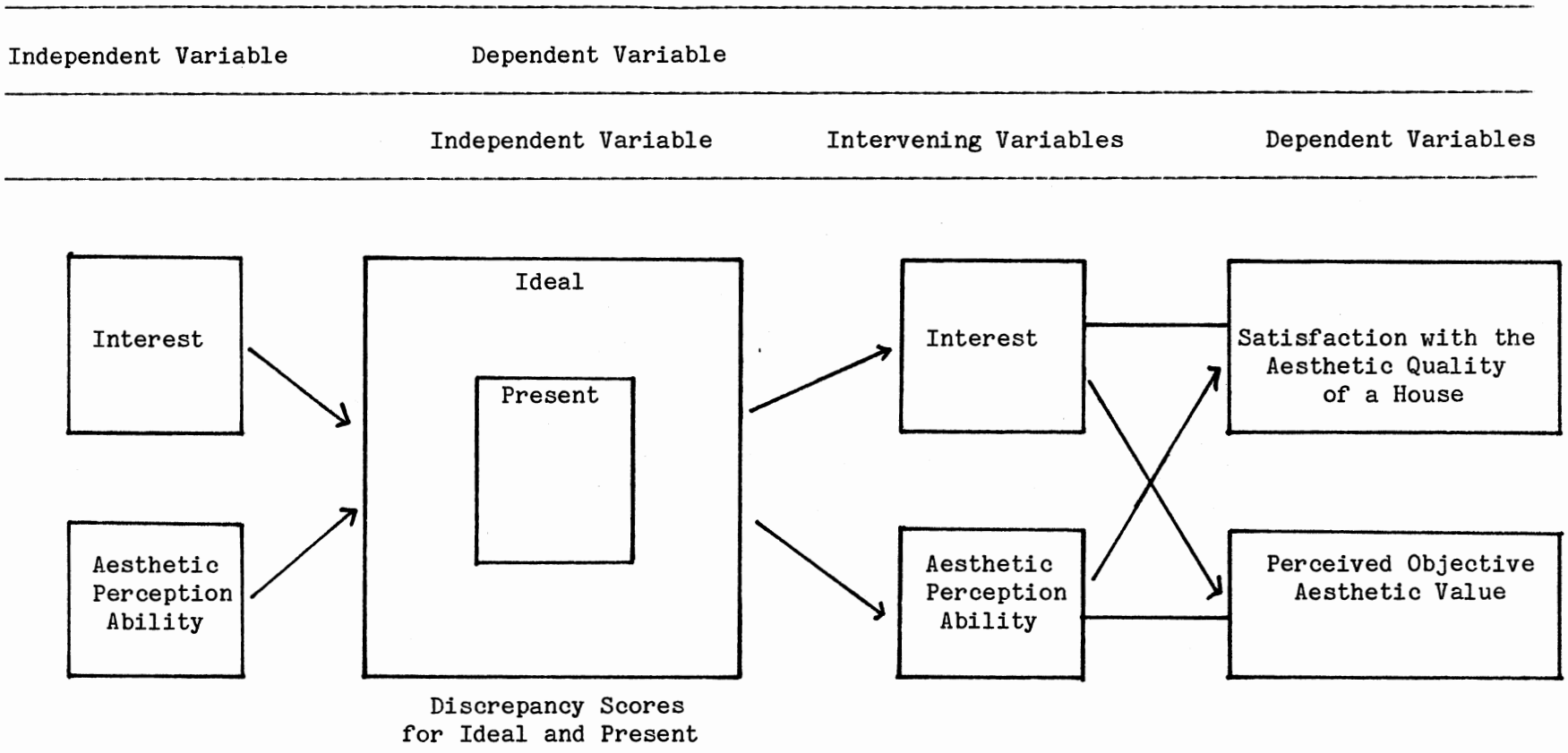


Figure 9. Model for Testing the Effects of Interest and Aesthetic Perception Ability to Predict one's Satisfaction with the Aesthetic Quality of the House and Perceived Objective Aesthetic Value of the House

perceived high discrepancy might be quite satisfied with the aesthetic quality of a house due to their lack of interest. Therefore, the two variables were tested twice: once before the discrepancy occurred, and again after the discrepancy occurred.

On the basis of the conceptual framework, six null hypotheses were stated.

Ho1: There is no significant difference in discrepancy scores between people with high and low interest in the aesthetic quality of a house.

Ho2: There is no significant difference in discrepancy scores between people with high and low aesthetic perception ability.

Ho3: There is no effect of interest in predicting one's satisfaction with the aesthetic quality of a house.

Ho4: There is no effect of aesthetic perception ability in predicting one's satisfaction with the aesthetic quality of a house.

Ho5: There is no effect of interest in predicting the perceived objective aesthetic value of the house.

Ho6: There is no effect of aesthetic perception ability in predicting the perceived objective aesthetic value.

To prove the developed instrument valid in measuring the aesthetic quality of a house, hypotheses one, three, and five should be rejected, since the aesthetic theory in relation to interest was already firmly established. From the testing results of hypotheses two, four, and six, the aesthetic theory can be extended.

Methodology

The research technique employed in this study was identified by Kerlinger (1973) as survey research. In this type of research, samples chosen from populations are studied to discover the relative incidence, distribution and interrelations of sociological and psychological variables. This chapter is mainly exploratory in nature, in that the instrument developed up to now will be validated prior to being used in the research reported in the next chapter, aesthetic evaluation of alternative housing, and further used at a later date by the Southern Regional Housing Technical Committee in future investigations of alternative housing occupants. All data were obtained by means of a structured questionnnaire that was mailed to the identified subjects.

Instrument

A four sectioned structured questionnaire was developed to meet "Objective A" of the Southern Regional Housing Technical Committee project 141. Based upon research cited in the review of literature and pilot studies, 63 descriptors to measure the aesthetic quality of houses, and several major questions related to aesthetics were developed. These statements were found in Sections II and III of the questionnaire which was mailed to the subjects of this study.

In addition to the above mentioned statements, subject responses to five questions in Section I of the questionnaire were used in this study to determine 1. the type of dwelling being occupied by the subjects, 2. age of dwelling, 3. years of residence, 4. size of dwelling, and

5. level of satisfaction with the present dwelling.

Section III of the incorporated questionnaire included three subparts. The first part included three questions on the interest in the aesthetic quality of the house, satisfaction with the aesthetic quality of the house, and the respondent's perceived objective aesthetic quality of the house. The first question was introduced to test the 'interest' variable as an intervening variable on the basis of the review of literature. The second question was used mainly to examine the relationship between the satisfaction with the aesthetic quality of the house and with the total dwelling. The third question was inserted to determine the compromised aesthetic value of the houses by asking respondents about other peoples' opinion of their houses. In this case, it was assumed that the researcher could reduce the magnitude of errors of the respondent's subjective perception in measuring the objective aesthetic value, since the true objective aesthetic value was impossible to measure from this sample. Respondents were able to record their reaction to each of these questions via a Likert scale. The second part included the 63 descriptors developed in the previous pilot study II. Each of these 63 descriptors was used three times for three different concepts such as ideal house, present house, and the importance of the descriptor. Therefore a total of 189 items were measured. In addition, three items of one duplicated descriptor with three concepts, were included to test internal reliability of the data. All of the items were organized into three categories: interiors, exteriors, and landscapes of the houses. Respondents were able to record their reaction to each of these statements via a seven point semantic differential scale. The third part included 14 pictures to measure

aesthetic perception ability; these were selected during pilot study I. All statements were based upon a review of literature and comments of 11 professionals who served on the content validity of the instrument at the pilot study II stage, and pilot study I. The demographic data contained in section IV were used by this researcher to describe sample characteristics. The instrument described above is shown in Appendix D.

Population and Sample Selection

Residents within the state of Oklahoma who were living in solar or earth sheltered dwellings comprised the target population for this study. Since a list of all such Oklahoma households does not exist, an effort was made to identify them through a variety of means. A total of 365 alternative dwelling types was identified. A list of 97 people living in earth sheltered homes was obtained from the Architectural Extension Department at Oklahoma State University. A list of 268 people living in solar homes was acquired through telephone and personal contact with Oklahoma architects, builders, distributors and solar collector manufacturers and installers. Of the 365 alternative dwellings thus identified, 359 were usable and comprised the population for the study. Thus, the inferential population and sample are the same in this study for families living in solar or earth sheltered homes.

A cluster sampling method was employed in the selection of a sample of conventional homes, based upon the geographic clustering of solar and earth sheltered dwellings. The counties selected for sampling closely approximated the state proportion of urban and rural population mix, and the sample size for each county was based on urban/rural population

proportions for that individual county. Therefore, Oklahoma County which had the largest number of alternative housing types, was replaced by the four adjacent counties which provided the survey population for the subjects in conventional houses (Table V).

The sample of conventional homes used in this study came from the following five counties: Canadian, Cleveland, Grady, Kingfisher and McClain. The criteria for selection of the 395 random subjects included a house age of less than seven years at the time of the survey, and a minimum market value of the house of $60,000 in 1980. If the assessed value of the house had been made in any year prior to or after 1980, a $3,000 increase or decrease per year was used to determine the 1980 market value.

Until the planned sample size for each county was obtained, the names and addresses of the owners of dwellings that fit the sampling criteria were noted. If the present occupant was different from the one listed on the tax rolls, it was predetermined that address of the dwelling would take precedence over the name of the owner.

Collection of Data

Residents living in conventional houses, and alternative houses, who were selected through the sampling procedure described above, provided data. Data were collected between March and May, 1983. The questionnaire, a cover letter (Appendix E), and a pre-addressed stamped envelope were mailed to the subjects. The cover letter stated the purpose and the importance of the study. For identifying subjects who did not respond within the time limit, each questionnaire was coded. A second letter (Appendix E) was mailed which requested their cooperation

TABLE V

LOCATION OF CONVENTIONAL HOME SAMPLE AND TOTAL RESPONSES FROM ALTERNATIVE HOME DWELLERS

County	Conventional Home Sample n=395		Alternative Home Responses n=190	
	Number	Percent	Number	Percent
Beckham			2	0.70
Blaine			5	1.76
Caddo			5	1.76
Canadian (Urban)	87	0.22	21	7.39
Carter			1	0.35
Cherokee			2	0.70
Cleveland (Urban)	106	0.27	22	7.75
Comanche			3	1.06
Craig			1	0.35
Delaware			1	0.35
Garfield			1	0.35
Garvin			2	0.70
Grady (Rural)	85	0.22	15	5.28
Kay			2	0.70
Kingfisher (Rural)	53	0.13	7	2.46
Logan			2	0.70
McClain (Urban/Rural)	65	0.16	10	3.52
McCurtain			2	0.70
Mayes			2	0.70
Murray			2	0.70
Muskogee			4	1.41
Oklahoma			59	20.77
Osage			1	0.35
Pawnee			1	0.35
Payne			4	1.41
Pottawatomie			3	1.06
Seminole			1	0.35
Stephens			3	1.06
Tulsa			4	1.41
Washita			1	0.35
Woodward			1	0.35

in completing and returning the instrument. Respondents were assured of confidentiality and names were not recorded on the questionnaire. The final closing date for the completion of the questionnaire was set at three weeks after distribution.

Analysis of Data

Data obtained from the questionnaires were coded and recorded on computer cards. The Statistical Analysis System (SAS) computer program was used to analyze data.

Factor analysis, principle method with varimax rotation was used:

1. To develop a more simplified final instrument with construct validity.
2. To define major factor dimension of all 37 descriptors.
3. To define sub-factor dimensions of each major factor dimension.
4. To define sub-factor dimensions of descriptors for interior, exterior, and landscape of the house, respectively.

Means and standard deviations were used to determine the profiles of the ideal aesthetic housing environment.

The t-test was used to determine the discriminant power of the discrepancy method, that is, whether or not there was a significant difference between people who were satisfied and people who were unsatisfied with the aesthetic quality of their houses.

Pearson's product moment correlation coefficients were used:

1. To determine the strength of association between the discrepancy scores and the resident's satisfaction with

the aesthetic quality of the house and with the total dwelling.

2. To test the internal reliability of the data.

The General Linear Model (GLM) procedure, F statistics, and Duncan's Multiple Range Test were used to examine whether or not there was a main effect of interest and aesthetic perception ability, an interaction effect of the discrepancy scores with the resident's interest, of discrepancy scores with aesthetic perception test scores, and other combinations.

Results

Final Instrument Development

Out of 63 pairs of descriptors developed from the pilot study, 37 pairs were identified as representative to describe the respondents' present houses. The criterion for selecting descriptors was factor loading above 0.49 in the first five factor dimensions which explains 61 percent of total variance explained by all 15 factors. Using only 37 descriptors selected, factor analysis was repeated to determine the major factor structure of those descriptors (Table VI). The descriptors for different environments such as interior, exterior and landscape were arranged under these categories. All descriptors in the first factor were descriptors for interiors. The second factor shows a combination of interior, exterior and landscape descriptors. Descriptors in the third factor all explained landscape environment. The fourth factor includes descriptors to indicate the hygiene of interiors where hygiene means the conditions or practices conducive to health (Webster's Third

TABLE VI

FACTOR STRUCTURE FOR DESCRIPTORS OF PRESENT HOUSE ENVIRONMENTS

Factor	Interior Descriptors	Loading	Exterior Descriptors	Loading	Landscape Descriptors	Loading
Factor 1	Well Ventilated-Stuffy	0.70				
	Comfortable Temperature-Uncomfortable Temperature	0.63				
	Pleasant-Unpleasant	0.74				
	Well Planned-Poorly Planned	0.76				
	Convenient-Inconvenient	0.78				
	Efficient-Inefficient	0.59				
	Well Scaled-Poorly Scaled	0.56				
	Bright-Dull	0.57				
	Adequate Size-Inadequate Size	0.57				
	Well Balanced-Poorly Balanced	0.62				
	Useful-Useless	0.67				
	Flexible-Inflexible	0.61				
Factor 2	Unfashionable-Fashionable	0.49	Pleasant-Unpleasant	-0.47	Unpleasant-Pleasant	0.52
	Nonfunctional-Functional	0.51	Frustrating-Satisfactory	0.61		
	Bad Color-Good Color	0.55	Ugly-Beautiful	0.89		
	Uncomfortable-Comfortable	0.64				
	Plain-Elegant	0.52				
	Unattractive-Attractive	0.84				
	Bad Lines-Good Lines	0.74				
	Appealing-Unappealing	-0.56				
	Repelling-Inviting	0.66				

TABLE VI (Continued)

Factor	Interior		Exterior		Landscape	
	Descriptors	Loading	Descriptors	Loading	Descriptors	Loading
Factor 3					Fertile-Barren	0.79
					Colorful-Colorless	0.73
					Alive-Dead	0.68
					Warm-Cold	0.67
					Civilized-Primitive	0.51
					Full-Empty	0.56
Factor 4	Uncluttered-Cluttered	0.76				
	Clean-Dirty	0.66				
	Orderly-Chaotic	0.71				
Factor 5	Traditional-Contemporary	0.57	Novel-Common	-0.68		
	Usual-Unusual	0.78				

New International Dictionary, 1976). The last factor includes descriptors related to innovativeness. These five dimensions of all 37 descriptors for the present housing environment were named as interior dimension for the first factor, dimension of harmony between inside and outside for the second factor, landscape dimension for the third factor, hygiene dimension for the fourth factor, and innovative dimension for the fifth factor. Therefore a general factor pattern with relevant descriptors was obtained. The cumulative portion, 34 percent out of the total explained by five factors, was attributed to factor 1, 26 percent to factor 2, 18 percent to factor 3, 11 percent to factor 4 and 10 percent to factor 5.

Generally, among the five major aspects of housing environments, the interior aspect appeared to be the most important to evaluate the aesthetic quality. The next most important aspect was harmony among interior, exterior and landscape. Landscape was considered less important than harmony, but more important than hygiene. The innovative characteristics of a housing environment were considered least important.

To determine whether or not this factor structure exists in different types of housing, further factor analysis was completed using two different groups of samples. Table VII shows the factor structure of the conventional house group, while Table VIII shows the factor structure of the alternative house group. In both cases, descriptors were clustered into the five almost identical major dimensions. However, the orders of factor 1 and factor 2 appeared to be different. This means the people living in conventional houses were more likely to emphasize the harmony among interior, exterior and landscape, rather

TABLE VII

FACTOR STRUCTURE FOR DESCRIPTORS OF PRESENT HOUSE ENVIRONMENT - CONVENTIONAL HOUSES

	Interior		Exterior		Landscape	
Factor	Descriptors	Loading	Descriptors	Loading	Descriptors	Loading
Factor 1	Unfashionable-Fashionable	0.22	Pleasant-Unpleasant	-0.61	Unpleasant-Pleasant	0.46
	Nonfunctional-Functional	0.44	Frustrating-Satisfactory	0.74		
	Bad Color-Good Color	0.24	Ugly-Beautiful	0.60		
	Uncomfortable-Comfortable	0.68				
	Plain-Elegant	0.29				
	Unattractive-Attractive	0.86				
	Bad Lines-Good Lines	0.61				
	Appealing-Unappealing	-0.60				
	Repelling-Inviting	0.79				
	Well Balanced-Poorly Balanced	-0.46				
	Useful-Useless	-0.53				
Factor 2	Well Ventilated-Stuffy	0.56				
	Comfortable Temperature Uncomfortable Temperature	0.59				
	Pleasant-Unpleasant	0.59				
	Well Planned-Poorly Planned	0.65				
	Convenient-Inconvenient	0.84				
	Efficient-Inefficient	0.46				
	Well Scaled-Poorly Scaled	0.54				
	Bright-Dull	0.63				
	Adequate Size-Inadequate Size	0.58				
	Well Balanced-Poorly Balanced	0.44				
	Useful-Useless	0.43				
	Flexible-Inflexible	0.65				

TABLE VII (Continued)

Factor	Interior		Exterior		Landscape	
	Descriptors	Loading	Descriptors	Loading	Descriptors	Loading
Factor 3					Fertile-Barren	0.52
					Colorful-Colorless	0.59
					Alive-Dead	0.70
					Warm-Cold	0.84
					Civilized-Primitive	0.69
					Full-Empty	0.56
Factor 4	Uncluttered-Cluttered	0.88				
	Clean-Dirty	0.79				
	Orderly-Chaotic	0.74				
Factor 5	Traditional-Contemporary	0.63	Novel-Common	-0.71		
	Usual-Unusual	0.78				
	Unfashionable-Fashionable	0.22				
	Plain-Elegant	0.67				

TABLE VIII

FACTOR STRUCTURE FOR DESCRIPTORS OF PRESENT HOUSE ENVIRONMENT - ALTERNATIVE HOUSES

Factor	Interior		Exterior		Landscape	
	Descriptors	Loading	Descriptors	Loading	Descriptors	Loading
Factor 1	Appealing-Unappealing	0.58	Pleasant-Unpleasant	0.62		
	Well Ventilated-Stuffy	0.60				
	Comfortable Temperature-Uncomfortable Temperature	0.56				
	Pleasant-Unpleasant	0.70				
	Well Planned-Poorly Planned	0.74				
	Convenient-Inconvenient	0.69				
	Efficient-Inefficient	0.75				
	Well Scaled-Poorly Scaled	0.60				
	Bright-Dull	0.58				
	Adequate Size-Inadequate Size	0.66				
	Well Balanced-Poorly Balanced	0.66				
	Useful-Useless	0.77				
	Flexible-Inflexible	0.61				
Factor 2	Unfashionable-Fashionable	0.49	Frustrating-Satisfactory	0.55	Unpleasant-Pleasant	0.50
	Nonfunctional-Functional	0.53	Ugly-Beautiful	0.73		
	Bad Color-Good Color	0.69				
	Uncomfortable-Comfortable	0.65				
	Plain-Elegant	0.57				
	Unattractive-Attractive	0.81				
	Bad Lines-Good Lines	0.75				
	Appealing-Unappealing	-0.39				
	Repelling-Inviting	0.65				

TABLE VIII (Continued)

Factor	Interior		Exterior		Landscape	
	Descriptors	Loading	Descriptors	Loading	Descriptors	Loading
Factor 3					Fertile-Barren	0.69
					Colorful-Colorless	0.65
					Alive-Dead	0.73
					Warm-Cold	0.68
					Civilized-Primitive	0.67
					Full-Empty	0.74
Factor 4	Uncluttered-Cluttered	0.80				
	Clean-Dirty	0.71				
	Orderly-Chaotic	0.76				
Factor 5	Traditional-Contemporary	0.60	Novel-Common	-0.74		
	Usual-Unusual	0.83				
	Plain-Elegant	0.49				

than the interior; people living in alternative houses seem more likely to emphasize the interior environment.

To define the sub-factor of each major factor dimension, factor analysis was employed for each major factor dimension using the total sample, people living in conventional houses and people living in alternative houses, respectively. Table IX shows the sub-factor structure for major factor 1. Using the total sample, only one factor was found. This means that all interior descriptors explain some aspect of the total housing environment together. This dimension was called 'habitability' where habitability means the state of bein habitable, in other words, the state of being reasonably fit for occupation by a tenant of the class for which it was let or of the class ordinarily occupying such a dwelling (Webster's Third New International Dictionary, 1976). When using separate samples, such as conventional and alternative house residents, the sub-factor structure for the first major factor was slightly different. In the case of alternative houses, habitability appeared as one factor, while in the case of conventional houses, two sub-factors were found. Here design practicality was separated from habitability. This means that people living in conventional houses are likely to distinguish two aspects out of major descriptors for the interior environment. For them, design practicality means something different from habitability. For people living in alternative houses, however, design practicality belongs with habitability together with other descriptors.

Table X shows sub-factor structure for major factor 2. Using the total sample, two sub-factors were found. The first was called 'aesthetic appeal and functionality' while the second was called 'design

TABLE IX

SUB-FACTOR STRUCTURE FOR DESCRIPTORS OF THE FIRST FACTOR DIMENSION (A) TOTAL RESPONDENTS, (B) PEOPLE LIVING IN CONVENTIONAL HOUSES, AND (C) PEOPLE LIVING IN ALTERNATIVE HOUSES

Factor	Total		Conventional House		Alternative House	
	Descriptors	Loading	Descriptors	Loading	Descriptors	Loading
Factor 1	Well Ventilated-Stuffy	0.70	Well Ventilated-Stuffy	0.80	Well Ventilated-Stuffy	0.69
	Comfortable Temperature-Uncomfortable Temperature	0.70	Comfortable Temperature-Uncomfortable Temperature	0.79	Comfortable Temperature-Uncomfortable Temperature	0.64
	Pleasant-Unpleasant	0.83	Pleasant-Unpleasant	0.69	Pleasant-Unpleasant	0.83
	Well Planned-Poorly Planned	0.84	Well Planned-Poorly Planned	0.80	Well Planned-Poorly Planned	0.83
	Convenient-Inconvenient	0.84	Convenient-Inconvenient	0.70	Convenient-Inconvenient	0.83
	Efficient-Inefficient	0.70	Well Scaled-Poorly Scaled	0.60	Efficient-Inefficient	0.75
	Well Scaled-Poorly Scaled	0.65	Well Balanced-Poorly Balanced	0.74	Well Scaled-Poorly Scaled	0.66
	Bright-Dull	0.63	Useful-Useless	0.66	Bright-Dull	0.60
	Adequate Size-Inadequate Size	0.71	Flexible-Inflexible	0.49	Adequate Size-Inadequate Size	0.73
	Well Balanced-Poorly Balanced	0.77			Well Balanced-Poorly Balanced	0.78
	Useful-Useless	0.81			Useful-Useless	0.83
	Flexible-Inflexible	0.70			Flexible-Inflexible	0.70
Factor 2			Efficient-Inefficient	0.67		
			Bright-Dull	0.77		
			Adequate Size-Inadequate Size	0.85		
			Flexible-Inflexible*	0.48		

*Belongs to two dimensions, but has lower loading.

TABLE X

SUB-FACTOR STRUCTURE FOR DESCRIPTORS OF THE SECOND FACTOR DIMENSION (A) TOTAL RESPONDENTS, (B) PEOPLE LIVING IN CONVENTIONAL HOUSES, AND (C) PEOPLE LIVING IN ALTERNATIVE HOUSES

Factor	Total		Conventional House		Alternative House	
	Descriptors	Loading	Descriptors	Loading	Descriptors	Loading
Factor 1	Unattractive-Attractive*	0.59	Uncomfortable-Comfortable	0.72	Unfashionable-Fashionable	0.67
	Uncomfortable-Comfortable	0.56	Unattractive-Attractive	0.79	Nonfunctional-Functional	0.71
	Appealing-Unappealing	0.75	Bad Lines-Good Lines*	0.47	Bad Color-Good Color	0.72
	Repelling-Inviting	0.67	Appealing-Unappealing	-0.76	Uncomfortable-Comfortable	0.65
	Pleasant-Unpleasant	0.77	Repelling-Inviting	0.79	Plain-Elegant	0.67
	Frustrating-Satisfactory	0.62	Pleasant-Unpleasant	-0.76	Unattractive-Attractive	0.73
	Ugly-Beautiful	0.64	Frustrating-Satisfactory	0.82	Bad Lines-Good Lines	0.63
	Unpleasant-Pleasant	0.70	Ugly-Beautiful	0.67	Repelling-Inviting*	0.50
	Bad Lines-Good Lines*	0.48	Unpleasant-Pleasant	0.54	Frustrating-Satisfactory*	0.45
					Ugly-Beautiful*	0.51
Factor 2	Unfashionable-Fashionable	0.76	Unfashionable-Fashionable	0.70	Appealing-Unappealing	-0.78
	Nonfunctional-Functional	0.68	Nonfunctional-Functional	0.66	Repelling-Inviting	0.59
	Bad Color-Good Color	0.57	Plain-Elegant	0.76	Pleasant-Unpleasant	-0.79
	Uncomfortable-Comfortable*	0.54			Frustrating-Satisfactory	0.46
	Plain-Elegant	0.66			Ugly-Beautiful	0.61
	Unattractive-Attractive	0.61			Unpleasant-Pleasant	0.71
	Bad Lines-Good Lines	0.58			Unattractive-Attractive	0.41
	Repelling-Inviting*	0.40			Bad Lines-Good Lines	0.45
	Ugly-Beautiful*	0.45				
Factor 3			Unfashionable-Fashionable*	0.52		
			Bad Color-Good Color	0.90		
			Bad Lines-Good Lines	0.50		

*Belongs to two dimensions, but has lower loading.

and harmony'. When using separate samples of conventional and alternative house residents, the sub-factor structure was quite different. In the case of conventional houses, the first sub-factor appeared the same as for the total sample, while the second was separated into two, 'design' and 'harmony'. In the case of alternative houses, these sub-factors were the same as for the total sample, but the order was reversed.

Table XI shows factor analysis results of each of the last three factors to find sub-factor structures. In all cases, each major factor was identified as a factor, and was therefore named as a whole. The third factor was named 'liveliness'. The fourth and fifth factors were already identified as 'hygiene' and 'innovativeness', respectively.

Descriptors for each environment (interior, exterior and landscape) were factor analyzed separately to identify the sub-factor structure of each different environment. For interior descriptors, using the total sample, four sub-factors were found (Table XII). These were 'habitability', 'design harmony' (including descriptive and affective aspects), 'hygiene', and 'innovativeness' in that order. Among alternative houses, the same sub-factors were found, while among conventional houses, 'ambience' was separated from the 'habitability' sub-factor where ambience means a surrounding or pervading atmosphere (Webster's Third New International Dictionary, 1976). For exterior descriptors, in all cases, only one factor was shown (Table XIII). This was named 'aesthetic appeal'. For landscape descriptors, again in all cases, only one factor was shown, previously named 'liveliness' (Table XIV). Tables XV and XVI show the summary of the factor analysis results used thus far.

TABLE XI

SUB-FACTOR STRUCTURE FOR DESCRIPTORS OF THE THIRD, FOURTH, AND FIFTH FACTOR DIMENSION (A) TOTAL RESPONDENTS, (B) PEOPLE LIVING IN CONVENTIONAL HOUSES, AND (C) PEOPLE LIVING IN ALTERNATIVE HOUSES

	Total		Conventional House		Alternative House	
Factor	Descriptors	Loading	Descriptors	Loading	Descriptors	Loading
Factor 1 (Third)	Fertile-Barren	0.71	Fertile-Barren	0.66	Fertile-Barren	0.71
	Colorful-Colorless	0.72	Colorful-Colorless	0.74	Colorful-Colorless	0.69
	Alive-Dead	0.84	Alive-Dead	0.86	Alive-Dead	0.83
	Warm-Cold	0.76	Warm-Cold	0.76	Warm-Cold	0.77
	Civilized-Primitive	0.69	Civilized-Primitive	0.74	Civilized-Primitive	0.67
	Full-Empty	0.73	Full-Empty	0.72	Full-Empty	0.75
Factor 1 (Fourth)	Uncluttered-Cluttered	0.89	Uncluttered-Cluttered	0.91	Uncluttered-Cluttered	0.87
	Clean-Dirty	0.88	Clean-Dirty	0.88	Clean-Dirty	0.87
	Orderly-Chaotic	0.90	Orderly-Chaotic	0.90	Orderly-Chaotic	0.90
Factor 1 (Fifth)	Traditional-Contemporary	0.70	Traditional-Contemporary	0.67	Traditional-Contemporary	0.77
	Usual-Unusual	0.83	Usual-Unusual	0.84	Usual-Unusual	0.84
	Novel-Common	-0.72	Novel-Common	-0.75	Novel-Common	-0.66

TABLE XII

FACTOR STRUCTURE FOR DESCRIPTORS OF PRESENT HOUSE INTERIOR ENVIRONMENT
(A) TOTAL RESPONDENTS, (B) PEOPLE LIVING IN CONVENTIONAL
HOUSES, AND (C) PEOPLE LIVING IN ALTERNATIVE HOUSES

	Total		Conventional House		Alternative House	
Factor	Descriptors	Loading	Descriptors	Loading	Descriptors	Loading
Factor 1	Well Ventilated-Stuffy	0.63	Well Ventilated-Stuffy	0.50	Well Ventilated-Stuffy	0.62
	Comfortable Temperature-Uncomfortable Temperature	0.61	Comfortable Temperature-Uncomfortable Temperature	0.54	Comfortable Temperature-Uncomfortable Temperature	0.56
	Pleasant-Unpleasant	0.72	Pleasant-Unpleasant	0.56	Pleasant-Unpleasant	0.74
	Well Planned-Poorly Planned	0.73	Well Planned-Poorly Planned	0.63	Well Planned-Poorly Planned	0.73
	Convenient-Inconvenient	0.75	Convenient-Inconvenient	0.80	Convenient-Inconvenient	0.68
	Efficient-Inefficient	0.71	Efficient-Inefficient	0.71	Efficient-Inefficient	0.74
	Well Scaled-Poorly Scaled	0.59	Well Scaled-Poorly Scaled	0.48	Well Scaled-Poorly Scaled	0.62
	Bright-Dull	0.64	Bright-Dull	0.72	Bright-Dull	0.61
	Adequate Size-Inadequate Size	0.68	Adequate Size-Inadequate Size	0.68	Adequate Size-Inadequate Size	0.67
	Well Balanced-Poorly Balanced	0.63	Well Balanced-Poorly Balanced*	0.44	Well Balanced-Poorly Balanced	0.69
	Appealing-Unappealing	0.56	Appealing-Unappealing*	0.39	Appealing-Unappealing	0.63
	Useful-Useless	0.77	Useful-Useless	0.57	Useful-Useless	0.83
	Flexible-Inflexible	0.67	Flexible-Inflexible	0.75	Flexible-Inflexible	0.64
Factor 2	Unfashionable-Fashionable	0.57	Uncluttered-Cluttered	0.90	Unfashionable-fashionable	0.57
	Nonfunctional-Functional	0.56	Clean-Dirty	0.83	Nonfunctional-Functional	0.63
	Bad Color-Good Color	0.72	Comfortable Temperature-Uncomfortable Temperature*	0.51	Bad Color-Good Color	0.75
	Uncomfortable-Comfortable	0.69	Pleasant-Unpleasant	0.64	Uncomfortable-Comfortable	0.69
	Plain-Elegant	0.53	Orderly-Chaotic	0.77	Plain-Elegant	0.59
	Unattractive-Attractive	0.80	Well Balanced-Poorly Balanced	0.46	Unattractive-Attractive	0.81
	Bad Lines-Good Lines	0.75	Appealing-Unappealing*	0.42	Bad Lines-Good Lines	0.72
	Repelling-Inviting	0.60			Repelling-Inviting	0.62

TABLE XII (Continued)

Factor	Total		Conventional House		Alternative House	
	Descriptors	Loading	Descriptors	Loading	Descriptors	Loading
Factor 3	Uncluttered-Cluttered	0.84	Unfashionable-Fashionable	0.69	Uncluttered-Cluttered	0.81
	Clean-Dirty	0.75	Nonfunctional-Functional	0.46	Clean-Dirty	0.73
	Orderly-Disorderly	0.77	Bad Color-Good Color	0.75	Orderly-Disorderly	0.79
			Uncomfortable-Comfortable	0.56		
			Bad Lines-Good Lines	0.73		
			Appealing-Unappealing*	-0.39		
			Well Balanced-Poorly Balanced	-0.47		
Factor 4	Traditional-Contemporary	0.75	Usual-Unusual*	0.56	Usual-Unusual	0.85
	Usual-Unusual	0.84	Plain-Elegant	0.65	Traditional-Contemporary	0.73
			Unattractive-Attractive	0.68	Plain-Elegant*	0.46
			Appealing-Unappealing	-0.54		
			Repelling-Inviting	0.74		
Factor 5			Traditional-Contemporary	0.84		
			Usual-Unusual	0.62		

*Belongs to two dimensions, but has lower loading.

TABLE XIII

FACTOR STRUCTURE FOR DESCRIPTORS OF PRESENT HOUSE EXTERIOR ENVIRONMENT (A) TOTAL RESPONDENTS, (B) PEOPLE LIVING IN CONVENTIONAL HOUSES, AND (C) PEOPLE LIVING IN ALTERNATIVE HOUSES

	Total		Conventional House		Alternative House	
Factor	Descriptors	Loading	Descriptors	Loading	Descriptors	Loading
Factor 1	Novel-Common	-0.50	Novel-Common	-0.55	Novel-Common	-0.48
	Pleasant-Unpleasant	-0.77	Pleasant-Unpleasant	-0.81	Pleasant-Unpleasant	-0.76
	Frustrating-Satisfactory	-0.78	Frustrating-Satisfactory	0.82	Frustrating-Satisfactory	0.75
	Ugly-Beautiful	0.81	Ugly-Beautiful	0.83	Ugly-Beautiful	0.80

TABLE XIV

FACTOR STRUCTURE FOR DESCRIPTORS OF PRESENT HOUSE LANDSCAPE ENVIRONMENT (A) TOTAL RESPONDENTS, (B) PEOPLE LIVING IN CONVENTIONAL HOUSES, AND (C) PEOPLE LIVING IN ALTERNATIVE HOUSES

	Total		Conventional House		Alternative House	
Factor	Descriptors	Loading	Descriptors	Loading	Descriptors	Loading
Factor 1	Fertile-Barren	0.70	Fertile-Barren	0.65	Fertile-Barren	0.71
	Colorful-Colorless	0.71	Colorful-Colorless	0.74	Colorful-Colorless	0.69
	Alive-Dead	0.83	Alive-Dead	0.85	Alive-Dead	0.83
	Warm-Cold	0.75	Warm-Cold	0.72	Warm-Cold	0.77
	Civilized-Primitive	0.68	Civilized-Primitive	0.74	Civilized-Primitive	0.65
	Full-Empty	0.73	Full-Empty	0.72	Full-Empty	0.74
	Unpleasant-Pleasant	-0.49	Unpleasant-Pleasant	-0.61	Unpleasant-Pleasant	-0.46

TABLE XV

SUMMARY OF MAJOR AND SUB-FACTOR STRUCTURES, USING TOTAL SAMPLE, PEOPLE LIVING IN CONVENTIONAL HOUSES, AND PEOPLE LIVING IN ALTERNATIVE HOUSES

Factor 1: Major Interior Aspect			Factor 2: Harmony Among Interior, Exterior, and Landscape			Factor 3: Landscape	Factor 4: Hygiene	Factor 5: Innovativeness
Total	Con.	Alt.	Total	Con.	Alt.	Total Con. Alt.	Total Con. Alt.	Total Con. Alt.
(General) Habitability	(Core) Habitability Design Practicality	(General) Habitability	Aesthetic Appeal and Functionality Design Harmony	Aesthetic Appeal and Functionality Harmony Design	Design Harmony Aesthetic Appeal and Functionality	Liveliness	Hygiene	Innovativeness

TABLE XVI

SUMMARY OF STRUCTURE OF SUB-FACTOR DIMENSIONS FOR INTERIOR, EXTERIOR, AND LANDSCAPE DESCRIPTORS USING TOTAL SAMPLE, PEOPLE LIVING IN CONVENTIONAL HOUSES, AND PEOPLE LIVING IN ALTERNATIVE HOUSES

Interior			Exterior			Landscape		
Total	Con.	Alt.	Total	Con.	Alt.	Total	Con.	Alt.
Habitability	Habitability	Habitability	Aesthetic Appeal			Liveliness		
Design Harmony	Design Harmony	Design Harmony						
Hygiene	Hygiene	Hygiene						
Innovativeness	Ambience	Innovativeness						
	Innovativeness							

In summary, the final instrument with 37 descriptors to measure the aesthetic quality was developed using factor analysis. To define the meaningful clusters for these descriptors, the major and sub-factor patterns were also identified through additional factor analysis. Besides the total sample, samples with two different housing types were examined to find whether a similar pattern existed in both cases. If the factor patterns were not very different, it seemed reasonable to use the general factor pattern derived from the total sample to describe the housing environment. In other words, for descriptors to be used in measuring the aesthetic quality of housing environments, at least the clustering descriptors need to be quite similar, regardless of housing types. In that way the importance of factor order can be compared. Further, interior, exterior and landscape descriptors were separately factor analyzed to define each substructure; in other words, to determine what subdimensions explain the interior environment, and so on. Great congruence was found in factor structure between the two different housing types. As expected, the order of factors turned out to be slightly different between the two types. There was also a tendency for people living in conventional houses to measure the aesthetic quality of a house by one aspect or another, while people living in alternative houses were more likely to emphasize the wholeness of the quality.

Testing Results with the Final Instrument

Relationship Among (1) Discrepancy in Ideal and Present Housing Environment, (2) Satisfaction with the Aesthetic Quality, (3) Perceived Objective Aesthetic Value, and (4) Satisfaction with the Total Dwelling.

Eight hypotheses stated on the basis of the first conceptual framework were tested. The analysis results were arranged under each hypothesis.

Ho1: There is no significant difference in discrepancy scores between people who are aesthetically satisfied and unsatisfied with the housing environment.

This hypothesis was tested by t-test, and the findings are summarized in Table XVII. There was enough evidence to reject the null hypothesis. There was a significant difference in discrepancy scores between the less satisfied group and the more satisfied group. Those who were less satisfied with the aesthetic quality of their present houses had higher discrepancy scores in ideal and present housing environment descriptors than those who were more satisfied. To further test the discriminant power of discrepancy scores of each area of housing (interior, exterior and landscape) additional t-tests were employed. The results shown in Table XVII indicate that, regardless of specific areas of housing environment, there was a significant difference between the two groups with less satisfied and more satisfied people. Therefore hypothesis 1 was rejected.

Ho2: There is no significant difference in the discrepancy scores between two groups with high and low objective aesthetic value perceived by themselves.

This hypothesis was also tested by using t-test, and the findings are summarized in Table XVIII. There was enough evidence to reject the null hypothesis. There was a significant difference in discrepancy scores between people who had lower perceived objective aesthetic value and people who had higher perceived objective aesthetic value about their houses. Those who perceived their aesthetic value of the house as

TABLE XVII

T-TEST FOR DISCREPANCY SCORES BETWEEN LESS AND MORE SATISFIED GROUPS WITH THE AESTHETIC QUALITY OF HOUSES

Dependent Variable Discrepancy Scores	Independent Variable[a] Satisfaction With Aesthetic Quality	T-Test N	Mean	SD	T
Discrepancy in Interior Housing Environment	Less Satisfied Group	145	21.86	16.00	
	More Satisfied Group	114	11.07	9.75	6.69***
Discrepancy in Exterior Housing Environment	Less Satisfied Group	154	3.15	3.11	
	More Satisfied Group	118	1.43	1.65	5.86***
Discrepancy in Landscape Environment	Less Satisfied Group	157	4.69	4.16	
	More Satisfied Group	118	3.12	4.95	2.79***
Discrepancy in Interior and Exterior Environment	Less Satisfied Group	142	25.11	18.77	
	More Satisfied Group	113	15.52	10.90	6.69***
Discrepancy in Total Housing Environment	Less Satisfied Group	142	29.90	21.68	
	More Satisfied Group	112	15.34	13.25	6.59***

[a]First group includes people who answered in "somewhat" (47%), "don't know" (4%), "little" (3%), and "not at all" (1%), while second group includes people who answered in "very much" (45%).

***Significant at α = 0.01 level.

TABLE XVIII

T-TEST FOR DISCREPANCY SCORES BETWEEN GROUPS WITH LOWER AND HIGHER PERCEIVED OBJECTIVE AESTHETIC VALUES

Dependent Variable Discrepancy Scores	Independent Variable[a] Perceived Objective Aesthetic Value	N	T-Test Mean	SD	T
Discrepancy in Interior Housing Environment	Lower Aesthetic Quality	138	20.70	15.81	
	Higher Aesthetic Quality	121	13.02	11.90	4.45***
Discrepancy in Exterior Housing Environment	Lower Aesthetic Quality	148	3.01	3.09	
	Higher Aesthetic Quality	124	1.68	1.97	4.32***
Discrepancy in Landscape Environment	Lower Aesthetic Qualtiy	152	4.58	4.19	
	Higher Aesthetic Quality	123	3.33	4.94	2.28**
Discrepancy in Interior and Exterior Environment	Lower Aesthetic Quality	135	23.95	18.51	
	Higher Aesthetic Quality	120	14.56	13.43	4.67***
Discrepancy in Total Housing Environment	Lower Aesthetic Quality	135	28.61	21.48	
	Higher Aesthetic Quality	119	17.66	15.85	4.57***

[a]First group includes people who answered in "somewhat aesthetic" (29%), "don't know" (23%), and "little aesthetic" (2%), while second group includes people who answered in "very aesthetic" (46%).

**Significant at α = 0.05 level.

***Significant at α = 0.01 level.

lower had higher discrepancy scores in ideal and present housing environment descriptors than those who perceived it to be higher. To further test the discriminant power of discrepancy scores of each area of housing (interior, exterior and landscape), additional t-tests were used. The results, also shown in Table XVIII, indicate that, regardless of specific areas of housing environment, there was a significant difference between the two groups of people who perceived their aesthetic quality of houses as lower and higher.

The two hypotheses' test results show the power of using discrepancy scores of the finally developed descriptors measuring the aesthetic quality of houses. Further testing was reasonable to determine the strength of the association among those variables mentioned above. In terms of this, three declarative hypotheses were tested.

Ha3: The higher an individual's discrepancy scores, the less satisfied the individual is with the aesthetic quality of the house.

The results are shown in Table XIX. In terms of scale, the more satisfied, the higher the value to be recorded; the greater discrepancy, the higher the value to be recorded. Pearson's product moment correlation coefficient was -0.41, which is considered quite good in the field of social science. Therefore the negative relationship was found with the amount of common variance to be approximately 17 percent when further analyzed in relation to each area of housing environment, the results were found consistent with the factor structure of all descriptors for present housing environment, that is, -0.41 for interior, -0.39 for exterior, and -0.19 for landscape. Therefore,

TABLE XIX

CORRELATION COEFFICIENTS BETWEEN DISCREPANCY SCORES AND THREE MAJOR VARIABLES

Variables	Satisfaction with Total Dwelling	Satisfaction with Aesthetic Quality	Objective Aesthetic Quality
Discrepancy Scores in Total Environment	0.50***	-0.41***	-0.25***
Discrepancy Scores in Interior Environment	0.52***	-0.41***	-0.25***
Discrepancy Scores in Exterior Environment	0.45***	-0.39***	-0.19***
Discrepancy Scores in Landscape Environment	0.23***	-0.19***	-0.10***
Discrepancy Scores in Interior and Exterior Environment	0.52***	-0.42***	-0.26***

***Significant at α = 0.01 level.

interior discrepancy scores better predict the degree of satisfaction with the aesthetic quality than exterior discrepancy scores; exterior discrepancy scores are more accurate than those for landscape. Discrepancy scores for both interior and exterior better predict the degree of satisfaction with the aesthetic quality. In a word, regardless of the specific area of housing environment, there was a negative relationship between the satisfaction with the aesthetic quality of a house and the discrepancy scores in ideal and present descriptors. The order of strength of association was found. Discrepancy scores in both interior and exterior best explained the satisfaction with the aesthetic quality of houses; interior discrepancy was second, total discrepancy third, exterior discrepancy fourth, and landscape discrepancy fifth. Therefore hypothesis 3 was supported.

Ha4: The higher an individual's discrepancy score, the lower the individual's perceived objective aesthetic value of a house.

The hypothesis was tested using Pearson's product moment correlation coefficients. The result is shown in Table XIX. In terms of scale, the higher the perceived objective value, the higher the value was given. The correlation coefficient was -0.25, which was not high enough, but still acceptable. Therefore the negative relationship was found, with the amount of common variance approximately six percent. When further analyzed in relation to each area of housing environment, the results were found also consistent with the factor structure of all descriptors for present housing environment; that is, -0.25 for interior, -0.19 for exterior, and -0.10 for landscape. Therefore, according to the results of analysis in Table XIX, discrepancy scores in

both interior and exterior best predict the perceived objective value of the aesthetic quality of a house. Interior discrepancy scores were second, total discrepancy third, exterior discrepancy fourth, and landscape discrepancy fifth. In a word, regardless of the specific areas of housing environment, there was a negative relationship between the perceived objective aesthetic quality of a house and the discrepancy scores in ideal and present descriptors. Therefore hypothesis 4 was supported.

Ha5: The higher an individual's discrepancy score, the less satisfied the individual is with the total dwelling.

The hypothesis was tested using Pearson's product moment correlation coefficients. The results are shown in Table XIX. In terms of scale, the more satisfied an individual was, the lower the score. The correlation coefficient was 0.50, which showed a very good relationship between these two variables. Therefore the negative relationship was found with the amount of common variance approximately 25 percent. When further analyzed in relation to each area of housing environment, the results were also found to be consistent with the factor structure of all descriptors for present housing environment; that is, 0.52 for interior, 0.45 for exterior, and 0.23 for landscape. According to the results of analysis in Table XIX, discrepancy scores in both interior and exterior best predict satisfaction with the total dwelling; interior discrepancy scores were second, total discrepancy third, exterior discrepancy fourth, and landscape discrepancy fifth. In a word, regardless of the specific areas of housing environment, there was a negative relationship between the satisfaction with the total

dwelling and discrepancy scores in ideal and present descriptors. Therefore hypothesis 5 was supported.

Ha6: The more an individual is satisfied with the aesthetic quality of a house, the more satisfied the individual is with the total dwelling.

The hypothesis was tested using Pearson's product moment correlation coefficients. The results are shown in Table XX. The correlation coefficient was -0.40, which showed a very good relationship between these two variables. Therefore the positive relationship was found with the amount of common variance approximately 20 percent. This means that the more an individual is satisfied with the aesthetic quality of a house, the more that individual is satisfied with the total dwelling. Therefore hypothesis 6 was supported.

Ha7: The higher perceived objective aesthetic value a house has, the more the owner is satisfied with the aesthetic quality of the house.

The hypothesis was tested using Pearson's product moment correlation coefficients. The results are shown in Table XX. The coefficient was 0.57, which showed a very strong relationship between these two variables. Therefore the positive relationship was found with the amount of common variance approximately 32 percent. This means that the higher the aesthetic quality of a house is appraised by other people, the more it contributes to the owner's satisfaction with the aesthetic quality of the house. Hypothesis 7 was supported.

Ha8: The higher the perceived objective aesthetic value of a house, the more the owner is satisfied with the total dwelling.

TABLE XX

CORRELATION COEFFICIENTS AMONG SATISFACTION WITH THE TOTAL DWELLING, SATISFACTION WITH THE AESTHETIC QUALITY OF A HOUSE, AND PERCEIVED OBJECTIVE AESTHETIC VALUE OF A HOUSE

Variables	Satisfaction with the Total Dwelling	Satisfaction with the Aesthetic Quality of a House
Satisfaction with the Aesthetic Quality of a House	-0.40***	-
Perceived Objective Aesthetic Quality of a House	-0.19***	0.57***

***Significant at α = 0.01 level.

The hypothesis was tested using Pearson's product moment correlation coefficients. The results were shown in Table XX. The coefficient was -0.19, which showed only a weak, but significant, relationship between these two variables. Therefore the positive relationship was found with the amount of common variance approximately four percent. The higher other people appraise the aesthetic quality of a house, the more it contributes to the owner's satisfaction with the total dwelling. However, it does not explain much of this relationship. In other words, the perceived objective aesthetic value is slightly related to the owner's satisfaction with the total dwelling. This might be because of the interaction effect; therefore this point was tested later. Hypothesis 8 was also supported.

The Effects of Interest and Aesthetic Perception Ability in Relation to Discrepancy Scores and Satisfaction with the Aesthetic Quality of a House and Perceived Objective Aesthetic Value of the House. Six hypotheses stated on the basis of the second conceptual framework were tested. The analysis results are arranged under each hypothesis.

Ho1: There is no significant difference in discrepancy scores between people with high and low interest in the aesthetic quality of a house.

This hypothesis was tested by t-test; and the findings are summarized in Table XXI. Using total discrepancy scores as a dependent variable, there was enough evidence to reject the null hypothesis. There was a significant difference in discrepancy scores between the low interest and high interest groups. Those who were less interested in the aesthetic quality of a house had higher discrepancy scores in ideal and

TABLE XXI

T-TEST FOR TWO GROUPS OF HIGH AND LOW INTEREST IN THE AESTHETIC QUALITY OF A HOUSE ENVIRONMENT IN TERMS OF DISCREPANCY SCORES

Dependent Variable	Independent Variable	N	Mean	SD	T
Discrepancy Scores In Total Environment	Low Interest	92	25.50	21.22	
	High Interest	162	21.20	18.60	2.46**
Discrepancy Scores In Interior Environment	Low Interest	94	20.35	15.90	
	High Interest	165	15.27	13.52	2.73***
Discrepancy Scores In Exterior Environment	Low Interest	102	2.79	2.81	
	High Interest	170	2.17	2.64	1.84*
Discrepancy Scores In Landscape Environment	Low Interest	105	4.23	3.95	
	High Interest	170	3.89	4.92	0.63
Discrepancy Scores In Interior and Exterior Environment	Low Interest	92	23.22	18.45	
	High Interest	163	17.45	15.72	2.64***

*Significant at α = 0.1 level.

**Significant at α = 0.05 level.

***Significant at α = 0.01 level.

present housing environment descriptors, than those who were more interested. To further discover how the 'interest' effect is involved, t-tests were employed to test the discrepancy in each area (interior, exterior, landscape, both interior and exterior). The results (Table XXI) indicate that, except for landscape environment, the effect of interest was significant. In other words, people who have a stronger interest in the aesthetic quality of a house are more likely to make the interior and exterior of the house more congruent with their ideal house environment, than people who have little interest.

Ho2: There is no significant difference in discrepancy scores between people with high and low aesthetic perception ability.

This hypothesis was tested by t-test and the findings are summarized in Table XXII. Using total discrepancy scores as a dependent variable, there was not enough evidence to reject the null hypothesis. There was no significant difference in discrepancy scores between groups having lower and higher aesthetic perception ability. However, when it was further tested using the discrepancy scores for each area, the aesthetic perception ability proved to be significant in relation to the discrepancy scores in landscape environment. In other words, people who have higher aesthetic perception ability are more likely to make the landscape environment more congruent with their ideal house environment than people who have lower aesthetic perception ability. Therefore hypothesis 2 was partially rejected.

Ho3: There is no effect of interest in predicting one's satisfaction with aesthetic quality.

Ho4: There is no effect of aesthetic perception ability in

TABLE XXII

T-TEST FOR TWO GROUPS OF HIGH AND LOW SCORES IN THE AESTHETIC PERCEPTION ABILITY TEST IN TERMS OF DISCREPANCY SCORES

Dependent Variable	Independent Variable	N	Mean	SD	T
Discrepancy Scores In Total Environment	Low APT Scores	114	21.67	18.32	
	High APT Scores	123	25.11	20.65	-1.36
Discrepancy Scores In Interior Environment	Low APT Scores	117	15.96	13.48	
	High APT Scores	125	18.35	15.45	-1.28
Discrepancy Scores In Exterior Environment	Low APT Scores	121	2.26	2.52	
	High APT Scores	133	2.56	2.84	-0.89
Discrepancy Scores In Landscape Environment	Low APT Scores	122	3.48	3.86	
	High APT Scores	135	4.49	4.99	-1.83*
Discrepancy Scores In Interior and Exterior Environment	Low APT Scores	115	18.10	15.56	
	High APT Scores	123	20.88	17.99	-1.27

*Significant at α = 0.1 level.

predicting one's satisfaction with aesthetic quality.

These hypotheses were tested by F-test using GLM (General Linear Model) procedure, and findings are summarized in Table XXIII. Using total discrepancy scores as an independent variable, there was found enough evidence to reject the null hypothesis for the main effect of interest, but there was not enough evidence to reject the null hypothesis for the main effect of aesthetic perception ability. Therefore hypothesis 3 was rejected and hypothesis 4 was not rejected.

Additional information in relation to the discrepancy scores of interior, exterior, landscape, both interior and exterior is summarized in the same table. The main effects of interest were found to be significant, where no main effect of aesthetic perception ability and no interaction effect of the aesthetic perception ability with discrepancy was found. Since only main effect was found, the mean scores of two groups with high and low interest were compared. The mean score for the low interest group was higher than that of the high interest group. Therefore, people with lower interest and higher discrepancy scores were least satisfied with the aesthetic quality of the house, while people with high interest and lower discrepancy scores were most satisfied with the aesthetic quality of the house.

Since interest has only two groups, data were sorted by interest group and correlations among discrepancy scores, and several major variables were examined under each level of interest. The results are summarized in Table XXIV, which shows that, within the high interest group, generally higher coefficients were found than within the low interest group. Even though there was not found the main effect of the aesthetic perception ability, data were sorted and examined within each

TABLE XXIII

TESTING OF THE EFFECTS OF DISCREPANCY SCORES, INTEREST IN THE AESTHETIC QUALITY OF HOUSE, AND APT SCORES ON SATISFACTION WITH THE AESTHETIC QUALITY AND PERCEIVED OBJECTIVE AESTHETIC VALUE

Dependent Variable	Satisfaction With Aesthetic Quality		Perceived Objective Aesthetic Value	
Independent Variable	DF	F Value	DF	F Value
Testing Total Environment				
Discrepancy in Total House Environment[a]	4	5.75***	4	1.53
Interest in Aesthetic Quality of House[b]	1	43.35***	1	62.00***
APT Scores[c]	1	2.65	1	0.19
Total Discrepancy * Interest	4	1.03	4	3.31**
Total Discrepancy * APT Scores	4	0.63	4	0.52
Interest * APT Scores	1	0.00	1	0.99
Total Discrepancy * Interest * APT Scores	4	0.60	4	0.82
Testing Interior Environment				
Discrepancy in Interior Environment[a]	4	5.05***	4	2.77**
Interest in Aesthetic Quality of House	1	48.04***	1	67.18***
APT Scores	1	2.32	1	0.00
Interior Discrepancy * Interest	4	0.77	4	3.12**
Interior Discrepancy * APT Scores	4	0.42	4	0.55
Interest * APT Scores	1	0.03	1	1.88
Interior Discrepancy * Interest * APT Scores	4	0.72	4	1.08
Testing Exterior Environment				
Discrepancy in Exterior Environment[a]	4	8.69***	4	3.08**
Interest in Aesthetic Quality of House	1	32.01***	1	28.38***
APT Scores	1	0.28	1	0.03
Exterior Discrepancy * Interest	4	0.80	4	3.83***
Exterior Discrepancy * APT Scores	4	1.69	4	1.22
Interest * APT Scores	1	4.26**	1	2.73*
Exterior Discrepancy * Interest * APT Scores	4	2.83**	4	1.87

TABLE XXIII (Continued)

Dependent Variable / Independent Variable	Satisfaction With Aesthetic Quality DF	Satisfaction With Aesthetic Quality F Value	Perceived Objective Aesthetic Value DF	Perceived Objective Aesthetic Value F Value
Testing Landscape Environment				
Discrepancy in Landscape Environment[a]	4	2.86**	4	2.19*
Interest in Aesthetic Quality of House	1	60.53***	1	60.47***
APT Scores	1	1.09	1	0.46
Landscape Discrepancy * Interest	4	1.38	4	1.15
Landscape Discrepancy * APT Scores	4	0.65	4	0.29
Interest * APT Scores	1	0.61	1	0.58
Landscape Discrepancy * Interest * APT Scores	4	1.01	4	0.22
Testing Interior and Exterior Environment				
Discrepancy in Interior and Exterior Environment[a]	4	5.92***	4	1.35
Interest in Aesthetic Quality of House	1	44.12***	1	63.33***
APT Scores	1	2.05	1	0.08
Interior and Exterior Discrepancy * Interest	4	0.67	4	3.52***
Interior and Exterior Discrepancy * APT Scores	4	0.68	4	0.28
Interest * APT Scores	1	0.01	1	0.92
Interior and Exterior Discrepancy * Interest * APT Scores	4	0.59	4	0.71

[a]Discrepancy scores were categorized into 5 groups on the basis of approximately the same percentage in each group.

[b]Interest scores were categorized into 2 groups on the basis of approximately the same percentage in each group.

[c]APT scores were categorized into 2 groups on the basis of approximately the same percentage in each group.

*Significant at α = 0.1 level.

**Significant at α = 0.05 level.

***Significant at α = 0.01 level.

TABLE XXIV

CORRELATION COEFFICIENTS BETWEEN DISCREPANCY SCORES AND SEVERAL VARIABLES IN TERMS OF TOTAL RESPONDENTS, LOW INTEREST, AND HIGH INTEREST GROUP

Variables	Total			Low Interest Group			High Interest Group		
	Satis. W/Total Dwelling	Satis. W/Aes. Quality	Obj. Aes. Quality	Satis. W/Total Dwelling	Satis. W/Aes. Quality	Obj. Aes. Quality	Satis. W/Total Dwelling	Satis. W/Aes. Quality	Obj. Aes. Quality
Discrepancy Scores In Total Environment	0.50***	-0.41***	-0.25***	0.52***	-0.32***	0.02	0.47***	-0.43***	-0.35***
Discrepancy Scores In Interior Environment	0.52***	-0.41***	-0.25***	0.54***	-0.30***	0.04	0.47***	-0.44***	-0.34***
Discrepancy Scores In Exterior Environment	0.45***	-0.39***	-0.19***	0.49***	-0.27***	0.09	0.41***	-0.45***	-0.32***
Discrepancy Scores In Landscape Environment	0.23***	-0.19***	-0.10***	0.25**	-0.26***	-0.00	0.23***	-0.15***	-0.14*
Discrepancy Scores In Interior and Exterior Environment	0.52***	-0.42***	-0.26***	0.54***	-0.30***	0.04	0.47***	-0.45***	-0.36***

*Significant at α = 0.1 level.

**Significant at α = 0.05 level.

***Significant at α = 0.01 level.

level of aesthetic perception ability (Table XXV). It seemed that higher coefficients were found in the higher aesthetic perception ability group. However, data did not provide enough support to reject the hypothesis.

Ho5: There is no effect of interest in predicting the perceived objective aesthetic value of a house.

Ho6: There is no effect of aesthetic perception ability in predicting the perceived objective aesthetic value of a house.

These hypotheses were tested by F-test using GLM procedures (Table XXIII). Using total discrepancy scores as an independent variable, there was found enough evidence to reject hypothesis 5, but not enough evidence to reject hypothesis 6. Therefore, hypothesis 5 was rejected and hypothesis 6 was not rejected.

Using several specific environments (interior, exterior, landscape, both interior and exterior), the main effects of interest were found significant, but no main effects of aesthetic perception ability were found in any of these. The interaction effect of interest with the discrepancy scores was significant in relation to interior, exterior, and both interior and exterior environments only, whereas no interaction effect of the aesthetic perception ability with the discrepancy scores was significant in any of these.

In summary, using hypotheses 3, 4, 5 and 6, interest in the aesthetic quality of the house has an effect in predicting the satisfaction with the aesthetic quality of the house. In further analysis, the mean scores of the low interest group in the degree of

TABLE XXV

CORRELATION COEFFICIENTS BETWEEN DISCREPANCY SCORES AND SEVERAL VARIABLES IN TERMS OF TOTAL RESPONDENTS, LOW APT SCORE GROUP, AND HIGH APT SCORE GROUP

Variables	Total				Low APT Score Group				High APT Score Group			
	Satis. W/Total Dwelling	Interest	Satis. W/Aes. Quality	Obj. Aes. Quality	Satis. W/Total Dwelling	Interest	Satis. W/Aes. Quality	Obj. Aes. Quality	Satis. W/Total Dwelling	Interes	Satis. W/Aes. Quality	Obj. Aes. Quality
Discrepancy Scores In Total Environment	0.50***	-0.11*	-0.41***	-0.25***	0.39***	-0.14	-0.38***	-0.24**	0.54***	-0.09	-0.45***	-0.30***
Discrepancy Scores In Interior Environment	0.52***	-0.13**	-0.41***	-0.25***	0.39***	-0.16*	-0.38***	-0.23**	0.57***	-0.10	-0.43***	-0.30***
Discrepancy Scores In Exterior Environment	0.45***	-0.04	-0.39***	-0.19***	0.39***	-0.17*	-0.33***	-0.19**	0.48***	0.00	-0.43***	-0.24***
Discrepancy Scores In Landscape Environment	0.23***	-0.00	-0.19***	-0.10*	0.27***	-0.02	-0.19**	-0.12	0.13	-0.00	-0.16*	-0.10
Discrepancy Scores In Interior and Exterior Environment	0.52***	-0.12**	-0.42***	-0.26***	0.40***	-0.16*	-0.39***	-0.24**	0.57***	-0.10	-0.45***	-0.31***

*Significant at α = 0.1 level.

**Significant at α = 0.05 level.

***Significant at α = 0.01 level.

satisfaction with the aesthetic quality of a house and lower perceived objective value, were found lower than those of the high interest group. Therefore, the less discrepancy and more interest an individual has, the more the individual is satisfied with the aesthetic quality. Since there was found the interaction effect of interest with the discrepancy scores in relation to the perceived objective aesthetic value, the mean values of all combinations of levels of two variables were compared separately using Duncan's Multiple Range Test, only in specific environments where the interaction effect of interest and discrepancy scores were found (Table XXVI). Using total discrepancy scores, the group with very low discrepancy scores and high interest, the group with high discrepancy and low interest, and the group with very low discrepancy and low interest were found to be distinctly different. The first group had the highest scores of the perceived objective aesthetic value, whereas the last group had the lowest. Using interior discrepancy scores, all except the group with high interest, had the higher perceived objective aesthetic value, regardless of the degree of discrepancy scores. The same thing occurred in both interior and exterior discrepancy.

Briefly, the test results of all hypotheses proposed to test the developed methodology to measure the aesthetic quality of a house, support the already established theories in relation to satisfaction and aesthetics. This, in turn, indicates that the developed methodology, including 37 descriptors and the way of using discrepancy scores between ideal and present house descriptors, is valid to measure the aesthetic quality of a house. Additionally, some propositions in the two broad theories were expanded and supported by testing these hypotheses.

TABLE XXVI

DUNCAN'S MULTIPLE RANGE TEST RESULTS FOR MEAN DIFFERENCES AMONG TEN DIFFERENT GROUPS WITH DIFFERENT INTEREST LEVELS AND DISCREPANCY SCORES

Total			Interior			Interior and Exterior		
Group	Mean	Duncan[i]	Group	Mean	Duncan	Gruop	Mean	Duncan
VL[a] Dis[f] * H[d] Int[g]	3.86[h]	A	VL Dis * H Int	3.79	A	VL Dis * H Int	3.81	A
L[b] Dis * H Int	3.50	AB	M Dis * H Int	3.65	A	M Dis * H Int	3.60	A
M[c] Dis * H Int	3.48	AB	H Dis * H Int	3.50	A	L Dis * H Int	3.54	A
H Dis * H Int	3.42	AB	L Dis * H Int	3.44	A	H Dis * H Int	3.42	A
VH[e] Dis * H Int	3.04	BC	VH Dis * H Int	2.92	B	VH Dis * H Int	2.96	B
H Dis * L Int	2.85	CD	H Dis * L Int	2.90	B	H Dis * L Int	2.82	B
VH Dis * L Int	2.75	CD	VH Dis * L Int	2.71	B	VH Dis * L Int	2.81	B
M Dis * L Int	2.71	CD	VL Dis * L Int	2.62	B	M Dis * L Int	2.70	B
L Dis * L Int	2.58	CD	M Dis * L Int	2.57	B	VL Dis * L Int	2.58	B
VL Dis * L Int	2.54	D	L Dis * L Int	2.56	B	L Dis * L Int	2.53	B

[a]Very Low
[b]Low
[c]Moderate
[d]High
[e]Very High
[f]Discrepancy: Total discrepancy scores were regrouped into five levels (very low, low, moderate, high, and very high.
[g]Interest
[h]Dependent variable was the perceived objective aesthetic value.
[i]Means followed by the same letter are not significantly different.

Therefore the relationships proposed in the two conceptual frameworks for testing the developed methodology were established. The results were:

1. Discrepancy scores can be used to predict the degree of satisfaction with the aesthetic quality of a house, perceived objective aesthetic value of a house, and satisfaction with the total dwelling.
2. Positive relationships exist among satisfaction with the aesthetic quality, the perceived objective aesthetic value, and satisfaction with the total dwelling.
3. In predicting discrepancy scores, there was a significant difference between two groups with high and low interest, whereas no significant difference was found between two groups with high and low aesthetic perception ability scores.
4. When total discrepancy scores were used, there was a main effect of interest and no main effect of aesthetic perception ability in relation to both the satisfaction with the aesthetic quality of a house and the perceived objective aesthetic value of the house.
5. When total discrepancy scores were used, there was an interaction effect of interest with the discrepancy scores, whereas no interaction effect of aesthetic perception ability with the discrepancy scores was found in relation to the perceived objective aesthetic value.

Reliability of Instrument

Using three duplicated items, internal reliability was established on the basis of Pearson's product moment correlation coefficients. The results are shown in Table XVII. The range of coefficients was from 0.63 to 0.71, which can be considered quite high in terms of measuring psychological and affective quality.

Summary

This chapter has considered the process of testing the finally developed instrument measuring the aesthetic quality of housing environments. Mention was made of (1) the purpose of this chapter, (2) the testing model, (3) the method including instrument, population and sample selection, collection of data, and analysis of data, and (4) results of analysis including description of the final instrument, testing results with the final instrument, and reliability of the instrument. The validity of the instrument was established in this chapter through the construct validity using factor analysis, and through the testing of two conceptual frameworks.

TABLE XXVII

PEARSON'S PRODUCT MOMENT CORRELATION FOR INTERNAL RELIABILITY TEST

Variables	Pleasant-Unpleasant for Ideal House	Pleasant-Unpleasant for Present House	Pleasant-Unpleasant for Importance
Pleasant-Unpleasant for Ideal House	0.71***		
Pleasant-Unpleasant for Present House		0.70***	
Pleasant-Unpleasant for Importance			0.63***

***Significant at α = 0.01 level.

CHAPTER V

AESTHETIC EVALUATION OF ALTERNATIVE HOUSING

Purpose and Objectives

This study was three-fold in nature: 1. to develop a methodology, 2. to test the developed methodology using conceptual frameworks derived from two already established theories, and 3. to evaluate the aesthetic quality of alternative housing. Up to this point, the first two purposes were achieved as discussed in previous chapters. In this chapter the third purpose of the study is discussed. In relation to this purpose two relevant objectives were stated:

1. To measure and evaluate the aesthetic quality of alternative housing in comparison with the results of measuring the aesthetic quality of conventional housing.
2. To provide practical information and recommendations on the aesthetics of alternative housing for practioners, researchers, and theorists in the area of aesthetics and housing.

Research Questions and Hypotheses

Research questions for the specific objectives above were developed in Chapter I. The questions were as follows:

Research Question 6: What are the profiles of ideal and

present aesthetic housing environment for all respondents, people living in conventional houses, and people living in alternative housing, respectively?

Research Question 7: Are there any differences among people living in different housing types in satisfaction with the total dwelling, interest in the aesthetic quality of the house, satisfaction with the aesthetic quality of the house, perceived objective aesthetic quality of the house, and scores of the aesthetic quality measured by the developed methodology?

Research Question 8: What and how many descriptors meet the desire for ideal aesthetic housing environment of total respondents, people living in conventional houses and in alternative housing, respectively?

Research Question 9: What descriptors are significantly different in describing the ideal housing environment among people living in conventional housing, and alternative housing such as solar and earth sheltered housing?

Research Question 10: What descriptors are significantly different in describing the present housing environment among people living in conventional housing, and alternative housing such as solar and earth sheltered housing?

Research Question 11: What descriptors are perceived significantly different in terms of the importance or meaningfulness, among people living in conventional

housing, and alternative housing such as solar and earth sheltered housing?

Method

Descriptive survey research has been implemented for the purpose of this chapter. Survey research probably has been the most commonly used method of research for obtaining the opinions and attitudes of people. This chapter deals with residents' opinions, attitudes, and their perceptions about the aesthetic quality of conventional and alternative housing.

Data using the preliminary instrument were collected for the purpose of testing the previously developed methodology. Since the descriptors for the final instrument were a selected part of the preliminary instrument, part of the data collected through the means described in the previous chapters were used. Therefore, instrument, population and sample selection, and collection of data are not described in this chapter. Only analysis of data is included.

Analysis of Data

Frequencies, percentages, mean, and standard deviations were used to describe the respondents and their responses to questions about the sample characteristics including demographic information, dwelling characteristics, attitudes and opinions about the aesthetic quality of their houses, and aesthetic descriptors. The t-test was used to determine the significant differences among people living in conventional housing and alternative housing in 1. satisfaction with

the total dwelling, 2. interest in the aesthetic quality of the house, 3. satisfaction with the aesthetic quality of the house, 4. perceived objective value of the aesthetic quality of the house, 5. discrepancy scores between ideal and present descriptors, and 6. to determine what descriptors were significantly different in describing the ideal and present housing environment among people living in conventional housing and alternative housing. The paired t-test was used to establish if the discrepancy score of each descriptor was significant among the total respondents, people living in conventional housing, and alternative housing, respectively. Factor analysis was used to provide the communalities of each descriptor to see the relative power among all descriptors in terms of both ideal and present housing environment. The F-test was used to determine differences among people living in conventional housing, solar housing, and earth sheltered housing in using descriptors in relation to ideal, present housing environment, and the importance of each descriptor. Further, Duncan's Multiple Range test was employed to find out where these differences existed. Pearson's correlation coefficients were used to determine the degree of relationship among the respondents demographic variables, dwelling characteristics, and other variables.

Findings and Discussion

The major purpose of this study was to evaluate the aesthetic quality of alternative housing by identifying differences in the aesthetic quality between conventional and alternative housing. Findings were organized into three categories: 1. sample characteristics, 2. research questions, and 3. other findings.

Sample Characteristics

Table XXVIII presents the sample distribution. The samples from conventional houses were based on the matched cluster sampling with the sample from alternative houses. The sample distribution of the conventional houses was shown in four counties. Table XXIX summarizes the demographic characteristics of the total sample, conventional houses, solar houses, and earth sheltered houses. Age of respondent ranged from 26-85, with the mean age being 44.89. The ages were regrouped into three groups. The number of respondents in the middle age group (47 percent) was comparatively larger than in the other two groups. Ninety-three percent were white. Ninety-two percent of the people were married. Thirty percent of the total sample had education below junior college level while 47 percent had college education and 23 percent had education above college degrees. Fifty-six percent of the total sample had professional and/or technical positions. The most frequent income range reported was $40,000 and above. The income levels were regrouped into three classes. Over 72 percent of the total sample had income of $35,000 or above. The number of males responding exceeded females considerably, 217 versus 68, respectively.

In relation to housing type, proportions of race, education, and occupation appeared similar between conventional and alternative housing. The percentage of females responding in conventional housing was 9 percent higher than the percentage in alternative housing. The percentage of the young married group in alternative housing was four percent lower than in conventional housing. The proportion of the

TABLE XXVIII

COUNTIES WHERE SAMPLE WAS DRAWN

County	Total		Alternative		Conventional	
Beckham	2	0.69	2	0.70		
Blaine	5	1.74	5	1.76		
Caddo	6	2.08	5	1.76		
Canadian	41	14.24	21	7.39	20	7.04
Carter	1	0.35	1	0.35		
Cherokee	2	0.69	2	0.70		
Cleveland	35	12.15	22	7.75	13	4.58
Comanche	3	1.04	3	1.06		
Craig	1	0.35	1	0.35		
Delaware	1	0.35	1	0.35		
Garfield	1	0.35	1	0.35		
Garvin	2	0.69	2	0.70		
Grady	39	13.54	15	5.28	24	8.45
Kay	2	0.69	2	0.70		
Kingfisher	26	9.03	7	2.46	19	6.69
Logan	2	0.69	2	0.70		
McClain	28	9.72	10	3.52	18	6.34
McCurtain	2	0.69	2	0.70		
Mayes	2	0.69	2	0.70		
Murray	2	0.69	2	0.70		
Muskogee	4	1.39	4	1.41		
Oklahoma	60	20.83	59	20.77		
Osage	1	0.35	1	0.35		
Pawnee	1	0.35	1	0.35		
Payne	4	1.39	4	1.41		
Pottawatomie	4	1.39	3	1.06		
Seminole	1	0.35	1	0.35		
Stephens	4	1.39	3	1.06		
Tulsa	4	1.39	4	1.41		
Washita	1	0.35	1	0.35		
Woodward	1	0.35	1	0.35		
TOTAL	288	100.00	190	66.90	94	34.10

Note: Totals may differ due to missing data.

TABLE XXIX

CHARACTERISTICS OF RESPONDENTS BY DEMOGRAPHIC AND HOUSING TYPE VARIABLES

DEMOGRAPHIC CHARACTERISTICS				HOUSING TYPE CHARACTERISTICS							
Variable	Category	Freq.	%	Conv. Homes	%	Alter. Homes	%	Solar Homes	%	E/S Homes	%
Sex	Male	217	76.14	65	70.00	152	79.17	113	79.58	39	78.00
N=285	Female	68	23.86	28	30.00	40	20.83	29	20.42	11	22.00
Age	26 - 35	72	26.67	26	29.21	46	25.41	35	25.55	11	25.00
N=270	36 - 55	127	47.04	39	43.82	88	48.62	66	48.18	22	50.00
	55+	71	26.30	24	26.97	47	25.97	36	26.28	11	25.00
Race	White	267	93.36	88	93.12	179	93.23	133	93.66	46	92.00
N=286	Non-white	19	6.64	6	6.38	13	6.77	9	6.34	4	8.00
Marital Status	Married	265	92.33	84	89.36	265	92.33	136	95.10	45	90.00
N=287	Not married	22	7.67	10	10.64	22	7.67	7	4.90	5	10.00
Educa-	0 - 12 years	85	29.62	29	30.85	56	29.02	39	27.27	17	34.00
tion	13 - 17 years	135	47.04	42	44.68	93	48.19	71	49.65	22	44.00
N=287	17+ years	67	23.34	23	24.47	44	22.80	33	23.08	11	22.00
Occupa-	Prof/Tech	161	56.49	56	60.22	105	54.69	75	52.82	30	60.00
tion	Non Prof/Serv.	66	23.16	19	20.43	47	24.48	35	24.65	12	24.00
N=285	Farm/Farm Mgr.	7	2.46	2	2.15	5	2.60	5	3.52	Ø	0.00
	Housewife	28	9.82	9	9.68	19	9.90	14	9.86	5	10.00
	Retired	23	8.07	7	7.53	16	8.33	13	9.15	3	6.00
Income	To $19,999	12	4.33	2	2.17	10	5.41	1	.73	9	19.15
N=277	$20,000-$34,999	64	23.10	14	15.22	50	27.03	37	26.81	13	27.66
	$35,000+	201	72.57	76	82.61	125	67.57	100	72.46	25	53.19

Total frequency was different from total sample size because of missing data.

unmarried group in solar housing was five percent lower than the conventional and earth sheltered housing. Among conventional housing samples, 83 percent of people had income of $35,000 or above, while 72 percent of people in solar housing, and only 53 percent of people in earth sheltered housing had the same level of income.

Table XXX summarizes the dwelling characteristics of total sample. Approximately 67 percent of the total sample had houses less than seven years old. About 70 percent of the respondents had lived in their homes less than seven years. Over 75 percent of the houses surveyed had square footage between 1,501 and 3,000. Less than one percent of respondents lived in houses smaller than 1,000 square feet, while nine percent of the houses were larger than 3,500 square feet.

As a convenient way to show how data were sorted and analyzed for comparison purposes among different housing types, Table XXXI was provided. Hereafter the sorting of data is not mentioned in detail.

Table XXXII presents the frequency distribution of major variables. Ninety three percent of total respondents answered "very satisfied" or "satisfied" in relation to satisfaction with total dwelling. Ninety five percent of total respondents answered "somewhat" or "very much" for the interest in the aesthetic quality of the house. Ninety two percent of total respondents answered "somewhat aesthetic" or "very aesthetic" to perceived objective aesthetic quality of the house. Table XXXIII shows the frequency distribution of discrepancy scores between ideal and present housing environment. The total discrepancy scores ranged from 0 to 107 with the maximum score 222, while interior scores ranged from 0 to 78 with the maximum score 156, exterior scores from 0 to 19 with the maximum score 24, landscape scores from 0 to 34 with the maximum score

TABLE XXX

DWELLING CHARACTERISTICS OF SAMPLE

Variable	Category	Frequency	Percent
Age of dwelling	0- 7	197	66.78
	8-14	49	16.61
	15-21	20	6.78
	22-28	15	5.09
	28+	14	4.75
Years of residence	0- 7	224	76.45
	8-14	38	12.97
	15-21	20	6.83
	22-28	8	2.73
	28+	3	1.02
Square footage of dwelling	500-1,000	2	0.68
	1,001-1,500	23	7.85
	1,501-2,000	107	36.52
	2,001-2,500	76	25.94
	2,501-3,000	42	14.33
	3,001-3,500	18	6.14
	3,501-4,000	12	4.10
	4,001+	13	4.44

TABLE XXXI

DIFFERENT WAYS TO IDENTIFY HOUSE TYPES FOR COMPARISON PURPOSES THROUGHOUT THIS STUDY

Housing Types[a]	A Way		B Way		C Way	
	Freq	%	Freq	%	Freq	%
Conventional House	96	32.54	96	32.54	96	32.54
Active Solar Only	118	40.00				
Passive Solar Only	13	4.41	146	49.49		
Active and Passive Solar	15	5.09				
Earth Sheltered	25	8.48			295	67.46
Active Solar and Earth Sheltered	5	1.70				
Passive Solar and Earth Sheltered	11	3.73	53	17.97		
Active, Passive Solar and Earth Sheltered	12	4.07				

[a]Solar houses were recognized by the characteristics related to inside or outside of a house; for example, a house with a solar system for swimming pool only was also considered as a solar house.

TABLE XXXII

FREQUENCY DISTRIBUTION OF VARIABLES (A) SATISFACTION WITH TOTAL DWELLING, (B) INTEREST IN THE AESTHETIC QUALITY OF THE HOUSE, (C) SATISFACTION WITH THE AESTHETIC QUALITY OF THE HOUSE, (D) PERCEIVED OBJECTIVE AESTHETIC QUALITY

Variables	Categories*	Freq.	Percent
A. Satisfaction with Total Dwelling	Very Satisfied	153	51.69
	Satisfied	122	41.22
	Neither Satisfied or Dissatisfied	18	6.08
	Dissatisfied	3	1.01
	Very Dissatisfied	0	0.00
B. Interest in the Aesthetic Quality of the House	Not at all	2	0.69
	Little	3	1.03
	Don't Know	10	3.45
	Somewhat	91	31.38
	Very Much	184	63.45
C. Satisfaction with the Aesthetic Quality of the House	Not at all	2	0.69
	Little	9	3.08
	Don't Know	13	4.45
	Somewhat	138	47.26
	Very Much	130	44.52
D. Perceived Objective Quality of the House	Little Aesthetic	5	1.71
	Don't Know	66	22.60
	Somewhat Aesthetic	86	29.45
	Very Aesthetic	135	46.23

*Categories are original in the finally tested main instrument.

TABLE XXXIII

FREQUENCY DISTRIBUTION OF DISCREPANCY SCORES
IN HOUSING ENVIRONMENT

Variables	Categories	Freq.	Percent
Total Discrepancy Scores of the Interior Environment	0 - 4	57	22.01
	5 - 10	48	18.53
	11 - 16	45	17.38
	17 - 28	59	22.78
	29 -	50	19.31
Total Discrepancy Scores of the Exterior Environment	0	86	31.62
	1 - 2	79	29.04
	3 - 4	60	22.06
	5 - 7	34	12.50
	8 -	13	4.78
Total Discrepancy Scores of the Landscape Environment	0	68	24.73
	1 - 2	63	22.91
	3 - 4	46	16.73
	5 - 8	62	22.55
	9 -	36	13.09
Total Discrepancy Scores of the Interior and Exterior Environment	0 - 4	51	20.00
	5 - 12	54	21.18
	13 - 20	50	19.61
	21 - 32	48	18.82
	33 -	52	20.39
Total Discrepancy Scores of the Total House Environment	0 - 5	52	20.47
	6 - 14	46	18.11
	15 - 24	54	21.26
	25 - 38	53	20.87
	39 -	49	19.29

42, and interior and exterior discrepancy scores from 0 to 93 with the maximum score 180. The discrepancy scores were recategorized into five groups on the basis of similar percentages for each group as possible for analysis purposes.

Research Questions

Research Question 6. What are the profiles of ideal and present aesthetic housing environment for total respondents, people living in conventional houses, and people living in alternative housing, respectively?

Using the mean scores, three profiles of ideal and present environments were developed. Figure 10 indicates the profiles of total respondents. The means and standard deviations for these descriptors are shown in Appendix C. Descriptors on the left side were positive toward ideal environment. Profiles of the ideal and present housing environment for people living in conventional and alternative housing was shown in Figure 11 and Figure 12, respectively. All these figures show the points of ideal and present description, the types of discrepancies, and where the discrepancies lie. The scale designation was completely, very, somewhat, neutral, somewhat, very, and completely in order. The adverb for each point was used with the descriptors close to it. In presenting and describing the ideal housing environment for total respondents, all descriptors with adverbs on the scale could be used. As an example, 'very well ventilated', 'very comfortable temperature', 'very well balanced', 'somewhat fashionable', 'somewhat contemporary', and so on.

Comparing the profiles of people living in conventional housing

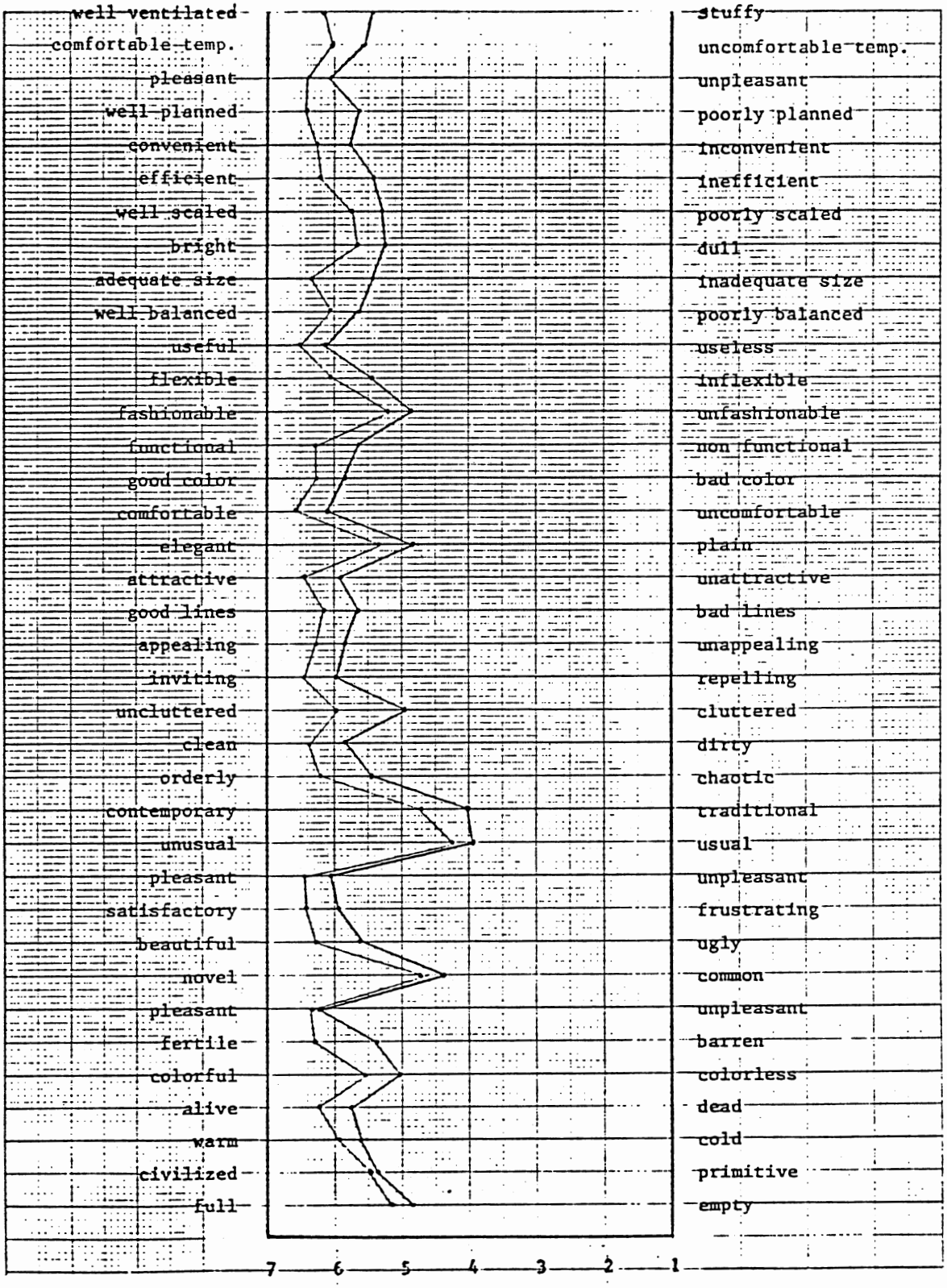


Figure 10. Profile of the Ideal and Present Housing Environment of Total Respondents

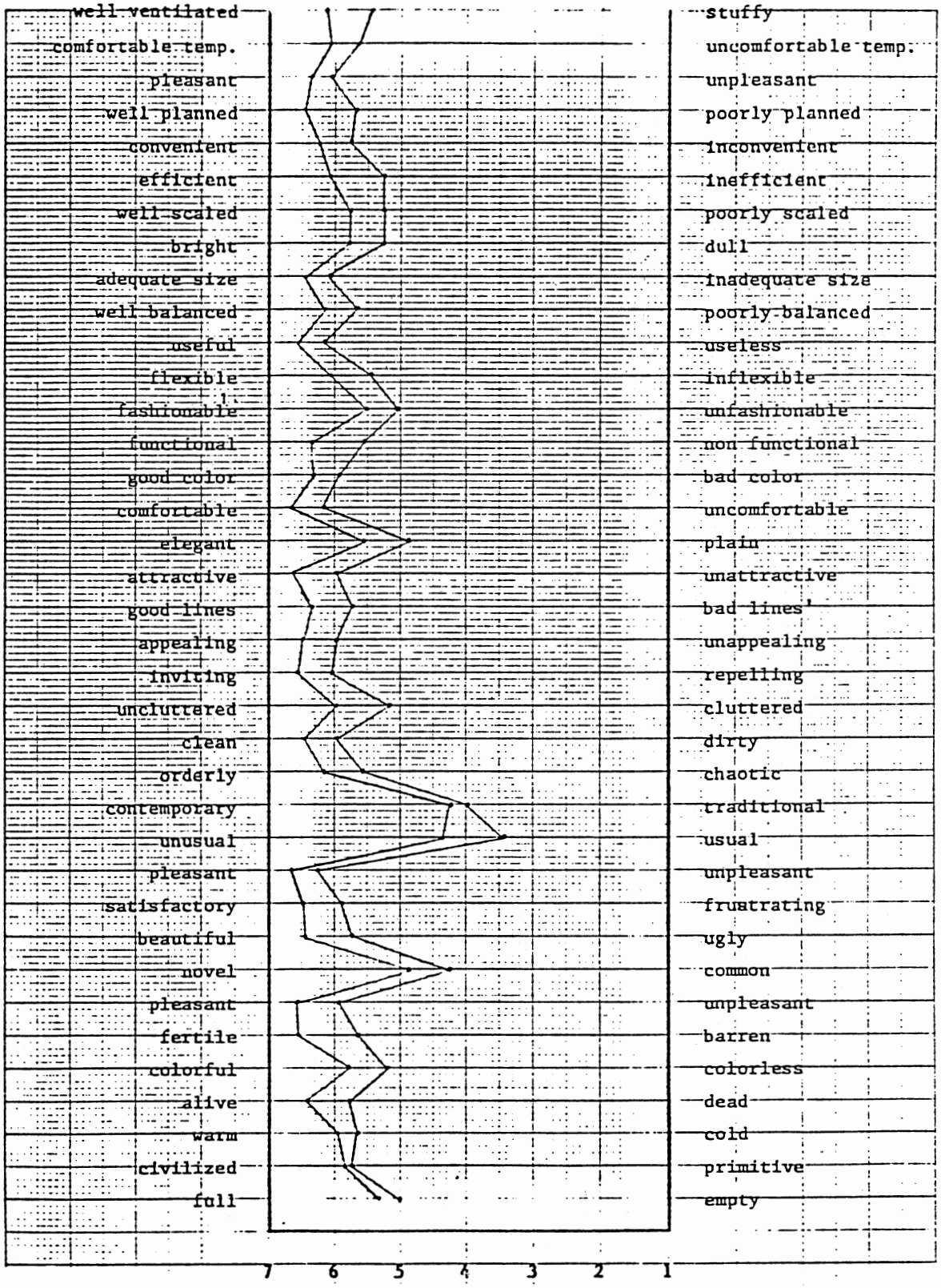


Figure 11. Profile of the Ideal and Present Housing Environment Descriptors of People Living in Conventional Houses

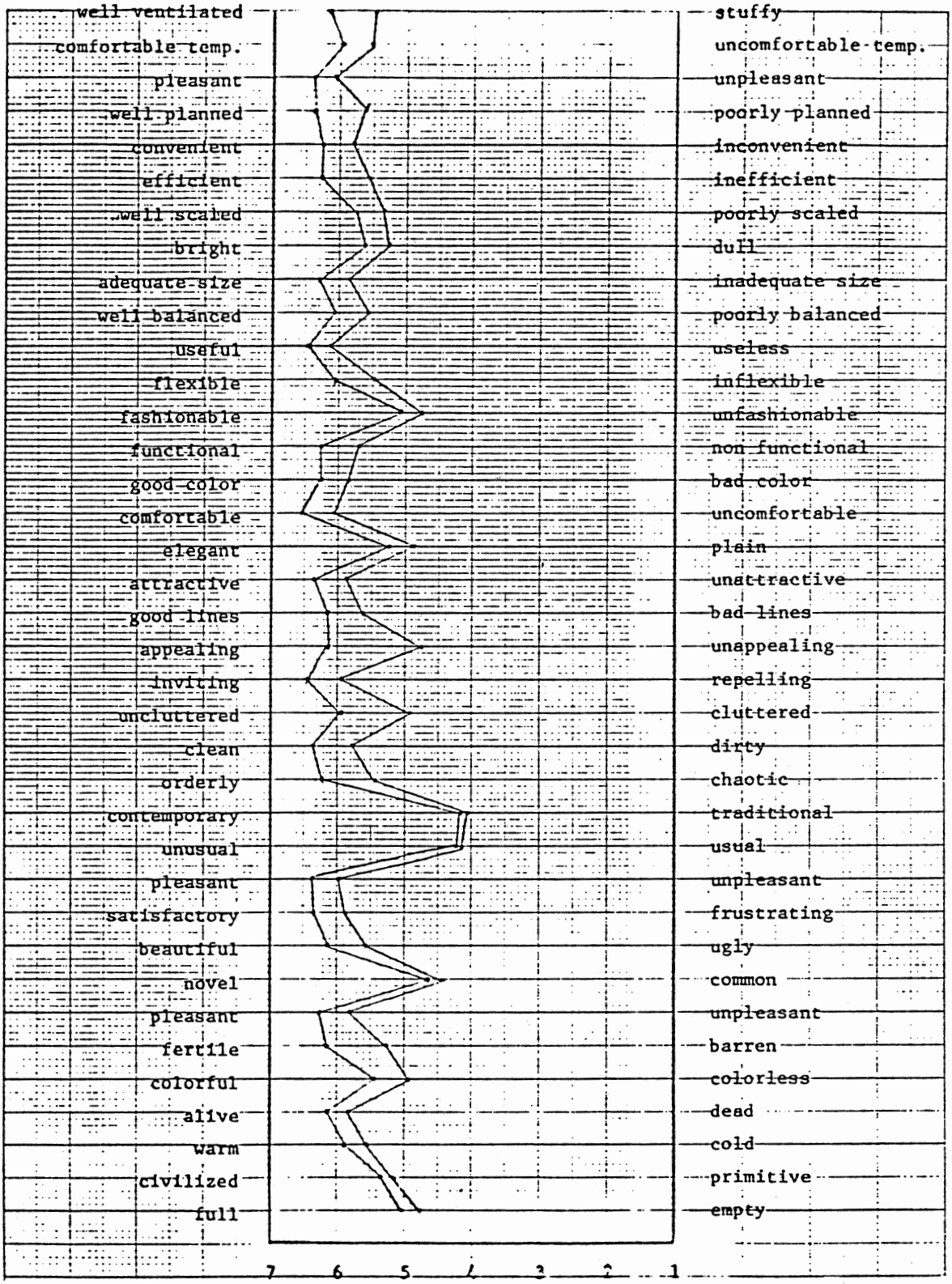


Figure 12. Profile of the Ideal and Present Housing Environment Descriptors of People Living in Alternative Houses

with the profile of people living in alternative housing, the discrepancy of the descriptor 'appealing' was greater than the discrepancy in conventional housing. Another example was also seen in the descriptor 'unusual'. For people living in conventional housing, the ideal descriptor was between 'somewhat and neutral unusual' while present descriptor was 'between neutral and somewhat usual'. A little discrepancy seemed to exist. For people living in alternative housing, the ideal descriptor was a 'little unusual' where present descriptor was also close to it. There seemed to be no discrepancy. Therefore the developed graphics of profiles easily tell what the ideal housing environment is and how and where discrepancies appear both in a general and specific way.

Research Question 7. Are there any differences among people living in different housing types in satisfaction with the total dwelling, interest in the aesthetic quality of the house, satisfaction with the aesthetic quality of the house, perceived objective aesthetic quality of the house, and scores of the aesthetic quality measured by the developed methodology?

In order to handle the question effectively, five null hypotheses were developed.

Ho1: There are no significant differences among people living in conventional and alternative housing types in the degree of satisfaction with the total dwelling.

This hypothesis was tested by t-test and findings are indicated in Table XXXIV. From the t-test, there was not enough evidence to say that there was a significant difference between conventional and alternative house.

TABLE XXXIV

T-TEST FOR THE SEVERAL DEPENDENT VARIABLES BETWEEN PEOPLE LIVING IN CONVENTIONAL AND ALTERNATIVE HOUSES

Dependent Variable	Independent Variable	N	Mean	S.D.	T
Satisfaction with Total Dwelling	Conventional House	96	1.57	0.71	0.21
	Alternative House	198	1.56	0.62	
Interest in the Aesthetic Quality of a House	Conventional House	91	4.66	0.60	1.70*
	Alternative House	195	4.51	0.71	
Satisfaction with the Aesthetic Quality of a House	Conventional House	92	4.35	0.83	0.38
	Alternative House	196	4.31	0.73	
Respondent's Perception about the Aesthetic Quality of the House Perceived by Others	Conventional House	92	0.38	0.81	2.29**
	Alternative House	196	3.14	0.85	
Total Discrepancy Score of the Interior and Exterior Environment Descriptors	Conventional House	85	19.95	18.43	0.34
	Alternative House	167	19.19	15.96	
Total Discrepancy Score of the Interior Environment Descriptors	Conventional House	87	17.33	15.59	0.23
	Alternative House	169	16.89	13.91	
Total Discrepancy Score of the Exterior Environment Descriptors	Conventional House	90	2.61	3.20	0.82
	Alternative House	178	2.30	2.43	
Total Discrepancy Score of the Landscape Environment Descriptors	Conventional House	90	4.33	4.83	0.78
	Alternative House	181	3.87	4.45	

TABLE XXXIV (Continued)

Dependent Variable	Independent Variable	N	Mean	S.D.	T
Total Discrepancy Score of the Total Environment Descriptors	Conventional House	85	23.82	21.28	0.25
	Alternative House	166	23.16	18.76	

*Significant at $\alpha = 0.1$ level.

**Significant at $\alpha = 0.05$ level.

Because of the distinctively different characteristics of solar and earth sheltered housing it was further tested. F-test and Duncan's Multiple Range Test were used to analyze the differences among conventional, solar, and earth sheltered houses. There was not enough evidence to say that there are significant differences among three housing types in the degree of satisfaction with total dwelling. Therefore null hypothesis 1 was not rejected.

Ho2: There are no significant differences among people living in conventional and alternative housing types in the degree of interest in the aesthetic quality of the house.

This hypothesis was tested by t-test and findings are included in Table XXXIV. It was found that enough evidence exists to say that there was a significant difference between conventional and alternative houses. To find out more precisely the differences among three housing types, additional F-test and Duncan's Multiple Range Test were used. Here there was a significant difference between conventional house and earth sheltered houses. However, differences in relation to solar house was not clear. Therefore, with 95 percent confidence, people living in conventional houses had stronger interest in the aesthetic quality of housing environment than people living in earth sheltered houses. The null hypothesis 2 was rejected.

Ho3: There are no significant differences among people living in conventional and alternative housing types in the degree of satisfaction with the aesthetic quality of the house.

This hypothesis was tested by t-test and findings are included in Table XXXIV. There was not enough evidence to say that there was a

significant difference between conventional and alternative housing. Because of the distinctive different characteristics of solar and earth sheltered housing, it was further tested using F-test and Duncan's Multiple Range Test (Table XXXV). A significant difference was found between solar and earth sheltered homes, but no clear answers were given in relation to conventional house. With 95 percent confidence it was found that people living in earth sheltered house had higher degree of satisfaction with the aesthetic quality of a house than people living in solar house. Therefore, the null hypothesis 3 was rejected.

Ho4: There are no significant differences among people living in conventional and alternative housing types in the perceived objective value of the aesthetic quality of the house.

This hypothesis was tested by t-test and findings are also included in Table XXXIV. There was enough evidence to say that there was a significant difference between conventional and alternative houses. To locate more accurate differences among different house types, F-test and Duncan's Multiple Range Test were used (Table XXXV). There was a significant difference between conventional house and solar house. No clear answers were found in relation to earth sheltered house. With 95 percent confidence it was found that people living in conventional houses had higher perceived objective value of the aesthetic quality of the house. Therefore, the null hypothesis 4 was rejected.

Ho5: There are no significant differences among people living in conventional and alternative housing types in the discrepancy scores between ideal and present descriptions.

TABLE XXXV

F TEST AND DUNCAN'S MULTIPLE RANGE TEST FOR
3 HOUSING TYPE DIFFERENCES IN SEVERAL
VARIABLE AND DISCREPANCY SCORES

Dependent Variable	Independent Variable	N	Mean	F	Duncan's[a]
Satisfaction with Total Dwelling	Solar House	145	1.61		A
	Conventional House	96	1.57	2.20	AB
	Earth Sheltered House	53	1.40		B
Interest in the Aesthetic Quality of a House	Conventional House	91	4.66		A
	Solar House	144	4.56	2.93**	AB
	Earth Sheltered House	51	4.37		B
Satisfaction with the Aesthetic Quality of a House	Earth Sheltered House	51	4.55		A
	Conventional House	93	4.35	3.48**	AB
	Solar House	145	4.23		B
Respondent's Perception about Objective Aesthetic Quality of a House	Conventional House	92	3.38		A
	Earth Sheltered House	51	3.27	3.55**	AB
	Solar House	145	3.09		B
Total Discrepancy Score of the Total Environment	Solar House	122	25.31		A
	Conventional House	85	23.82	2.84*	A
	Earth Sheltered House	44	17.21		B
Total Discrepancy Score of the Interior and Exterior Environment	Solar House	123	20.96		A
	Conventional House	85	19.95	2.70*	A
	Earth Sheltered House	44	14.23		B

TABLE XXXV (Continued)

Dependent Variable	Independent Variable	N	Mean	F	Duncan's
Total Discrepancy Score of the Interior Environment	Solar House	125	18.45	2.86*	A
	Conventional House	87	17.33		A
	Earth Sheltered House	44	12.46		B
Total Discrepancy Score of the Exterior Environment	Conventional House	90	2.6	0.14	A
	Solar House	131	2.51		A
	Earth Sheltered House	47	1.70		A
Total Discrepancy Score of the Landscape Environment	Conventional House	90	4.33	1.35	A
	Solar House	134	4.16		A
	Earth Sheltered House	47	3.04		A

[a]Means with the same letter are not significantly different.

*Significant at = 0.1 level.

**Significant at = 0.05 level.

This hypothesis was tested by t-test and findings are also included in Table XXXIV. There was not enough evidence to say that there was a significant difference between conventional and alternative house. Considering the fact of the unique characteristics of solar and earth sheltered housing, it was further tested using F-test and Duncan's Multiple Range Test (Table XXXV). A significant difference was found between earth sheltered and solar house, and between earth sheltered house and conventional house. Conventional and solar turned out to be the same in terms of total discrepancy scores. Therefore, with 90 percent confidence it was found that people living in earth sheltered houses had more congruent present houses with their ideal housing environments than people living in conventional houses or solar houses. In other words, earth sheltered housing appear to meet the residents' aesthetic needs more than conventional and solar housing meet the residents' needs. Therefore the null hypothesis 5 was rejected.

Additionally, different parts of the housing environment were also examined in terms of discrepancy scores, and tested using t-test and later F-test and Duncan's Multiple Range Tests. Results are shown in Tables XXXIV and XXXV. There were significant differences between solar and earth sheltered houses and between conventional and earth sheltered houses in relation to interior discrepancy scores and both the interior and exterior discrepancy scores. However, no significant difference between solar and conventional houses in interior discrepancy scores and both interior and exterior discrepancy scores. In terms of exterior discrepancy and landscape discrepancy scores, there were no significant differences among conventional, solar, and earth sheltered houses.

Research Question 8. What and how many descriptors meet the desire for ideal aesthetic housing environment in case of total respondents, people living in conventional housing, and people living in alternative housing?

To answer the question, paired t-test was used to determine the discrepancy in each descriptor between ideal and present environments using total respondents, people living in conventional, solar, and earth sheltered housing, respectively. The results are summarized in Table XXXVI. Using total respondents, there was a significant difference for each of all of these descriptors between ideal and present housing environment. In other words, the degrees of discrepancies were all significant. In the case of the conventional house, the same results were shown except 'civilized-primitive'. In the solar house, some discrepant results were also found. However, in case of earth sheltered house, several descriptors were found congruent with the residents' ideal environment. These were 'pleasant-unpleasant' interior, 'convenient-inconvenient' interior, 'traditional-contemporary' interior, 'bright-dull' interior, 'adequate size-inadequate size' interior, 'well balanced-poorly balanced' interior, 'usual-common' exterior, 'alive-dead' landscape, 'civilized-primitive' landscape, and 'full-empty' landscape.

In summary, significant discrepancies between ideal and present environment in all descriptors exist among total respondents, and among people living in solar houses. For people living in conventional houses 'civilized-primitive' landscape was not their problem. In other words, whatever the degree of desire was, the present and ideal landscape were congruent in that aspect. However, people living in earth sheltered

TABLE XXXVI

RESULTS OF PAIRED T-TEST FOR ITEM DISCREPANCY BETWEEN IDEAL AND PRESENT HOUSING ENVIRONMENT - CONVENTIONAL HOUSE, SOLAR HOUSE, AND EARTH SHELTERED HOUSE

House Type	Total			Conventional House			Solar House			Earth Sheltered House		
Descriptors	Mean	S.E.	T	Mean	S.E.	T	Mean	S.E.	T	Mean	S.E.	T
Uncluttered-Cluttered (I)	-0.97	0.08	-12.17***	-0.83	0.12	-7.02***	-1.24	0.13	-9.66***	-0.47	0.15	-3.22***
Well Ventilated-Stuffy (I)	-0.67	0.07	-9.94***	-0.69	0.11	-6.56***	-0.58	0.10	-6.05***	-0.89	0.19	-4.58***
Clean-Dirty (I)	-0.56	0.05	-10.19***	-0.55	0.09	-5.88***	-0.61	0.09	-7.15***	-0.47	0.11	-4.29***
Comfortable Temperature-Uncomfortable Temperature (I)	-0.46	0.06	-7.91***	-0.43	0.11	-4.05***	-0.51	0.09	-5.95***	-0.38	0.12	-3.09***
Pleasant-Unpleasant (I)	-0.31	0.04	-7.50***	-0.29	0.06	-4.79***	-0.39	0.07	-5.66***	-0.09	0.05	-1.66
Well Planned-Poorly Planned (I)	-0.76	0.07	-11.02***	-0.79	0.12	-6.58***	-0.83	0.10	-8.30***	-0.51	0.16	-3.12***
Convenient-Inconvenient (I)	-0.48	0.06	-8.53***	-0.47	0.10	-4.67***	-0.60	0.08	-7.18***	-0.15	0.11	-1.41
Orderly-Chaotic (I)	-0.74	0.07	-10.28***	-0.59	0.11	-5.44***	-0.93	0.12	-8.02***	-0.43	0.12	-3.42***
Unfashionable-Fashionable (I)	0.32	0.06	5.26***	0.43	0.12	3.53***	0.30	0.09	3.49***	0.19	0.10	1.85*
Traditional-Contemporary (I)	0.17	0.07	2.55**	0.22	0.13	1.67*	0.22	0.09	2.51**	-0.07	0.13	-0.52
Nonfunctional-Functional (I)	0.64	0.06	10.23***	0.79	0.13	6.18***	0.64	0.08	7.60***	0.34	0.11	3.19***
Efficient-Inefficient (I)	-0.78	0.07	-10.75***	-0.80	0.13	-6.23***	-0.91	0.11	-8.53***	-0.34	0.15	-2.32**
Bad Color-Good Color (I)	0.41	0.06	6.78***	0.39	0.09	4.16***	0.40	0.09	4.26***	0.39	0.12	3.31***
Uncomfortable-Comfortable (I)	0.48	0.05	10.27***	0.49	0.08	6.50***	0.53	0.07	7.50***	0.26	0.09	2.73***
Well Scaled-Poorly Scaled (I)	-0.45	0.06	-7.45***	-0.46	0.12	-3.95***	-0.49	0.08	-5.71***	-0.30	0.12	-2.46**
Usual-Unusual (I)	0.32	0.08	3.89***	0.87	0.16	5.35***	0.21	0.09	2.24**	-0.49	0.20	-2.43**
Bright-Dull (I)	-0.40	0.05	-7.50***	-0.51	0.09	-5.50***	-0.44	0.08	-5.29***	-0.09	0.09	-1.00
Plain-Elegant (I)	0.47	0.07	6.94***	0.70	0.13	5.44***	0.39	0.10	3.85***	0.23	0.08	2.87***
Adequate Size-Inadequate Size (I)	-0.42	0.06	-6.92***	-0.40	0.09	-4.37***	-0.53	0.10	-5.23***	-0.13	0.09	-1.43
Unattractive-Attractive (I)	0.55	0.05	10.12***	0.68	0.11	6.08***	0.53	0.08	7.08***	0.34	0.09	3.89***

TABLE XXXVI (Continued)

House Type Descriptors	Total Mean	Total S.E.	Total T	Conventional House Mean	Conventional House S.E.	Conventional House T	Solar House Mean	Solar House S.E.	Solar House T	Earth Sheltered House Mean	Earth Sheltered House S.E.	Earth Sheltered House T
Well Balanced-Poorly Balanced (I)	-0.47	0.05	-8.62***	-0.47	0.09	-5.08***	-0.56	0.08	-6.95***	-0.17	0.11	-1.53
Bad Lines-Good Lines (I)	0.55	0.06	9.50***	0.62	0.12	5.31***	0.49	0.07	6.80***	0.53	0.14	3.93***
Appealing-Unappealing (I)	-0.44	0.05	-8.83***	-0.52	0.08	-6.10***	-0.45	0.07	-6.11***	-0.26	0.12	-2.13**
Repelling-Inviting (I)	0.49	0.05	10.32***	0.52	0.09	5.75***	0.53	0.07	7.74***	0.32	0.09	3.69***
Useful-Useless (I)	-0.38	0.04	-8.77***	-0.40	0.08	-5.00***	-0.44	0.06	-6.88***	-0.15	0.07	-2.19**
Flexible-Inflexible (I)	-0.55	0.06	-9.48***	-0.61	0.10	-5.87***	-0.60	0.08	-7.45***	-0.32	0.15	-2.14**
Novel-Common (E)	-0.34	0.07	-4.76***	-0.60	0.14	-4.17***	-0.31	0.09	-3.40***	0.11	0.15	0.73
Pleasant-Unpleasant (E)	-0.40	0.05	-8.66***	-0.38	0.09	-4.17***	-0.46	0.07	-7.03***	-0.26	0.08	-3.07***
Frustrating-Satisfactory (E)	0.53	0.06	9.28***	0.61	1.10	6.14***	0.55	0.09	6.23***	0.30	0.10	2.96***
Ugly-Beautiful (E)	0.64	0.05	12.08***	0.73	0.10	7.33***	0.61	0.08	8.03***	0.53	0.10	5.08***
Fertile-Barren (L)	-0.91	0.08	-11.78***	-0.95	0.13	-7.24***	0.99	0.11	-8.68***	-0.64	0.19	-3.39***
Colorful-Colorless (L)	-0.55	0.07	-8.22***	-0.58	0.12	-4.73***	-0.57	0.10	-5.93***	-0.45	0.15	2.95***
Alive-Dead (L)	-0.43	0.06	-7.37***	-0.63	0.11	-5.76***	-0.42	0.08	-5.25***	-0.02	0.11	-0.19
Warm-Cold (L)	-0.31	0.05	-6.63***	-0.27	0.08	-3.58***	-0.36	0.07	-5.34***	-0.21	0.12	-1.75*
Civilized-Primitive (L)	-0.11	0.05	-2.21**	0.02	0.07	0.30	-0.19	0.08	-2.37**	-0.13	0.12	-1.10
Full-Empty (L)	-0.29	0.06	-4.94***	-0.33	0.11	-2.95***	-0.30	0.08	-3.94***	-0.17	0.15	-1.13
Unpleasant-Pleasant (L)	0.52	0.05	9.71***	0.60	0.11	5.71***	0.53	0.08	7.05***	0.32	0.09	3.48***

*Significant at the $\alpha = 0.1$ level.

**Significant at the $\alpha = 0.05$ level.

***Significant at the $\alpha = 0.01$ level.

houses responded that in terms of pleasant, convenient, contemporary, bright, adequate size, and well balanced aspects for interiors, novel aspect for exterior, and alive, civilized, full aspects for landscape were not their problems. In other words, these aspects satisfied their needs.

Research Question 9. What descriptors are significantly different in describing the ideal housing environment among people living in conventional housing, and alternative housing such as solar and earth sheltered housing?

In answering the question, first the t-test was used to find out what descriptors are significantly different in terms of expressing the ideal housing environment between those living in conventional house and alternative house. Results are shown in Table XXXVII. Twelve items among 37 descriptors were significantly different. Those were 'unfashionable-fashionable (interior)', 'plain-elegant (interior)', 'unattractive-attractive (interior)', appealing-unappealing (interior)', 'pleasant-unpleasant (exterior)', ugly-beautiful (exterior)', unpleasant-pleasant (landscape)', 'fertile-barren (landscape)', 'colorful-colorless (landscape)', 'alive-dead (landscape)', 'civilized-primitive (landscape)', and 'full-empty (landscape)'.

People living in conventional houses were more likely to emphasize the fashionable, elegant, attractive, appealing aspects of interior, pleasant, beautiful aspects of exterior, and pleasant, fertile, colorful, civilized, alive, and full aspects of landscape than people living in alternative houses. As a reference, communalities of each descriptor were also provided. Communality is a proportion of variances

TABLE XXXVII

MEANS, STANDARD DEVIATIONS AND COMMUNALITIES OF VARIABLES[a] FOR THE TOTAL RESPONDENTS, RESPONDENTS LIVING IN ALTERNATIVE HOUSING, AND RESPONDENTS LIVING IN CONVENTIONAL HOUSING, AND T-TEST FOR THE LAST TWO GROUPS IN TERMS OF IDEAL ENVIRONMENT

Variable	Total				Alternative				Conventional				T-Test
	N	Mean	S.D.	h^{2c}	N	Mean	S.D	h^2	N	Mean	S.D.	h^2	
Well Ventilated-Stuffy	288	1.89[b]	1.24	0.64	189	1.88	1.19	0.59	95	1.89	1.33	0.62	0.07
Comfortable Temperature-Uncomfortable Temperature	289	2.00	1.23	0.69	189	2.03	1.20	0.66	96	1.95	1.28	0.68	-0.51
Pleasant-Unpleasant	289	1.62	1.13	0.84	189	1.61	1.08	0.83	96	1.64	1.19	0.86	0.19
Well Planned-Poorly Planned	289	1.60	1.12	0.81	189	1.63	1.11	0.80	96	1.53	1.10	0.80	-0.71
Convenient-Inconvenient	289	1.74	1.16	0.74	190	1.72	1.10	0.76	95	1.78	1.23	0.73	0.44
Efficient-Inefficient	287	1.79	1.45	0.61	188	1.71	1.35	0.64	95	1.96	1.62	0.54	1.29
Well Scaled-Poorly Scaled	281	2.26	1.69	0.58	184	2.26	1.62	0.48	93	2.26	1.83	0.47	-0.01
Bright-Dull	284	2.33	1.48	0.60	186	2.39	1.47	0.53	94	2.21	1.47	0.67	-0.96
Adequate Size-Inadequate Size	286	1.65	1.20	0.77	187	1.70	1.26	0.72	95	1.55	1.09	0.83	-1.01
Well Balanced-Poorly Balanced	285	1.91	1.31	0.67	186	1.94	1.32	0.59	95	1.84	1.32	0.65	-0.60
Useful-Useless	282	1.50	1.10	0.84	185	1.52	1.15	0.86	93	1.45	0.95	0.83	-0.52
Flexible-Inflexible	278	1.96	1.20	0.66	182	1.98	1.22	0.68	92	1.92	1.12	0.53	-0.39
Unfashionable-Fashionable	278	5.20	1.34	0.57	187	5.04	1.34	0.66	94	5.50	1.25	0.71	2.76***
Nonfunctional-Functional	284	6.27	1.17	0.53	186	6.26	1.14	0.54	94	6.33	1.03	0.81	0.51
Bad Color-Good Color	284	6.25	1.08	0.59	186	6.22	1.07	0.70	94	6.31	1.13	0.81	0.64
Uncomfortable-Comfortable	285	6.57	0.82	0.57	187	6.52	0.89	0.67	94	6.67	0.63	0.80	1.65*
Plain-Elegant	282	5.33	1.39	0.70	185	5.22	1.41	0.72	94	5.56	1.32	0.58	1.96**
Unattractive-Attractive	283	6.45	0.94	0.74	186	6.37	0.97	0.73	93	6.61	0.87	0.73	2.08**
Bad Lines-Good Lines	283	6.19	1.15	0.65	185	6.12	1.10	0.58	94	6.32	1.23	0.64	1.34
Appealing-Unappealing	282	1.73	1.25	0.69	185	1.84	1.37	0.66	93	1.52	0.94	0.76	-2.30**
Repelling-Inviting	280	6.45	0.88	0.71	184	6.41	0.88	0.63	92	6.54	0.88	0.85	-1.16
Uncluttered-Cluttered	288	2.04	1.22	0.68	189	2.05	1.16	0.66	95	2.02	1.32	0.67	-0.21
Clean-Dirty	288	1.61	1.10	0.75	188	1.64	1.05	0.76	96	1.52	1.17	0.83	-0.90

TABLE XXXVII (Continued)

Variable	Total				Alternative				Conventional				T-Test
	N	Mean	S.D.	h^2	N	Mean	S.D.	h^2	Nh	Mean	S.D.	h^2	
Orderly-Chaotic	289	1.80	1.11	0.78	190	1.78	1.04	0.79	95	1.84	1.21	0.69	0.43
Traditional-Contemporary	283	4.17	1.72	0.69	185	4.16	1.09	0.75	94	4.20	1.77	0.42	0.18
Usual-Unusual	285	4.24	1.64	0.65	187	4.18	1.62	0.68	94	4.32	1.67	0.63	0.69
Pleasant-Unpleasant	281	1.54	1.05	0.78	185	1.61	1.15	0.82	92	1.39	0.73	0.78	-1.89*
Frustrating-Satisfactory	274	6.41	0.89	0.56	180	6.37	0.91	0.56	90	6.49	0.82	0.62	1.07
Ugly-Beautiful	278	6.26	0.94	0.67	183	6.16	0.98	0.61	91	6.44	0.83	0.63	2.34**
Novel-Common	279	3.29	1.50	0.65	184	3.36	1.54	0.69	91	3.12	1.42	0.56	-1.27
Unpleasant-Pleasant	277	6.34	1.17	0.51	182	6.27	1.18	0.53	91	6.53	0.99	0.69	1.76*
Fertile-Barren	280	1.70	1.09	0.62	184	1.82	1.18	0.58	92	1.43	0.80	0.73	-3.20***
Colorful-Colorless	278	2.43	1.32	0.67	183	2.55	1.32	0.66	91	2.22	1.30	0.71	-1.94*
Alive-Dead	276	1.78	1.17	0.81	182	1.87	1.23	0.72	90	1.59	1.02	0.83	-2.02**
Warm-Cold	280	2.08	1.26	0.69	184	2.10	1.28	0.62	92	2.05	1.21	0.74	-0.27
Civilized-Primitive	277	2.51	1.43	0.69	183	2.64	1.47	0.61	90	2.26	1.29	0.64	-2.13**
Full-Empty	275	2.87	1.21	0.63	181	2.96	1.15	0.64	90	2.67	1.33	0.70	-1.89*

[a]The first 26 pairs were interior descriptors, the next four pairs were exterior, and the last seven pairs were landscape descriptors.

[b]The scores were given 1 to 7 from the left side to the right side words.

[c]The communality h^2 is the result of the rotation of five common factors.

*Significant at α = 0.1 level.

**Significant at α = 0.05 level.

***Significant at α = 0.01 level.

explained by a descriptor in describing the total housing environment, in this case, only using loadings on five major factor dimensions.

Further, F-test and Duncan's Multiple Range Test was used to find differences among the three house types. Only three out of 11 which were found different between conventional and alternative housing, were significantly different among the three house types. These were 'unfashionable-fashionable (interior)', 'fertile-barren (landscape)', 'colorful-colorless (landscape)'. Additionally, four descriptors were significantly different among the house types in describing their ideal housing environment. These were 'traditional-contemporary (interior)', 'usual-unusual (interior)', 'novel-common (exterior)', 'alive-dead (landscape)'. The data showed that:

1. People living in conventional houses or solar houses were more likely to desire a fertile landscape than people living in earth sheltered houses.
2. People living in conventional houses were more likely to desire a fashionable interior than people living in solar or earth sheltered houses.
3. People living in conventional houses were more likely to desire a colorful, alive, and civilized landscape environment than people living in earth sheltered houses.
4. People living in earth sheltered houses were more likely to desire a contemporary and unusual interior environment than people living in solar houses.

Briefly, 11 descriptors were significantly different between the conventional and alternative houses in describing respondents' ideal housing environments. When factor analyzed, three out of these 11 and

four additional descriptors were significantly different among conventional, solar, and earth sheltered houses.

Research Question 10. What descriptors are significantly different in describing the present housing environment among people living in conventional housing and alternative housing such as solar and earth sheltered housing?

The answers to this question gave the general present housing environment which were different between conventional and alternative housing. Six descriptors were found to be significantly different between conventional and alternative housing in describing respondents' present housing environment on the basis of t-tests. The results are summarized in Table XXXVIII. These six descriptors were 'unfashionable-fashionable (interior)', 'usual-unusual (interior)', 'pleasant-unpleasant (exterior)', 'fertile-barren (landscape)', 'colorful-colorless (landscape)', 'civilized-primitive (landscape)'. People living in conventional houses were more likely to perceive that they had a fashionable interior, pleasant interior, and fertile, colorful and civilized landscape than people living in alternative houses who perceived that they had more unusual interior than people in conventional houses.

Further, the F-test and Duncan's Multiple Range Test were used to find differences among the three house types. The results are included in Table XXXIX. Only two out of the six mentioned above were significantly different among three house types. These were 'ususal-unusual (interior)', and 'civilized-primitive (landscape)'. Additionally seven descriptors were found significant among house types

TABLE XXXVIII

MEANS, STANDARD DEVIATIONS AND COMMUNALITIES OF VARIABLES[a] FOR THE TOTAL RESPONDENTS, RESPONDENTS LIVING IN ALTERNATIVE HOUSING, AND RESPONDENTS LIVING IN CONVENTIONAL HOUSING, AND T-TEST FOR THE LAST TWO GROUPS IN TERMS OF PRESENT ENVIRONMENT

Variable	Total					Alternative				Conventional				T-Test
	N	Mean	S.D.	h^{2c}	h^{2d}	N	Mean	S.D.	h^{2d}	N	Mean	S.D.	h^{2d}	
Well Ventilated-Stuffy	289	2.54[b]	1.30	0.65	0.50	189	2.51	1.27	0.49	96	2.58	1.34	0.51	0.43
Comfortable Temperature-Uncomfortable Temperature	289	2.46	1.31	0.62	0.51	190	2.49	1.27	0.43	95	2.39	1.38	0.64	-0.64
Pleasant-Unpleasant	288	1.93	1.17	0.74	0.71	190	1.92	1.15	0.71	95	1.94	1.17	0.74	0.11
Well Planned-Poorly Planned	287	2.37	1.30	0.76	0.73	187	2.39	1.27	0.74	96	2.32	1.33	0.69	0.70
Convenient-Inconvenient	289	2.22	1.26	0.76	0.72	190	2.21	1.25	0.70	95	2.25	1.28	0.82	0.30
Efficient-Inefficient	287	2.58	1.44	0.70	0.55	188	2.47	1.38	0.63	95	2.76	1.54	0.36	1.57
Well Scaled-Poorly Scaled	282	2.70	1.51	0.58	0.42	185	2.69	1.45	0.44	93	2.72	1.62	0.41	0.15
Bright-Dull	284	2.73	1.31	0.58	0.45	186	2.74	1.31	0.41	94	2.72	1.32	0.46	-0.11
Adequate Size-Inadequate Size	286	2.07	1.38	0.65	0.52	187	2.13	1.47	0.56	95	1.95	1.21	0.49	-1.10
Well Balanced-Poorly Balanced	285	2.38	1.25	0.68	0.61	186	2.41	1.29	0.61	95	2.32	1.18	0.66	-0.59
Useful-Useless	282	1.88	1.11	0.75	0.70	185	1.89	1.14	0.75	93	1.85	1.01	0.67	-0.26
Flexible-Inflexible	278	2.52	1.26	0.65	0.56	182	2.51	1.31	0.55	92	2.53	1.14	0.63	0.17
Unfashionable-Fashionable	285	4.88	1.34	0.80	0.38	187	4.77	1.37	0.43	94	5.07	1.19	0.35	1.83*
Nonfunctional-Functional	284	5.64	1.26	0.66	0.44	186	5.69	1.24	0.50	94	5.54	1.28	0.52	-0.95
Bad Color-Good Color	283	5.84	1.27	0.70	0.49	185	5.82	1.24	0.56	94	5.91	1.33	0.46	0.58
Uncomfortable-Comfortable	285	6.09	1.00	0.64	0.62	187	6.05	1.05	0.60	94	6.18	0.88	0.74	1.07
Plain-Elegant	282	4.85	1.41	0.67	0.58	185	4.87	1.43	0.62	94	4.86	1.35	0.56	-0.05
Unattractive-Attractive	283	5.89	1.12	0.78	0.75	186	5.88	1.08	0.74	93	5.94	1.22	0.80	0.38
Bad Lines-Good Lines	282	5.64	1.30	0.66	0.64	184	5.62	1.22	0.65	94	5.70	1.46	0.67	0.47
Appealing-Unappealing	282	2.17	1.25	0.69	0.58	185	2.24	1.33	0.51	93	2.03	1.08	0.76	-1.39
Repelling-Inviting	279	5.96	1.04	0.64	0.59	183	5.93	1.02	0.51	92	6.02	1.09	0.61	0.65
Uncluttered-Cluttered	289	3.01	1.51	0.74	0.80	190	3.09	1.52	0.75	95	2.85	1.49	0.71	-1.24
Clean-Dirty	290	2.16	1.30	0.76	0.74	190	2.21	1.27	0.73	96	2.07	1.36	0.73	-0.82

TABLE XXVIIII (Continued)

Variable	Total					Alternative				Conventional				T-Test
	N	Mean	S.D.	h^{2c}	h^{2d}	N	Mean	S.D.	h^{2d}	N	Mean	S.D.	h^{2d}	
Orderly-Chaotic	289	2.54	1.37	0.75	0.76	190	2.58	1.39	0.79	95	2.43	1.31	0.65	-0.89
Traditional-Contemporary	284	4.00	1.71	0.62	0.44	186	4.01	1.69	0.40	94	3.98	1.78	0.55	-0.15
Usual-Unusual	286	3.91	1.75	0.69	0.69	188	4.13	1.78	0.69	94	3.45	1.59	0.66	-3.13***
Pleasant-Unpleasant	281	1.95	1.12	0.73	0.64	185	2.02	1.16	0.70	92	1.77	1.01	0.63	-1.72*
Frustrating-Satisfactory	273	5.88	1.08	0.63	0.47	179	5.88	1.08	0.42	90	5.88	1.09	0.61	-0.04
Ugly-Beautiful	277	5.61	0.98	0.70	0.62	182	5.56	0.99	0.65	91	5.71	0.98	0.61	1.22
Novel-Common	279	3.63	1.47	0.72	0.66	184	3.57	1.52	0.72	91	3.73	1.37	0.54	0.85
Unpleasant-Pleasant	277	6.34	1.17	0.55	0.42	181	5.80	1.22	0.41	91	5.92	1.29	0.47	0.79*
Fertile-Barren	280	2.61	1.39	0.56	0.48	184	2.72	1.40	0.53	92	2.38	1.33	0.63	-1.91*
Colorful-Colorless	278	2.98	1.27	0.68	0.52	183	3.08	1.30	0.48	91	2.80	1.19	0.57	-1.73*
Alive-Dead	276	2.21	1.19	0.71	0.67	182	2.19	1.22	0.69	90	2.22	1.14	0.68	0.19
Warm-Cold	280	2.39	1.19	0.68	0.60	184	2.42	1.22	0.59	92	2.33	1.15	0.73	-0.61
Civilized-Primitive	277	2.62	1.36	0.69	0.55	183	2.82	1.44	0.56	90	2.23	1.08	0.63	-3.76***
Full-Empty	275	3.16	1.31	0.74	0.60	181	3.23	1.24	0.60	90	3.00	1.45	0.63	-1.34

[a]The first 26 pairs were interior descriptors, the next four pairs were exterior, and the last seven pairs were landscape descriptors.

[b]The scores were given 1 to 7 from the left side to the right side words.

[c]The communality h^2 is the result of the rotation of 15 common factors.

[d]The communality h^2 is the result of the rotation of five common factors.

*Significant at $\alpha = 0.1$ level.

***Significant at $\alpha = 0.01$ level.

TABLE XXXIX

F-TEST AND DUNCAN'S MULTIPLE RANGE TEST FOR DIFFERENCES AMONG DIFFERENT HOUSE TYPES IN TERMS OF IDEAL AND PRESENT HOUSING DESCRIPTORS AND THE IMPORTANCE OF HOUSING DESCRIPTORS

Descriptors	Ideal[a]				Present[a]				Importance[b]			
	HY	Mean	F	Duncan[c]	HY	Mean	F	Duncan	HY	Mean	F	Duncan
Interior:					Con	2.76		A				
Efficient-					Solar	2.60	3.32**	A				
Inefficient					Earth	2.11		B				
Interior:					Solar	2.83		A	Solar	2.20		A
Well Scaled					Con	2.72	2.55*	AB	Con	2.13	2.04	AB
Poorly Scaled					Earth	2.26		B	Earth	1.83		B
Interior:	Con	5.50		A								
Unfashionable-	Solar	5.06	3.83**	B								
Fashionable	Earth	5.00		B								
Interior:					Earth	5.23		A				
Plain-					Con	4.86	2.14	AB				
Elegant					Solar	4.75		B				
Interior:					Solar	3.25		A				
Uncluttered-					Con	2.85	4.15**	AB				
Cluttered					Earth	2.60		B				
Interior:	Earth	4.74		A	Earth	4.80		A				
Traditional-	Con	2.20	3.55**	AB	Con	3.98	6.80***	B				
Contemporary	Solar	3.97		B	Solar	3.75		B				
Interior:	Earth	4.81		A	Earth	5.30		A				
Usual-	Con	4.32	5.06***	AB	Solar	3.74	21.58***	B				
Unusual	Solar	3.96		B	Con	3.45		B				
Exterior:									Earth	2.68		A
Ugly-									Solar	2.53	2.47*	AB
Beautiful									Con	2.21		B

TABLE XXXIX (Continued)

Descriptors	Ideal[a]				Present[a]				Importance[b]			
	HY	Mean	F	Duncan[c]	HY	Mean	F	Duncan	HY	Mean	F	Duncan
Exterior:	Solar	3.50		A	Solar	3.81		A				
Novel-	Con	3.12	3.16**	AB	Con	3.73	8.18***	A				
Common	Earth	2.96		B	Earth	2.85		B				
Landscape:					Earth	6.19		A				
Unpleasant-					Con	5.92	3.59**	AB				
Pleasant					Solar	5.66		B				
Landscape:	Earth	2.17		A					Earth	2.02		A
Fertile-	Solar	1.70	7.56***	B					Solar	1.76	1.98	AB
Barren	Con	1.43		B					Con	1.69		B
Landscape:	Earth	2.74		A								
Colorful-	Solar	2.48	2.62*	AB								
Colorless	Con	2.22		B								
Landscape:	Earth	2.09		A								
Alive-	Solar	1.80	2.86*	AB								
Dead	Con	1.59		B								
Landscape:	Earth	2.77		A	Earth	2.89		A	Solar	2.31		A
Civilized-	Solar	2.60	2.50*	AB	Solar	2.79	5.95***	A	Earth	2.24	2.64	A
Primitive	Con	2.26		B	Con	2.23		B	Con	2.01		A

[a]Scores were given 1 to 5 from left side words to right side words.
[b]Scores were given 1 to 5 from very important to very unimportant.
[c]Means followed by the same letter are not significantly different.

*Significant at $\alpha = 0.1$ level.
**Significant at $\alpha = 0.05$ level.
***Significant at $\alpha = 0.01$ level.

in describing their present housing environments. These were 'efficient-inefficient (interior)', 'well scaled-poorly scaled (interior)', 'plain-elegant (interior)', 'uncluttered-cluttered (interior)', 'traditional-contemporary (interior)' 'novel-common (exterior)', and 'unpleasant-pleasant (landscape)'.

The data showed that:

1. People living in earth sheltered houses were more likely to express that they had efficient, unusual and contemporary interiors, and novel exteriors than people living in conventional or solar houses.
2. People living in earth sheltered houses were more likely to express that they had well scaled, elegant, uncluttered interiors and pleasant landscape than people living in solar houses.
3. People living in conventional houses were more likely to express that they had civilized landscape than people living in earth sheltered or solar houses.

Briefly, six descriptors were found to be significantly different between conventional and alternative houses in describing respondents' present housing environments. When further analyzed, two out of these six and seven additional descriptors were significantly different among conventional, solar, and earth sheltered houses.

Research Question 11. What descriptors are perceived significantly different in terms of the importance or meaningfulness among people living in conventional housing, and alternative housing such as solar and earth sheltered housing?

The answer to this question provided the specific information about certain descriptors whose perceived importances were different between the house types. First, the t-test was used to answer the question. The results are shown in Table XL. Three items among the 37 descriptors were significantly different. These were 'unattractive-attractive (interior)', 'pleasant-unpleasant (exterior)', and 'ugly-beautiful (exterior)'. For people living in conventional houses consider the concepts of attractive interior, pleasant exterior, beautiful exterior was more important than people living in alternative houses.

Further, the F-test and Duncan's Multiple Range Test were used to find differences among the three house types. The results are shown in Table XXXIX. Only one out of the three mentioned above were shown to be significantly different among the three house types. This was 'ugly-beautiful (exterior)'. People living in conventional houses perceived the concept of beautiful exterior more important than people living in earth sheltered houses. Briefly, only one descriptor was found significantly different among conventional, solar, and earth sheltered houses in respondents' perception of the importance of descriptors.

Other Findings

Correlation coefficients were used to find relationships among variables related to respondents' demographic characteristics, dwelling characteristics, and questions about aesthetics of housing environment. The demographic variables were respondents' education, income, and age. The dwelling characteristic variables were square footage, age of dwelling, and length of residence. The other variables which were related to the aesthetics of housing were satisfaction with the

TABLE XL

MEAN AND S.D. OF THE IMPORTANCE OF EACH DESCRIPTOR FOR (1) TOTAL RESPONDENTS, (2) PEOPLE LIVING IN ALTERNATIVE HOUSES, AND (3) PEOPLE LIVING IN CONVENTIONAL HOUSES, (4) T-TEST BETWEEN THE LAST TWO GROUPS

Samples	Total			Alternative House			Conventional House			T-Test
Descriptors	N	Mean[a]	S.D.	N	Mean	S.D.	N	Mean	S.D.	
Well Ventilated-Stuffy	289	1.88	1.12	189	1.94	1.11	96	1.77	1.09	-1.20
Comfortable Temperature-Uncomfortable Temperature	288	1.84	1.08	189	1.82	1.08	95	1.85	1.04	0.24
Pleasant-Unpleasant	288	1.59	1.02	190	1.61	1.05	94	1.52	0.90	-0.70
Well Planned-Poorly Planned	288	1.69	1.04	188	1.71	1.04	96	1.64	1.01	-0.60
Convenient-Inconvenient	289	1.80	1.03	190	1.78	1.00	95	1.81	1.05	0.21
Efficient-Inefficient	287	1.63	1.00	188	1.56	0.94	95	1.75	1.05	1.53
Well Scaled-Poorly Scaled	282	2.12	1.11	185	2.11	1.08	93	2.13	1.15	0.15
Bright-Dull	282	2.11	1.03	184	2.11	1.06	94	2.11	0.93	-0.02
Adequate Size-Inadequate Size	284	1.69	0.96	185	1.72	0.96	95	1.62	0.95	-0.81
Well Balanced-Poorly Balanced	281	2.08	0.99	183	2.07	0.96	94	2.12	1.04	0.41
Useful-Useless	279	1.57	0.91	182	1.58	0.94	93	1.53	0.82	-0.44
Flexible-Inflexible	276	2.00	0.94	180	1.96	0.88	92	2.05	1.01	0.79
Unfashionable-Fashionable	286	3.12	1.15	188	3.16	1.10	94	3.03	1.25	-0.91
Nonfunctional-Functional	286	2.61	1.54	187	2.58	1.55	95	2.73	1.53	0.76
Bad Color-Good Color	285	2.54	1.45	187	2.51	1.42	94	2.61	1.50	0.51
Uncomfortable-Comfortable	284	2.35	1.64	187	2.37	1.60	94	2.31	1.71	-0.29
Plain-Elegant	280	2.78	1.15	185	2.77	1.12	94	2.80	1.22	0.22
Unattractive-Attractive	280	2.39	1.43	184	2.51	1.45	92	2.14	1.37	-2.00**
Bad Lines-Good Lines	278	2.59	1.29	181	2.68	1.28	93	2.45	1.31	-1.39
Appealing-Unappealing	279	1.85	0.95	182	1.89	0.95	93	1.73	0.91	-1.34
Repelling-Inviting	278	2.44	1.42	182	2.52	1.45	92	2.27	1.37	-1.35
Uncluttered-Cluttered	289	2.15	1.21	190	2.20	1.21	95	1.99	1.19	-1.39

TABLE XL (Continued)

Samples / Descriptors	Total			Alternative House			Conventional House			T-Test
	N	Mean	S.D.	N	Mean	S.D.	N	Mean	S.D.	
Clean-Dirty	289	1.67	1.04	189	1.74	1.04	96	1.52	0.98	-1.71
Orderly-Chaotic	289	1.88	1.00	190	1.91	0.99	95	1.79	0.96	-0.94
Traditional-Contemporary	283	2.87	1.14	186	2.89	1.14	93	2.77	1.13	-0.82
Usual-Unusual	283	2.70	1.02	185	2.72	1.00	94	2.64	1.04	-0.67
Pleasant-Unpleasant	279	1.64	0.84	183	1.69	0.87	92	1.50	0.70	-1.99**
Frustrating-Satisfactory	271	2.40	1.39	178	2.48	1.43	89	2.24	1.31	-1.36
Ugly-Beautiful	275	2.45	1.32	180	2.57	1.39	91	2.21	1.15	-2.25***
Novel-Common	277	2.58	0.96	183	2.61	1.00	90	2.50	0.86	-0.91
Unpleasant-Pleasant	276	2.34	1.40	181	2.35	1.37	91	2.32	1.47	-0.19
Fertile-Barren	278	1.79	0.95	183	1.83	0.94	91	1.69	0.94	-1.15
Colorful-Colorless	276	2.22	0.90	181	2.26	0.88	91	2.15	0.89	-0.93
Alive-Dead	274	1.74	0.84	181	1.76	0.86	89	1.70	0.77	-0.61
Warm-Cold	278	1.88	0.95	182	1.89	0.96	92	1.87	0.92	-0.17
Civilized-Primitive	274	2.20	0.97	180	2.29	0.95	90	2.01	0.94	-2.26
Full-Empty	274	2.37	0.92	180	2.41	0.87	90	2.29	1.01	-0.98

[a]The scale was given 1 to 5 from very important to very unimportant.

**Significant at the $\alpha = 0.05$ level.

***Significant at the $\alpha = 0.01$ level.

dwelling, interest in the aesthetic quality of the house, satisfaction with the aesthetic quality of the house, perceived objective aesthetic quality of the house, discrepancy scores in total, interior, exterior, landscape, and both interior and exterior, and finally, aesthetic perception test scores. The results are summarized in Table XLI.

Respondents' education was positively related to their income, house size, interests in the aesthetic quality of the house, satisfaction with the aesthetic quality of the house, the perceived objective aesthetic value of the house, and landscape discrepancy scores, while it was negatively related to the respondents' age. Respondents' income was positively related to the size of the house, interest in the aesthetic quality of the house, satisfaction with the aesthetic quality of the house, and perceived objective aesthetic quality of the house. Respondents' age was positively related to the age of the dwelling, years of residence, and satisfaction with the dwelling, while it was negatively related to the discrepancy scores. Square footage of the respondents' house was positively related to satisfaction with the total dwelling, interest in the aesthetic quality of the house, satisfaction with the aesthetic quality of the house, and perceived objective aesthetic quality of the house, while it was negatively related to the discrepancy scores. Age of dwelling was positively related to the years of residence, while it was negatively related to the satisfaction with the aesthetic quality of the house and perceived objective aesthetic value. Years of residence was negatively related to the perceived objective aesthetic value.

The t-test was used to assess differences in the variables related to aesthetics of housing between different groups of several demographic

TABLE XLI

CORRELATION COEFFICIENTS AMONG DEMOGRAPHIC DWELLING CHARACTERISTICS VARIABLES AND MAJOR AESTHETIC RELATED VARIABLES

Variables	APT Scores	Resp. Education	Resp. Income	Resp. Age	Square Feet	Age of Dwelling	Years of Residence
Income	-	0.34***					
Resp Age	-	-0.16***	-				
Square Feet	-	0.24***	0.38***	-			
Age of Dwelling	-	-	-	0.34***	-		
Years of Residence	-	-	-	0.42***	-	0.79***	
Satis. W/ Dwelling	-	-	-	-0.17***	-0.26***	-	-
Interest in Aesthetics	-	0.14**	0.18***	-	0.17***	-	-
Satis. W/ Aesthetics	-0.12*	0.11*	0.13**	-	0.27***	-0.10*	-
Perceived Obj. Aes. Qual.	-	0.16***	0.14**	-	0.31***	-0.18***	-0.22***
Total Discrepancy	-	-	-	-0.27***	-0.20***	-	-
Int. & Ext. Discrepancy	-	-	-	-0.26***	-0.20***	-	-
Interior Discrepancy	-	-	-	-0.26***	-0.19***	-	-
Exterior Discrepancy	-	-	-	-0.21***	-0.14**	-	-
Landscape Discrepancy	0.13**	0.11*	-	-0.22***	-0.10*	-	-

variables. The dependent variables were satisfaction with the total dwelling, interest in the aesthetic quality of the house, satisfaction with the aesthetic quality of the house, perceived objective aesthetic quality of the house, and discrepancy scores, where independent variables were marital status (married and not married), race (white and non-white), and sex (male and female). There was only a significant difference between male and female in the perceived objective aesthetic value of the house. Mean value for females was 3.38 while mean value for males was 3.14. The male was more likely to perceive the objective aesthetic quality of the house higher than the female.

In relation to occupational differences in the dependent variables mentioned above, the F-test and Duncan's Multiple Range Test were used. Only a significant difference in landscape discrepancy scores was found. Table XLII shows the results. A significant difference was found between farmers and retired people in landscape discrepancy scores; retired people had far lower discrepancy scores than farmers. Considering the fact that income level of the sample was generally in the upper middle range, it might be the case that retired people within this range of income lived in a landscape where they wanted to live. Therefore discrepancy scores could be less than others.

Briefly, the higher income and educational level and the larger house an individual had, the stronger his interest in and satisfaction with the aesthetic quality of the house, and the higher his perceived objective aesthetic value. The older an individual and/or the larger the house, the lower his discrepancy scores. This might be explained as follows: as people age, they learn how to make their present environment congruent with their ideal environment; as people have more

space, they know how to use the space as they desire. Also, the newer the house, the higher the aesthetic value given.

TABLE XLII

F-TEST AND DUNCAN'S MULTIPLE RANGE TEST FOR OCCUPATIONAL DIFFERENCES IN THE LANDSCAPE DISCREPANCY SCORES

Occupation	N	Mean	F	Duncan[a]
Farmer/Farm manager	2	6.86		A
Housewife	27	4.89		AB
Non-prof./Serv.	64	4.45	2.08*	AB
Prof./Tech.	154	3.88		AB
Retired	18	1.89		B

[a]Means with the same letter are not significantly different.

Summary and Conclusions

The purpose of this chapter was to evaluate the aesthetic quality of alternative housing. A multi-cluster random sampling method was employed to identify the sample from the total households in the state of Oklahoma. Two hundred ninety-nine individuals responded. Data were collected by a structured and self-administered questionnaire. The t-test, paired t-test, F-test, Duncan's Multiple Range Test, factor

analysis, and Pearson's product moment correlation coefficients were the statistical tools utilized in analyzing the data.

The number of males responding exceeded females considerably, 217 and 68, respectively. Over 72 percent of the total sample had incomes of $350,000 or above.

Three profiles of the ideal and present housing environment were developed for total respondents, people living in conventional houses, and people living in alternative houses. There was no significant difference in satisfaction with the total dwelling among people living in different housing types. People living in conventional houses had stronger interest in the aesthetic quality of the housing environment than people living in earth sheltered houses. People living in earth sheltered houses had a higher degree of satisfaction with the aesthetic quality of a house than people living in solar houses. People living in conventional houses had a higher perceived objective value of the aesthetic quality of a house. People living in earth sheltered houses had a greater congruence between present housing and ideal housing environments than people living in conventional or solar houses. Significant discrepancies between ideal and present housing environments in all descriptors existed among total respondents, and among people living in solar houses. For people living in conventional houses, the present and ideal landscapes were congruent in the 'civilized' aspect. However, for people living in earth sheltered houses, there was complete congruency in the aspects of 'pleasant', 'convenient', 'contemporary', 'bright', 'adequate size', and 'well balanced' for the interior, with the 'novel' aspect for the exterior, and with the aspects of 'alive', 'civilized', and 'full' for the landscape. Eleven descriptors were

found significantly different between conventional and alternative houses in describing respondents' ideal housing environments, while seven were significantly different among conventional, solar and earth sheltered houses.

People living in conventional houses or solar houses were more likely to desire a fertile landscape than people living in earth sheltered houses. People living in conventional houses were more likely to desire a fashionable interior than people living in solar or earth sheltered houses. People living in conventional houses were more likely to desire a colorful, alive and civilized landscape environment than people living in earth sheltered houses. People living in earth sheltered houses were more likely to desire a contemporary and unusual interior environment than people living in solar houses. Six descriptors were found significantly different between conventional and alternative houses in describing respondents' present housing environments. When further analyzed, two out of these six and seven additional descriptors were significantly different among conventional, solar and earth sheltered houses. People living in earth sheltered houses were more likely to express that they had an efficient, unusual and contemporary interior and a novel exterior, than people living in conventional or solar houses. People living in earth sheltered houses were more likely to express that they had well scaled, elegant, uncluttered interiors and pleasant landscapes than people living in solar houses. People living in conventional houses were more likely express that they had a civilized landscape than people living in earth sheltered or solar houses.

Only one descriptor was found significantly different among conventional, solar and earth sheltered houses in respondents' perception of the importance of descriptors. People living in conventional houses perceived the concept of a beautiful exterior as more important than people living in earth sheltered houses.

The higher income and educational level, and the larger house an individual has, the stronger his interest in and satisfaction with the aesthetic quality of the house, and the higher his perceived objective aesthetic value. The older an individual and/or the larger the house, the lower his discrepancy scores.

Acknowledging the sample characteristics of 1. middle and upper middle income, 2. house age less than or equal to seven years, and 3. house size between 1500 and 3000 square feet, certain conclusions can be drawn. House types such as conventional, solar and earth sheltered were associated with the interest in and satisfaction with the aesthetic quality of the house, perceived objective aesthetic value, and discrepancy scores, while they were not directly associated with the satisfaction with the total dwelling. This insignificant relationship might be due to other important extraneous variables which this study did not control, such as economics, demographic and dwelling characteristics. In later analysis, it was found that the age of the respondent and the size of the house were negatively related to the satisfaction with the total dwelling. Therefore, the reason that this study could not find direct relationships between house types and total dwelling satisfaction could be attributable to other uncontrolled extraneous variables. As far as the general theory tells the positive relationship between the satisfaction with the total dwelling and with

the aesthetic quality of the house, it is reasonable to think that one can increase the degree of satisfaction with the total dwelling by increasing the degree of the aesthetic quality of the house, and more practically by reducing the discrepancy between one's ideal and present environment. In this way the quality of life can be improved (Campbell, Converse, and Rodgers, 1976; Peck, 1981). The specific descriptors which were significantly discrepant between the ideal and present housing environment were found in relation to the total sample, people living in conventional, solar and earth sheltered houses, respectively. The comparison of those descriptors used to describe the ideal and present housing environment, and used to indicate the importance of meaning to people, was made among people living in conventional, solar and earth sheltered houses. All descriptors, regardless of their significant differences, can provide practicality with specific information for housing development, and provide researchers who are interested in explanatory research with a detailed guide. Furthermore, all the people living in conventional, solar and earth sheltered houses are not different in terms of the degree of importance of those developed 37 descriptors. While people living in conventional houses generally desire a higher level of aesthetic quality of the house than people living in earth sheltered houses, people living in earth sheltered houses generally express the present houses as more congruent with the ideal houses than people living in conventional houses. These results are consistent with the results of research by Cook (1978). Perhaps people living in earth sheltered houses evaluate carefully what is most important to them. Therefore these dwellers may have realized

that all design problems have tradeoffs, since any plan cannot offer the ultimate ideal in all respects. For example, the exterior of an earth sheltered house may differ considerably from the usual exterior appearance of a conventional house. If exterior appearance is important as a status symbol or for another reason, than an earth sheltered house may not be the most desirable option. This example also supports the factor structure developed in Chapter IV: the first factor dimension for people living in alternative houses was the habitability of the interior environment, whereas the first for people living in conventional houses was the harmony among interior, exterior and landscape. This new proposition developed through research questions and hypotheses provides a guideline for practioners, researchers, and also theorists in the field of housing and aesthetics.

CHAPTER VI

SUMMARY, CONCLUSION, AND RECOMMENDATIONS

Summary and Conclusion

This study was three-fold in nature:

1. To develop a methodology which measures the aesthetic qualities of housing environments.
2. To validate the developed methodology by testing existing theories.
3. To evaluate the aesthetic quality of alternative energy efficient housing environments with the developed method.

Four specific objectives were developed to guide this study and 11 research questions were raised in relation to the objectives. The four objectives were:

1. To develop a methodology including the instrument and the procedure of using it which measures the aesthetic qualities of housing environment.
2. To test the developed methodology using conceptual frameworks derived from already established theories.
3. To measure and evaluate the aesthetic quality of alternative housing in comparison with the results of measuring the aesthetic quality of conventional housing,
4. To provide practical information and recommendations on

the aesthetics of alternative housing for practioners, researchers, and theorists in the area of aesthetics and housing.

Under each objective, the relevant research questions were stated.

As a basis of this research, relevant literature and research were reviewed. In relation to the topic of this study, aesthetic evaluation of alternative housing, four large areas were reviewed in detail. Those were aesthetics, aesthetics in an holistic environmental perspective, research precedent on the measurement of qualities of built environments, and energy efficient housing alternatives. On the basis of the review of literature, 105 possible environmental descriptors for testing purposes to develop a preliminary instrument were recognized and one conceptual framework was developed from the existing aesthetic theory to test the finally developed methodology later. In addition, aesthetic perception ability was found valuable to test, support, and expand the power of the theory. Therefore, the review of literature gave part of the answers for research questions four and five.

Chapter III, Development of Preliminary Instrument, dealt with two pilot studies. The purpose of pilot study I was to make a simpler version of the Meier's Art Judgment Test which was selected to measure the aesthetic perception ability of people, as a ground work for testing purposes later. The purposes of pilot study II were to reduce the number of descriptors for the preliminary instrument, to provide the construct validity of the instrument, and to obtain a preliminary profile of aesthetic descriptors for ideal housing environment. This became a groundwork to answer research question one.

Chapter IV dealt with the process of answering research questions

one, two, three, four, and five. The major purposes of this chapter were:

1. To determine the representative descriptors to measure the aesthetic quality of housing environment.
2. To test two theories postulated by the researcher, one directly from the aesthetic theory, the other adapted from job satisfaction discrepancy theory, using the finally developed methodology.

This chapter was divided into four sections: (1) purpose, (2) testing models, (3) methods, and (4) results.

Two conceptual frameworks were developed to be used as testing models. One was developed directly from the existing aesthetic theory, and the other was adapted from the discrepancy theory in job satisfaction area of the organizational behavior field. Eight hypotheses were stated under the first conceptual framework, while six hypotheses were stated under the second conceptual framework.

Testing results of all hypotheses proposed to test the developed methodology to measure the aesthetic quality of a house, support the already established theories in relation to satisfaction and aesthetics. This, in turn, indicates that the developed methodology, including 37 descriptors and the way of using discrepancy scores between ideal and present house descriptors, is valid to measure the aesthetic quality of a house. Additionally, some propositions in the two broad theories were expanded and supported by testing these hypotheses. Therefore, the relationships proposed in the two conceptual frameworks for testing the developed methodology were established. The results were:

1. Discrepancy scores can be used to predict the degree of satisfaction with the aesthetic quality of a house, perceived objective aesthetic value of a house, and satisfaction with the total dwelling;
2. Positive relationships exist among satisfaction with the aesthetic quality, the perceived objective aesthetic value, and satisfaction with the total dwelling;
3. In predicting discrepancy scores, there was a significant difference between two groups with high and low interest, whereas no significant difference was found between two groups with high and low aesthetic perception ability scores;
4. When total discrepancy scores were used, there was a block effect of interest and no block effect of aesthetic perception ability in relation to both the satisfaction with the aesthetic quality of a house, and the perceived objective value of the house;
5. When total discrepancy scores were used, there was an interaction effect of interest with the discrepancy scores, whereas no interaction effect of aesthetic perception ability with the discrepancy scores was found in relation to the perceived objective aesthetic value.

Chapter V dealt with the process of answering objectives three and four, specifically, research questions six through 11. The major purpose of this chapter was to evaluate the aesthetic quality of alternative housing. Two relevant objectives were:

1. To measure and evaluate the aesthetic quality of

alternative housing in comparison with the results of measuring the aesthetic quality of conventional housing, and

2. To provide practical information and recommendations on the aesthetics of alternative housing for practioners, researchers, and theorists in the area of aesthetics and housing.

This chapter was divided into four sections: (1) purpose, (2) method, (3) finding and discussion, and (4) summary and conclusion.

Analysis results for research questions and hypotheses testing showed that:

1. All the people living in conventional, solar, and earth sheltered houses are not different in terms of the degree of importance of developed 37 descriptors.
2. While people living in conventional houses generally desire a higher level of aesthetic quality of the house than the people living in earth sheltered houses, people living in earth sheltered houses generally express the present houses more congruent with the ideal houses than people living in conventional houses.

The results support the findings of previous research on earth sheltered housing done by Cook (1978) and the factor dimension structure of 37 aesthetic environmental descriptors for people living in alternative and conventional housing identified by this researcher previously.

Recommendations

Recommendations from this study indicate: 1. the possible areas where the results of this study need to be used, and 2. further research that should be done in the future. In depth analyses of each environmental descriptor for aesthetics of housing could be helpful to the housing developers, planners, policy makers, and the consumer. Specific recommendations that may reflect these needs may fall within the areas of marketing, finance, design and construction, codes and policies, and environmental evaluation including the housing development area.

In the area of marketing, the results of this study could give information about various characteristics of different house type dwellers, patterns of major emphasis in responding to the housing environment, and aesthetic aspects of different house types. In the area of finance, since the earth sheltered housing contributes more to the quality of life by having less discrepancy scores between the ideal and present housing environment, a special consideration needs to be given to 1. the way of disseminating information about earth sheltered housing, and 2. the type and source of financing which have been used or need to be available in the future for people who have lived and will live in earth sheltered housing.

In the area of design and construction, the study provides specific information about where and how the design and construction of the house needs to be improved, emphasized and specially considered. In this way, alternative housing could attract more general consumers.

As this research suggests specific and clear guidelines to improve

the aesthetic quality of alternative houses, codes and policies may need to be made to provide more aesthetic and attractive alternative housing. City leaders need to carefully examine the purpose of city building codes. Some codes may not be particularly relevant to earth sheltered housing. Especially in the environmental evaluation field, the developed descriptors could be widely used to evaluate different housing types.

In relation to the topic of this study, recommendations for further research were made, and arranged under three specific parts of this study. The first two parts mainly include various exploratory studies. The third part includes both descriptive and/or explanatory studies.

(1) Development of the Preliminary Instrument.

   a. A study with a larger sample from a population needs to be conducted to find a simplier version of the Meier's Art Judgment Test for more confident usage to measure one's aesthetic perception ability.

   b. A study assessing various types of standard tests to measure one's aesthetic perception ability to be included as part of the main instrument.

   c. A study with a broader range of pooled environmental descriptors identified by other researchers.

(2) Testing the Developed Methodology.

   a. A study with various samples from different housing types to find the common factor dimensions to describe the housing environment.

   b. A study testing the developed methodology with other existing theories.

c. A study using the discrepancy methodology developed by the researcher to test or expand, or create new theories.

d. A study finding other possible theoretical background in aesthetics and psychology for application in the housing area.

e. A study using other personal trait variables to expand the power of the existing aesthetic theory.

f. A study using the concept of discrepancy suggested by the researcher, to measure the degree of satisfaction with the environmental qualities including the aesthetic aspects of other types of environments such as community environments.

g. A study to find descriptors to measure the aesthetic qualities of other kinds of environments related to the housing environment such as community environment.

(3) Aesthetic Evaluation of Alternative Housing.

a. A study with a larger sample on a national basis should be conducted for the generalization and comparison among states or between rural and urban areas.

b. A study with a larger sample dealing with various profiles on the basis of demographic information such as sex, age, education, occupation, and income level. For example, a study to assess the profiles of ideal aesthetic environment for people between 40 and 50 years of age living in earth sheltered houses.

c. A study using a sample from different energy efficient

housing types to ascertain the aesthetic incentive for the housing type.

d. A study with the emphasis on the topic that includes information about types of building materials and house design characteristics produced which are related to certain feelings that could be explained by the developed descriptors.

e. A study with a sample of low income families, dealing with housing aesthetics, to improve the housing qualities and other qualities of life.

f. A study dealing with the relationship between the living patterns of people in different housing types and the design aspects of their houses.

g. A study dealing with other possible incentives besides the aesthetics for use in the dissemination of various energy efficient housing types throughout the United States.

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APPENDIX A

MEIER'S ART JUDGMENT TEST RECORD SHEET

1940 Edition

THE MEIER ART TESTS

I. ART JUDGMENT

By NORMAN CHARLES MEIER, PH.D.

RECORD SHEET

DIRECTIONS

In the accompanying booklet are pictures arranged in pairs, the two in each pair being very nearly alike. They differ only in *one* respect and you are told *what that* is in each case on pages 1, 2, and 3 of this blank.

You are to compare the two pictures in each pair, noting the unlike portion, and then decide which one is better (more pleasing, more artistic, more satisfying). Do not hurry. Study each pair carefully in turn.

Indicate your preference by making an X in the circle under *Left*, if you decide that the left-hand picture is better or in the circle under *Right* if you believe that the right hand one is more desirable.

Examples of proper marking: (pictures not illustrated).

Left	*Right*	*No.*	
⊗	○	A	Presence or absence of tree. (*This would mean that you prefer the left-hand picture*)
○	⊗	B	Treatment of waves. (*This would mean that you prefer the right-hand picture*)

Select the better one in every pair. Do not omit any. If unable to decide within a reasonable time mark the place and return to that one later.

Left	Right	Pair No.	Difference
○	○	1	Arrangement of wall and foreground
○	○	2	Foreground
○	○	3	Treatment of the central figure (man with hammer)
○	○	4	Shape of bowl of vase
○	○	5	Position of the empty chair
○	○	6	Size of tree on the left
○	○	7	Position of left arm
○	○	8	Development of foreground and background
○	○	9	Location of girls in picture
○	○	10	Detail in fore- and background
○	○	11	Design of ground and tree
○	○	12	Size of the middle ship
○	○	13	Position of moon
○	○	14	Location of the band
○	○	15	The arrangement of logs
○	○	16	Position of women with relation to arch
○	○	17	Position of gulls only
○	○	18	Arrangement of boats in middle-ground
○	○	19	Size of the top sail
○	○	20	Position of umbrella and girl's head

Continue on page 2.

Select the better one in every pair. Do not omit any. If unable to decide within a reasonable time mark the place and return to that one later.

Left	Right	Pair No.	Difference
○	○	21	Foreground
○	○	22	Folds of the robe
○	○	23	Lines along building and windows on right
○	○	24	Distribution of shading
○	○	25	Background
○	○	26	Amount of shading in various parts
○	○	27	Position of the fisherman
○	○	28	"The Rent Bill." Posture of the old man
○	○	29	Quality of line
○	○	30	Background scenery
○	○	31	Presence or absence of the dimly outlined piling
○	○	32	Inclination of twig supporting bird
○	○	33	Position of the left arm
○	○	34	Presence or absence of picture in upper right corner
○	○	35	Position of woman and boat
○	○	36	Position of last (smallest) arch
○	○	37	Design on bowl of vase
○	○	38	Circular objects on table
○	○	39	Position of the largest tree
○	○	40	Borders and ornaments about bird
○	○	41	Inclination of branches of tall tree
○	○	42	Attitudes and positions of birds
○	○	43	Inclusion or omission of arch
○	○	44	Treatment of light and shade
○	○	45	Position of girl in picture
○	○	46	Bundle on hip or shoulder (nearest woman)
○	○	47	Position of squirrel on right
○	○	48	Position of the child on right side of picture
○	○	49	Inclusion or omission of the horns
○	○	50	Arrangement in picture of the woman and umbrella
○	○	51	Position of the figures
○	○	52	Pattern of apron
○	○	53	Position of small boats in river
○	○	54	"Midday Rest." Arrangement of the boats
○	○	55	Presence or absence of tall reeds
○	○	56	Position of foot on left side of picture
○	○	57	Treatment of the clouds
○	○	58	Background detail
○	○	59	Direction of movement of the swaying trees
○	○	60	Arrangement of objects on dressing table

Continue on page 3.

Select the better one in every pair. Do not omit any. If unable to decide within a reasonable time mark the place and return to that one later.

Left	Right	Pair No.	Difference
○	○	61	"San Juan Bridge." Relative proportion of bridge and city
○	○	62	Presence or absence of the small objects on left
○	○	63	Size of windows on left wall
○	○	64	Position of right arm of spinner
○	○	65	Arrangement of plumage and dress
○	○	66	Inclusion or omission of the long-stemmed pipe
○	○	67	Location of canal boat
○	○	68	The bird
○	○	69	Presence or absence of small bowl and bottle
○	○	70	Inclusion of the two children and person by boat
○	○	71	Treatment of the sky
○	○	72	Treatment of cloud and haze in middle-ground
○	○	73	Treatment of the clouds
○	○	74	Presence or absence of shadows on snow
○	○	75	Foreground
○	○	76	Background
○	○	77	Suitability of background
○	○	78	Presence or absence of tower
○	○	79	Location of tall trees
○	○	80	Presence or absence of woman
○	○	81	Inclusion or omission of the geese
○	○	82	Treatment of waves
○	○	83	Arrangement of the geese
○	○	84	The man's position on the wheelbarrow
○	○	85	Inclusion or omission of the cow in lower right
○	○	86	Black or white base
○	○	87	Treatment of foreground
○	○	88	Tilt of the boy's head
○	○	89	Character and arrangement of the waves
○	○	90	Inclusion or omission of picture on wall
○	○	91	Character of tracery-work about animal figure
○	○	92	"Herons." Appropriateness of the setting
○	○	93	Arrangement of the lighting and picture
○	○	94	Birches or elms in foreground
○	○	95	Location of horizon in the picture
○	○	96	Size of the decorated vase
○	○	97	Location of pagoda in picture
○	○	98	Distribution of light and dark
○	○	99	Direction of pine tree's main branch
○	○	100	Treatment of the water

End of the test. Check any deferred items.

Score _____

%-ile Rank _____

FILL IN THESE BLANKS AFTER COMPLETING TEST

Name _____ Birthplace _____ Age_____

Address (*street*) _____ (*city*) _____

School _____ Grade or year_____ Date_____ 19___

Indicate answers below by underlining wherever possible:

What training have you had in art: *elementary school drawing, high school art, college art, private art instruction, art school.*

Courses taken or now being taken: *freehand drawing, mechanical drawing, cast, design, sketching, still-life, painting, life, modeling, aesthetics, history of art.*

Are any relatives artists? *Parent, grandparent, uncle, aunt, cousin, brother, sister.*

Your ancestry (for example, *English, German*): _____

Art Museums visited (as *Art Institute of Chicago, The Louvre*) _____

_____ At what age?_____

Traveled: *less than 500 miles, 2000 miles, 4000 miles, abroad—where?* _____

_____

Resided most of life under 21: *on farm, in village, town, small city, large city.*

Do you read art magazines such as *Arts and Decoration, The Studio, etc.? Never, occasionally, regularly.*

Do you read magazines such as *Life, Better Homes and Gardens, Womans Home Companion, House Beautiful? Never, occasionally, regularly.*

Remarks: _____

Do not fill in the blanks below this line

SUPPLEMENTARY DATA ON SUBJECT

Grades in art courses _____

Student's rank: general subjects (*above average, average, below average*);
art subjects (*above average, average, below average*)

Scores on other art tests_____ Intelligence test score_____

Craftsmen in ancestry: (number of each)

( ) cabinet-maker	( ) weaver	( ) lithographer	( ) watch repairman
( ) carpenter	( ) architect	( ) potter	( ) _____
( ) engraver	( ) jeweller	( ) draftsman	( ) _____
( ) artist	( ) technician	( ) sculptor	( ) _____

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APPENDIX B

PILOT STUDY II INSTRUMENT

PILOT STUDY II

NAME: _____ SEX: _____ AGE: _____
Last First M or F Years

MARIIED? (past or present): _____
Yes or No

This is a study of the words that we typically use to describe houses. Whenever we describe a house, we use a number of different adjectives. The following pages contain a large number of pairs of adjectives which have been suggested as useful to describe INTERIORS, EXTERIORS of and LANDSCAPES around houses. Your job here will be to indicate an "ideal" aesthetic house environment.

Printed below is a rating scale numbered one (1) through seven (7). The adverbs at the top of each page on the scale indicate the degrees of each corresponding adjectives following. For example, on a pair of words "ugly-beautiful", if you think that the more beautiful a interior is, the more pleasing it is, number (7) "completely" on "beautiful" side will be appropriate to indicate your opinion (see example 1). On a pair of words "huge-tiny", you may not think that the more huge, the more pleasing. In this case, select an appropriate adverb. You may select "very tiny (2)" or "somewhat tiny (3)" or "neutral (4)" or "somewhat huge (5)" or "very huge (6)" for your "ideal" house (see example 2).

Scale

Words	1	2	3	4	5	6	7	Words
	Completely	Very	Somewhat	Neutral	Somewhat	Very	Completely	
Example 1								
Ugly	1	2	3	4	5	6	(7)	Beautiful
Example 2								
Tiny	1	2	3	4	(5)	6	7	Huge

Look at each pair of words carefully, select the adverb you think best represents the description of your "ideal" aesthtetic housing environment. Most words will be familiar to you. However if you find words you don't know, please put a question mark in the parentheses at the right side of the scale (see example 3).

Example 3

Words	1	2	3	4	5	6	7	Words (?)

Whenever people use rating scales they tend to introduce constant errors into their ratings. All raters, for example, are hesitant to give extreme ratings at the ends of the rating scale and in toward the middle of the scale. Do not hesitate to use the ends of the scale when you feel comfortable with the adverbs.

Although some pairs of words are similar in meaning, please rate each pair of words individually in terms of its unique expression.

This questionnaire includes three parts: the first part is only related to INTERIORS of houses; the second part is only related to EXTERIORS of houses; the third part is only related to the LANDSCAPES aroung houses.

You are now ready to turn the page and begin. Be sure you rate each pair of words as a pair and that you rate each pair in the order presented to you, giving time and thought to each of your ratings.

PART 1 : INTERIORS OF HOUSES

	1 Completely	2 Very	3 Somewhat	4 Neutral	5 Somewhat	6 Very	7 Completely	
Adequate Size	1	2	3	4	5	6	7	Inadequate size ( )
Private	1	2	3	4	5	6	7	Public ( )
Quiet	1	2	3	4	5	6	7	Noisy ( )
Cramped	1	2	3	4	5	6	7	Spacious ( )
Appealing	1	2	3	4	5	6	7	Unappealing ( )
Well scaled	1	2	3	4	5	6	7	Poorly scaled ( )
Simple	1	2	3	4	5	6	7	Complex ( )
Wide	1	2	3	4	5	6	7	Narrow ( )
Unusual	1	2	3	4	5	6	7	Usual ( )
Useless	1	2	3	4	5	6	7	Useful ( )
Attractive	1	2	3	4	5	6	7	Unattractive ( )
Expensive	1	2	3	4	5	6	7	Inexpensive ( )
Fashionable	1	2	3	4	5	6	7	Unfashionable ( )
Bad lines	1	2	3	4	5	6	7	Good lines ( )
Ugly	1	2	3	4	5	6	7	Beautiful ( )
Good lighting	1	2	3	4	5	6	7	Poor lighting ( )
Organized	1	2	3	4	5	6	7	Disorganized ( )
Ornate	1	2	3	4	5	6	7	Unadorned ( )
Colorful	1	2	3	4	5	6	7	Colorless ( )
Comfortable	1	2	3	4	5	6	7	Uncomfortable ( )
Direct lighting	1	2	3	4	5	6	7	Diffuse lighting ( )
Ordinary	1	2	3	4	5	6	7	Distinctive ( )
Fresh odor	1	2	3	4	5	6	7	Stale odor ( )
Functional	1	2	3	4	5	6	7	Non functional ( )
Single purpose	1	2	3	4	5	6	7	Multiple purpose ( )
Warm	1	2	3	4	5	6	7	Cool ( )
Well balanced	1	2	3	4	5	6	7	Poorly balanced ( )
Sparkling	1	2	3	4	5	6	7	Subdued ( )
Stylish	1	2	3	4	5	6	7	Unstylish ( )
Cluttered	1	2	3	4	5	6	7	Uncluttered ( )
Uncrowded	1	2	3	4	5	6	7	Crowded ( )
Flexible	1	2	3	4	5	6	7	Inflexible ( )

PART 1 : INTERIORS OF HOUSES-Continued

	1 Completely	2 Very	3 Somewhat	4 Neutral	5 Somewhat	6 Very	7 Completely		
Well kept	1	2	3	4	5	6	7	Run down	( )
Appealing	1	2	3	4	5	6	7	Unappealing	( )
Complex	1	2	3	4	5	6	7	Simple	( )
Traditional	1	2	3	4	5	6	7	Contemporary	( )
Bright	1	2	3	4	5	6	7	Dull	( )
Gloomy	1	2	3	4	5	6	7	Cheerful	( )
Elegant	1	2	3	4	5	6	7	Plain	( )
Empty	1	2	3	4	5	6	7	Full	( )
Inefficient	1	2	3	4	5	6	7	Efficient	( )
Stuffy	1	2	3	4	5	6	7	Well ventilated	( )
Clean	1	2	3	4	5	6	7	Dirty	( )
Comfortable temperature	1	2	3	4	5	6	7	Uncomfortable temperature	( )
Poor acoustics	1	2	3	4	5	6	7	Good acoustics	( )
Impressive	1	2	3	4	5	6	7	Unimpressive	( )
Inviting	1	2	3	4	5	6	7	Repelling	( )
Bad color	1	2	3	4	5	6	7	Good color	( )
Large	1	2	3	4	5	6	7	Small	( )
Dark	1	2	3	4	5	6	7	Light	( )
Neat	1	2	3	4	5	6	7	Messy	( )
Old	1	2	3	4	5	6	7	New	( )
Bright colors	1	2	3	4	5	6	7	Muted colors	( )
Soft lighting	1	2	3	4	5	6	7	Harsh lighting	( )
Tasteful	1	2	3	4	5	6	7	Tasteless	( )
Untidy	1	2	3	4	5	6	7	Tidy	( )
Pleasant	1	2	3	4	5	6	7	Unpleasant	( )
Well planned	1	2	3	4	5	6	7	Poorly planned	( )
Cool	1	2	3	4	5	6	7	Warm	( )
Usual	1	2	3	4	5	6	7	Unusual	( )
Convenient	1	2	3	4	5	6	7	Inconvenient	( )
Orderly	1	2	3	4	5	6	7	Chaotic	( )
Unfashionable	1	2	3	4	5	6	7	Fashionable	( )

PART 2: EXTERIORS OF HOUSES

	1 Completely	2 Very	3 Somewhat	4 Neutral	5 Somewhat	6 Very	7 Completely		
Simple	1	2	3	4	5	6	7	Complex	( )
Stimulating	1	2	3	4	5	6	7	Sedate	( )
Harmonious	1	2	3	4	5	6	7	Discordant	( )
Rough	1	2	3	4	5	6	7	Smooth	( )
Ambiguous	1	2	3	4	5	6	7	Clear	( )
Formal	1	2	3	4	5	6	7	Informal	( )
Symmetric	1	2	3	4	5	6	7	Asymmetric	( )
Bold	1	2	3	4	5	6	7	Unobtrusive	( )
Interesting	1	2	3	4	5	6	7	Boring	( )
Hard	1	2	3	4	5	6	7	Soft	( )
Individual	1	2	3	4	5	6	7	Universal	( )
United	1	2	3	4	5	6	7	Varied	( )
Austere	1	2	3	4	5	6	7	Sensuous	( )
Novel	1	2	3	4	5	6	7	Common	( )
Satisfactory	1	2	3	4	5	6	7	Frustrating	( )
Tense	1	2	3	4	5	6	7	Relaxed	( )
Informal	1	2	3	4	5	6	7	Formal	( )
Exhilarated	1	2	3	4	5	6	7	Depressed	( )
Common	1	2	3	4	5	6	7	Novel	( )
High	1	2	3	4	5	6	7	Low	( )
Peaceful	1	2	3	4	5	6	7	Disruptive	( )
Static	1	2	3	4	5	6	7	Dynamic	( )
Ordered	1	2	3	4	5	6	7	Disordered	( )
Uniform	1	2	3	4	5	6	7	Divergent	( )
Calm	1	2	3	4	5	6	7	Exciting	( )
Soft	1	2	3	4	5	6	7	Hard	( )
Intimate	1	2	3	4	5	6	7	Distant	( )
Relaxed	1	2	3	4	5	6	7	Tense	( )
Ugly	1	2	3	4	5	6	7	Beautiful	( )
Pleasant	1	2	3	4	5	6	7	Unpleasant	( )

PART 3: LANDSCAPES AROUND HOUSES

	1 Completely	2 Very	3 Somewhat	4 Neutral	5 Somewhat	6 Very	7 Completely		
Graceful	1	2	3	4	5	6	7	Awkward	( )
Wild	1	2	3	4	5	6	7	Tame	( )
Boring	1	2	3	4	5	6	7	Exciting	( )
Unique	1	2	3	4	5	6	7	Commonplace	( )
Full	1	2	3	4	5	6	7	Empty	( )
Disturbing	1	2	3	4	5	6	7	Restful	( )
Colorful	1	2	3	4	5	6	7	Colorless	( )
Beautiful	1	2	3	4	5	6	7	Ugly	( )
Weak	1	2	3	4	5	6	7	Powerful	( )
Active	1	2	3	4	5	6	7	Passive	( )
Artificial	1	2	3	4	5	6	7	Natural	( )
Quiet	1	2	3	4	5	6	7	Loud	( )
Pleasant	1	2	3	4	5	6	7	Unpleasant	( )
Primitive	1	2	3	4	5	6	7	Civilized	( )
Delicate	1	2	3	4	5	6	7	Rugged	( )
Alive	1	2	3	4	5	6	7	Dead	( )
Turbulent	1	2	3	4	5	6	7	Tranquil	( )
Tame	1	2	3	4	5	6	7	Wild	( )
Barren	1	2	3	4	5	6	7	Fertile	( )
Simple	1	2	3	4	5	6	7	Complex	( )
Cold	1	2	3	4	5	6	7	Warm	( )
Natural	1	2	3	4	5	6	7	Artificial	( )

APPENDIX C

MEANS AND S.D. OF DESCRIPTORS FOR IDEAL HOUSING ENVIRONMENT OF SAMPLES OF BOTH PILOT STUDY II AND TESTING INSTRUMENT STAGE

TABLE XLIII

MEANS AND S.D. OF DESCRIPTORS FOR IDEAL HOUSING ENVIRONMENT OF SAMPLES OF BOTH PILOT STUDY II AND TESTING INSTRUMENT STAGE

Samples Descriptors	Testing of Instrument Stage			Pilot Study II		
	N	Mean	S.D.	N	Mean	S.D.
Well Ventilated-Stuffy	288	1.89	1.24	101	1.33	0.68
Comfortable Temperature-Uncomfortable Temperature	289	2.00	1.23	101	1.41	0.68
Pleasant-Unpleasant	289	1.62	1.13	101	1.35	0.67
Well Planned-Poorly Planned	289	1.60	1.11	101	1.44	0.73
Convenient-Inconvenient	289	1.74	1.16	101	1.83	0.88
Efficient-Inefficient	287	1.79	1.45	101	1.53	0.74
Well Scaled-Poorly Scaled	281	2.26	1.69	93	1.74	1.19
Bright-Dull	284	2.33	1.48	101	2.51	0.92
Adequate Size-Inadequate Size	286	1.65	1.20	100	1.65	1.09
Well Balanced-Poorly Balanced	285	1.91	1.31	99	1.86	0.94
Useful-Useless	282	1.50	1.10	101	1.52	0.88
Flexible-Inflexible	278	1.96	1.20	98	2.18	1.18
Unfashionable-Fashionable	285	5.20	1.34	101	5.42	1.08
Nonfunctional-Functional	284	6.27	1.11	98	6.31	1.03
Bad Color-Good Color	284	6.25	1.08	101	6.58	0.64
Uncomfortable-Comfortable	285	6.57	0.82	101	6.63	0.63
Plain-Elegant	282	5.33	1.39	101	4.88	1.26
Unattractive-Attractive	283	6.45	0.94	101	6.46	1.18
Bad Lines-Good Lines	283	6.19	1.15	88	6.27	1.01
Appealing-Unappealing	282	1.73	1.25	100	1.56	1.09
Repelling-Inviting	280	6.45	0.88	101	6.41	0.93
Uncluttered-Cluttered	288	2.05	1.22	100	2.39	1.65
Clean-Dirty	288	1.61	1.10	101	1.43	0.86
Orderly-Chaotic	289	1.80	1.11	99	1.78	0.97
Traditional-Contemporary	283	4.17	1.72	99	4.23	1.60
Usual-Unusual	285	4.24	1.64	101	4.55	1.48
Pleasant-Unpleasant	281	1.54	1.05	101	1.41	0.65
Frustrating-Satisfactory	274	6.41	0.90	97	6.28	1.02
Ugly-Beautiful	278	6.26	0.94	101	6.37	0.88
Novel-Common	279	3.29	1.50	97	2.93	1.19
Unpleasant-Pleasant	277	6.34	1.17	100	6.61	0.62
Fertile-Barren	280	1.70	1.10	99	2.10	1.18
Colorful-Colorless	278	2.43	1.32	101	2.06	1.00
Alive-Dead	276	1.78	1.17	100	1.48	0.76
Warm-Cold	280	2.08	1.26	114	2.76	1.22
Civilized-Primitive	277	2.51	1.43	100	2.91	1.54
Full-Empty	275	2.87	1.21	98	2.64	1.29

APPENDIX D

THE DEVELOPED AND TESTED PRELIMINARY INSTRUMENT

Section I.

1. What type of energy related innovations does your house have? (Check as many as apply.)

		Date of installation
____1.	Active solar collectors for space heating	_____
____2.	Active solar collectors for water heating	_____
____3.	Active solar collectors for swimming pools	_____
____4.	Passive solar design	_____
____5.	Other, please explain	_____

_____

2. How old is your housing dwelling unit?
   1. _____ years old
3. How long have you lived in this house? (Record actual number.)
   1. _____ years
4. Give me an estimate of the number of square feet in housing dwelling unit.
   1. _____ square feet
5. How satisfied are you with your present dwelling?
   ____1. Very satisfied
   ____2. Satisfied
   ____3. Neither satisfied or dissatisfied
   ____4. Dissatisfied
   ____5. Very dissatisfied

Section II - Part A.

1. Are you interested in the aesthetic quality of your house?

very much	somewhat	don't know	little	not at all
5	4	3	2	1

2. How satisfied are you with the aesthetic quality of your house?

very much	somewhat	don't know	little	not at all
5	4	3	2	a

3. What do others say about the aesthetic quality of your house?

very aesthetic	somewhat aesthetic	don't know	little aesthetic
4	3	2	1

Section III: Rate each of the following pairs of words for an ideal aesthetic house environment (from 1 to 7). Then indicate how your present home
Part B environment rates for the same pair of words (from 1 to 7). Lastly, indicate the level of importance of each pair of words to you.

EXAMPLE:

Ideal home	Hot	1	2	3	4	(5)	6	7	Cold
Present home	Hot	1	2	(3)	4	5	6	7	Cold
Importance to me	very important		1	2	3	4	(5)		very unimportant

1. Interior of house

Ideal home	uncluttered	1	2	3	4	5	6	7	cluttered
Present home	uncluttered	1	2	3	4	5	6	7	cluttered
Importance to me	very important		1	2	3	4	5		very unimportant
Ideal home	well ventilated	1	2	3	4	5	6	7	stuffy
Present home	well ventilated	1	2	3	4	5	6	7	stuffy
Importance to me	very important		1	2	3	4	5		very unimportant
Ideal home	clean	1	2	3	4	5	6	7	dirty
Present home	clean	1	2	3	4	5	6	7	dirty
Importance to me	very important		1	2	3	4	5		very unimportant
Ideal home	comfortable temperature	1	2	3	4	5	6	7	uncomfortable temperature
Present home	comfortable temperature	1	2	3	4	5	6	7	uncomfortable temperature
Importance to me	very important		1	2	3	4	5		very unimportant
Ideal home	pleasant	1	2	3	4	5	6	7	unpleasant
Present home	pleasant	1	2	3	4	5	6	7	unpleasant
Importance to me	very important		1	2	3	4	5		very unimportant
Ideal home	well planned	1	2	3	4	5	6	7	poorly planned
Present home	well planned	1	2	3	4	5	6	7	poorly planned
Importance to me	very important		1	2	3	4	5		very unimportant
Ideal home	convenient	1	2	3	4	5	6	7	inconvenient
Present home	convenient	1	2	3	4	5	6	7	inconvenient
Importance to me	very important		1	2	3	4	5		very unimportant
Ideal home	complex	1	2	3	4	5	6	7	simple
Present home	complex	1	2	3	4	5	6	7	simple
Importance to me	very important		1	2	3	4	5		very unimportant
Ideal home	orderly	1	2	3	4	5	6	7	chaotic
Present home	orderly	1	2	3	4	5	6	7	chaotic
Importance to me	very important		1	2	3	4	5		very unimportant
Ideal home	narrow	1	2	3	4	5	6	7	wide
Present home	narrow	1	2	3	4	5	6	7	wide
Importance to me	very important		1	2	3	4	5		very unimportant
Ideal home	unfashionable	1	2	3	4	5	6	7	fashionable
Present home	unfashionable	1	2	3	4	5	6	7	fashionable
Importance to me	very important		1	2	3	4	5		very unimportant
Ideal home	traditional	1	2	3	4	5	6	7	contemporary
Present home	traditional	1	2	3	4	5	6	7	contemporary
Importance to me	very important		1	2	3	4	5		very unimportant
Ideal home	non functional	1	2	3	4	5	6	7	functional
Present home	non functional	1	2	3	4	5	6	7	functional
Importance to me	very important		1	2	3	4	5		very unimportant
Ideal home	efficient	1	2	3	4	5	6	7	inefficient
Present home	efficient	1	2	3	4	5	6	7	inefficient
Importance to me	very important		1	2	3	4	5		very unimportant

Ideal home	bad color	1	2	3	4	5	6	7	good color
Present home	bad color	1	2	3	4	5	6	7	good color
Importance to me	very important		1	2	3	4	5		very unimportant
Ideal home	uncomfortable	1	2	3	4	5	6	7	comfortable
Present home	uncomfortable	1	2	3	4	5	6	7	comfortable
Importance to me	very important		1	2	3	4	5		very unimportant
Ideal home	well scaled	1	2	3	4	5	6	7	poorly scaled
Present home	well scaled	1	2	3	4	5	6	7	poorly scaled
Importance to me	very important		1	2	3	4	5		very unimportant
Ideal home	usual	1	2	3	4	5	6	7	unusual
Present home	usual	1	2	3	4	5	6	7	unusual
Importance to me	very important		1	2	3	4	5		very unimportant
Ideal home	empty	1	2	3	4	5	6	7	full
Present home	empty	1	2	3	4	5	6	7	full
Importance to me	very important		1	2	3	4	5		very unimportant
Ideal home	old	1	2	3	4	5	6	7	new
Present home	old	1	2	3	4	5	6	7	new
Importance to me	very important		1	2	3	4	5		very unimportant
Ideal home	bright	1	2	3	4	5	6	7	dull
Present home	bright	1	2	3	4	5	6	7	dull
Importance to me	very important		1	2	3	4	5		very unimportant
Ideal home	poor lighting	1	2	3	4	5	6	7	good lighting
Present home	poor lighting	1	2	3	4	5	6	7	good lighting
Importance to me	very important		1	2	3	4	5		very unimportant
Ideal home	plain	1	2	3	4	5	6	7	elegant
Present home	plain	1	2	3	4	5	6	7	elegant
Importance to me	very important		1	2	3	4	5		very unimportant
Ideal home	ordinary	1	2	3	4	5	6	7	distinctive
Present home	ordinary	1	2	3	4	5	6	7	distinctive
Importance to me	very important		1	2	3	4	5		very unimportant
Ideal home	adequate size	1	2	3	4	5	6	7	inadequate size
Present home	adequate size	1	2	3	4	5	6	7	inadequate size
Importance to me	very important		1	2	3	4	5		very unimportant
Ideal home	single purpose	1	2	3	4	5	6	7	multiple purposes
Present home	single purpose	1	2	3	4	5	6	7	multiple purposes
Importance to me	very important		1	2	3	4	5		very unimportant
Ideal home	unattractive	1	2	3	4	5	6	7	attractive
Present home	unattractive	1	2	3	4	5	6	7	attractive
Importance to me	very important		1	2	3	4	5		very unimportant
Ideal home	small	1	2	3	4	5	6	7	large
Present home	small	1	2	3	4	5	6	7	large
Importance to me	very important		1	2	3	4	5		very unimportant
Ideal home	well balanced	1	2	3	4	5	6	7	poorly balanced
Present home	well balanced	1	2	3	4	5	6	7	poorly balanced
Importance to me	very important		1	2	3	4	5		very unimportant
Ideal home	bad lines	1	2	3	4	5	6	7	good lines
Present home	bad lines	1	2	3	4	5	6	7	good lines
Importance to me	very important		1	2	3	4	5		very unimportant

Ideal home	appealing	1	2	3	4	5	6	7	unappealing
Present home	appealing	1	2	3	4	5	6	7	unappealing
Importance to me	very important		1	2	3	4	5		very unimportant
Ideal home	repelling	1	2	3	4	5	6	7	inviting
Present home	repelling	1	2	3	4	5	6	7	inviting
Importance to me	very important		1	2	3	4	5		very unimportant
Ideal home	pleasant	1	2	3	4	5	6	7	unpleasant
Present home	pleasant	1	2	3	4	5	6	7	unpleasant
Importance to me	very important		1	2	3	4	5		very unimportant
Ideal home	useful	1	2	3	4	5	6	7	useless
Present home	useful	1	2	3	4	5	6	7	useless
Importance to me	very important		1	2	3	4	5		very unimportant
Ideal home	colorful	1	2	3	4	5	6	7	colorless
Present home	colorful	1	2	3	4	5	6	7	colorless
Importance to me	very important		1	2	3	4	5		very unimportant
Ideal home	flexible	1	2	3	4	5	6	7	inflexible
Present home	flexible	1	2	3	4	5	6	7	inflexible
Importance to me	very important		1	2	3	4	5		very unimportant

2. Exterior of house

Ideal aesthetic home	novel	1	2	3	4	5	6	7	common
Present home	novel	1	2	3	4	5	6	7	common
Importance to me	very important		1	2	3	4	5		very unimportant
Ideal home	ordered	1	2	3	4	5	6	7	disordered
Present home	ordered	1	2	3	4	5	6	7	disordered
Importance to me	very important		1	2	3	4	5		very unimportant
Ideal home	pleasant	1	2	3	4	5	6	7	unpleasant
Present home	pleasant	1	2	3	4	5	6	7	unpleasant
Importance to me	very important		1	2	3	4	5		very unimportant
Ideal home	high	1	2	3	4	5	6	7	low
Present home	high	1	2	3	4	5	6	7	low
Importance to me	very important		1	2	3	4	5		very unimportant
Ideal home	asymmetric	1	2	3	4	5	6	7	symmetric
Present home	asymmetric	1	2	3	4	5	6	7	symmetric
Importance to me	very important		1	2	3	4	5		very unimportant
Ideal home	uniform	1	2	3	4	5	6	7	divergent
Present home	uniform	1	2	3	4	5	6	7	divergent
Importance to me	very important		1	2	3	4	5		very unimportant
Ideal home	hard	1	2	3	4	5	6	7	soft
Present home	hard	1	2	3	4	5	6	7	soft
Importance to me	very important		1	2	3	4	5		very unimportant
Ideal home	intimate	1	2	3	4	5	6	7	distant
Present home	intimate	1	2	3	4	5	6	7	distant
Importance to me	very important		1	2	3	4	5		very unimportant
Ideal home	frustrating	1	2	3	4	5	6	7	satisfactory
Present home	frustrating	1	2	3	4	5	6	7	satisfactory
Importance to me	very important		1	2	3	4	5		very unimportant
Ideal home	ugly	1	2	3	4	5	6	7	beautiful
Present home	ugly	1	2	3	4	5	6	7	beautiful
Importance to me	very important		1	2	3	4	5		very unimportant
Ideal home	bold	1	2	3	4	5	6	7	unobtrusive
Present home	bold	1	2	3	4	5	6	7	unobtrusive
Importance to me	very important		1	2	3	4	5		very unimportant
Ideal home	calm	1	2	3	4	5	6	7	exciting
Present home	calm	1	2	3	4	5	6	7	exciting
Importance to me	very important		1	2	3	4	5		very unimportant
Ideal home	varied	1	2	3	4	5	6	7	united
Present home	varied	1	2	3	4	5	6	7	united
Importance to me	very important		1	2	3	4	5		very unimportant
Ideal home	rough	1	2	3	4	5	6	7	smooth
Present home	rough	1	2	3	4	5	6	7	smooth
Importance to me	very important		1	2	3	4	5		very unimportant
Ideal home	relaxed	1	2	3	4	5	6	7	tense
Present home	relaxes	1	2	3	4	5	6	7	tense
Importance to me	very important		1	2	3	4	5		very unimportant

3. Landscapes around house

Ideal home	fertile	1	2	3	4	5	6	7	barren
Present home	fertile	1	2	3	4	5	6	7	barren
Importance to me	very important		1	2	3	4	5		very unimportant
Ideal home	tranquil	1	2	3	4	5	6	7	turbulent
Present home	tranquil	1	2	3	4	5	6	7	turbulent
Importance to me	very important		1	2	3	4	5		very unimportant
Ideal home	tame	1	2	3	4	5	6	7	wild
Present home	tame	1	2	3	4	5	6	7	wild
Importance to me	very important		1	2	3	4	5		very unimportant
Ideal home	delicate	1	2	3	4	5	6	7	rugged
Present home	delicate	1	2	3	4	5	6	7	rugged
Importance to me	very important		1	2	3	4	5		very unimportant
Ideal home	colorful	1	2	3	4	5	6	7	colorless
Present home	colorful	1	2	3	4	5	6	7	colorless
Importance to me	very important		1	2	3	4	5		very unimportant
Ideal home	alive	1	2	3	4	5	6	7	dead
Present home	alive	1	2	3	4	5	6	7	dead
Importance to me	very important		1	2	3	4	5		very unimportant
Ideal home	quiet	1	2	3	4	5	6	7	loud
Present home	quiet	1	2	3	4	5	6	7	loud
Importance to me	very important		1	2	3	4	5		very unimportant
Ideal home	warm	1	2	3	4	5	6	7	cold
Present home	warm	1	2	3	4	5	6	7	cold
Importance to me	very important		1	2	3	4	5		very unimportant
Ideal home	simple	1	2	3	4	5	6	7	complex
Present home	simple	1	2	3	4	5	6	7	complex
Importance to me	very important		1	2	3	4	5		very unimportant
Ideal home	civilized	1	2	3	4	5	6	7	primitive
Present home	civilized	1	2	3	4	5	6	7	primitive
Importance to me	very important		1	2	3	4	5		very unimportant
Ideal home	full	1	2	3	4	5	6	7	empty
Present home	full	1	2	3	4	5	6	7	empty
Importance to me	very important		1	2	3	4	5		very unimportant
Ideal home	unpleasant	1	2	3	4	5	6	7	pleasant
Present home	unpleasant	1	2	3	4	5	6	7	pleasant
Importance to me	very important		1	2	3	4	5		very unimportant
Ideal home	restful	1	2	3	4	5	6	7	disturbing
Present home	restful	1	2	3	4	5	6	7	disturbing
Importance to me	very important		1	2	3	4	5		very unimportant

Section II - Part C.

Directions

In the following two pages are pictures arranged in pairs, the two in each pair being very nearly alike. They differ only in *one* respect and you are told *what that is* in each case below each pair of pictures.

You are to compare the two pictures in each pair, noting the unlike portion, and then decide which one is better (more pleasing, more artistic, more satisfying). Do not hurry. Study each pair carefully in turn.

Indicate your preference by making an X in the circle under *Left*, if you decide that the left-hand picture is better or in the circle under *Right* if you believe that the right hand one is more desirable.

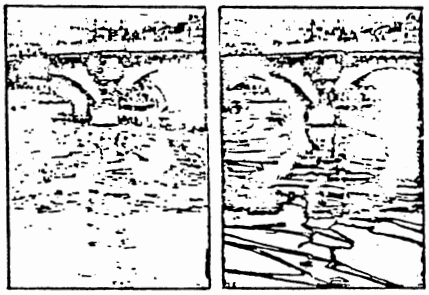
Examples of proper marking: (pictures not illustrated).

Left	*Right*	*No.*	
O	O	A	Presence or absence of tree. *(This would mean that you prefer the left-hand picture)*
O	O	B	Treatment of waves. *(This would mean that you prefer the right-hand picture)*

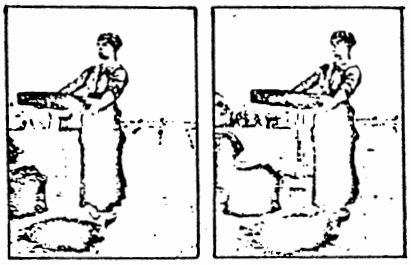
Select the better one in every pair. Do not omit any. If unable to decide within a reasonable time, mark the place and return to that one later.

O O The man's position on the wheelbarrow

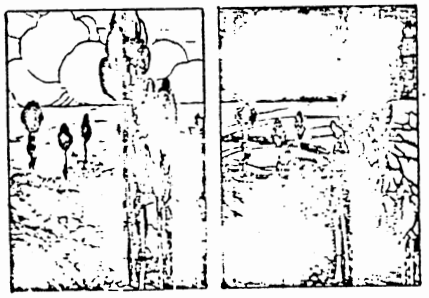
O O Arrangement of objects on dressing table



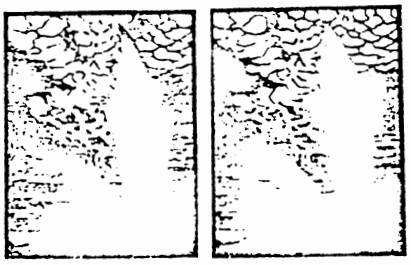
O O Treatment of the water



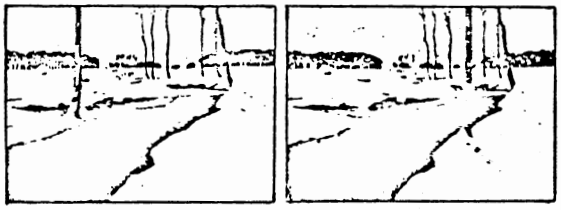
O O Position of girl in picture



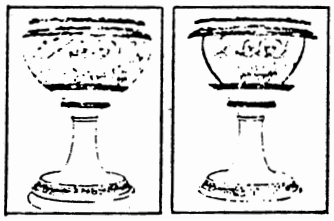
O O Distribution of shading



O O Size of tree on the left

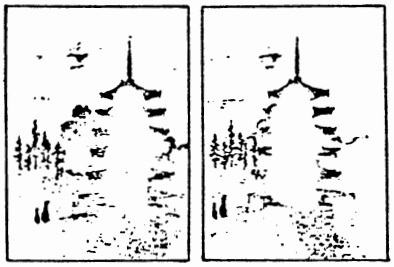


O O Position of the largest tree



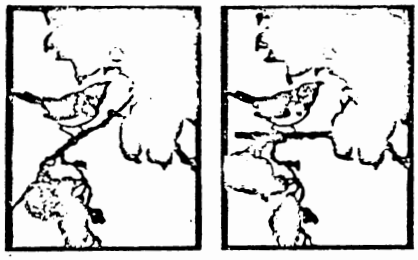
O O Design on bowl of vase

O O Arrangement of wall and foreground

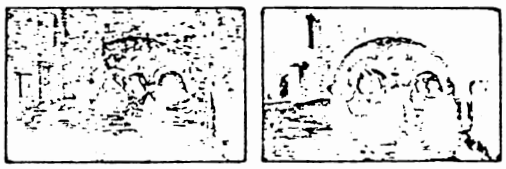


O O Location of pagoda in picture

O O Treatment of the clouds



O O Inclination of twig supporting bird



O O Amount of shading in various parts

O O Black or white base

Section IV:

1. **Demographic Data. Please fill in the information for each person in your home.**

Sex	Age	Race	Marital Status	Education	Occupation
1. male 2. female	Enter your actual age	1. Afro-American 2. White 3. Hispanic 4. American Indian 5. Other	1. single 2. married 3. widowed, divorced or separated 4. Other	Enter the number of highest grade completed	Indicate the type of job you have (Indicate student, retired, homemaker, or other if not gainfully employed)
Example 1 (male)	27 (age)	3 (Hispanic)	2 (married)	16 (college)	Manager - TG&Y
Respondent					
Spouse					
Children					
Others					

2. Which of these broad categories describes your total family income before taxes in 1982?
   - ___ 1. Less than $5,000
   - ___ 2. $5,000 to $9,999
   - ___ 3. $10,000 to $14,999
   - ___ 4. $15,000 to $19,999
   - ___ 5. $20,000 to $24,999
   - ___ 6. $25,000 to $29,999
   - ___ 7. $30,000 to $34,999
   - ___ 8. $35,000 to $39,999
   - ___ 9. $40,000 or more

APPENNDIX E

LETTERS TO SAMPLE

Oklahoma State University

COLLEGE OF HOME ECONOMICS
Department of Housing, Design and Consumer Resources

STILLWATER, OKLAHOMA 74078
HOME ECONOMICS WEST BUILDING
(405) 624-5048

Dear

You have been contacted recently about participating in a research study at Oklahoma State University in cooperation with a Southern Regional Housing project. This project is related to attitudes that people have regarding alternative and/or innovative types of housing, particularly related to energy efficiency.

We at Oklahoma State University are participating in the Southern Regional project and are interested in attitudes that people hold who are now living in alternative types of housing and a comparison of these attitudes with the attitudes of people who are considering moving into alternative housing is important. We are hoping that this kind of information will help us in the formulation of educational materials that will help in consumer acceptance of alternative types of housing.

We are particularly interested in individuals that live in active and/or passive solar housing and earth sheltered housing. We will be sending a questionnaire to these individuals for their responses. We will be glad to furnish you with data from the questionnaire when it is completed. We are anticipating completion of major parts of the data collection and analysis by mid to late Summer and will be glad to send you information at that point. We really appreciate your cooperation with us in furnishing us names of people living in the unit and will treat all information supplied in a confidential manner.

If you should have any questions related to the project, we will be glad to answer any of these and would be glad to work with you at any time. Thank you.

Sincerely,

Margaret Weber

Margaret Weber, Ph.D.
Associate Professor

Phyllis Marcus

Phyllis Marcus
Graduate Research Associate

Yeun Sook Lee

Yeun Sook Lee
Graduate Research Associate

Oklahoma State University

COLLEGE OF HOME ECONOMICS
Department of Housing, Design and Consumer Resources

STILLWATER OKLAHOMA 74078
HOME ECONOMICS WEST BUILDING
(405) 624-5048

The Department of Housing, Design and Consumer Resources at Oklahoma State University is conducting a study related to housing and energy. We are particularly interested in innovative types of housing, including active and passive solar and earth sheltered housing. This research project is part of a Southern Regional Project which consists of 10 to 12 states studying attitudes related to alternative housing.

We are particularly interested in your attitudes related to alternative housing and would appreciate your response to the enclosed questionnaire. The questionnaire has four major parts to it: (1) present housing, including specific kinds of information about your housing unit, (2) innovation and acceptance - your concept of innovativeness, (3) aesthetic perception of your home, and (4) demographics - basic information about your family. We would like you to take 30-40 minutes and fill out this questionnaire for us. You will remain anonymous - no name is connected with the information. This information will help us as we assess different types of housing forms and the kinds of attitudes that people have about these housing forms.

We carefully selected a sample of people living in conventional single-family housing in Canadian County. You were one of those households selected and we are very interested in your attitudes and information about your present housing unit.

We will be glad to send you information once the project is completed about the kinds of responses that we received and we would anticipate this research being completed by the end of summer. Would you please complete the questionnaire and send it back by May 27.

Again, thank you for participating in this research project. If you should have any questions about the questionnaire or the research in general, we would be happy to answer any of them. Please feel free to contact me at Oklahoma State University.

Sincerely yours,

Margaret Weber

Margaret Weber
Associate Professor

MW/bdw

Oklahoma State University

COLLEGE OF HOME ECONOMICS
Department of Housing, Design and Consumer Resources

STILLWATER, OKLAHOMA 74078
HOME ECONOMICS WEST BUILDING
(405) 624-5048

A couple weeks ago a questionnaire seeking answers about the type of housing that you are now living in, was mailed to you. Your name was chosen at random from Cleveland County.

If you have already completed and returned the questionnaire, please accept our sincere thanks. If not, could you please do so today because the questionnaire has been sent to only a small but representative sample of residents, in the Cleveland area, it is extremely important that yours be included in the study if the results are to accurately represent the opinions of people living in Cleveland County.

If by some chance you did not receive the questionnaire or it was misplaced, please call me and I will get another one in the mail to you today.

Sincerely,

Margaret Weber

Margaret Weber, Project Director
Associate Professor

VITA

Yeun Sook Lee

Candidate for the Degree of

Doctor of Philosophy

Thesis: AESTHETIC EVALUATION OF ALTERNATIVE HOUSING - A METHODOLOGICAL DEVELOPMENT

Major Field: Home Economics - Housing, Design and Consumer Resources

Biographical:

Personal Data: Born in Seoul, Korea, October 20, 1954, the daughter of Mr. and Mrs. Sung Whan and Yong Ae Lee.

Education: Graduated from Keung-Nam Girls' High School, Busan, Korea, in February 1973; received the Bachelor of Science degree from Yonsei University, February 1977, with a major in Housing and Interior Decoration; received the Master of Science degree from Yonsei University, February 1978, with an emphasis in Housing and Interior Decoration; completed the requirements for the Doctor of Philosophy degree at Oklahoma State University in July 1983, with an emphasis in Housing and Design.

Professional Experience: Teaching Assistant of Housing and Interior Decoration Department at Yonsei University, March 1977 to February 1978; Research Assistant of Housing and Interior Decoration Department at Yonsei University, March 1978 to February 1979; Teaching Assistant of HDCR at OSU, January 1981 to May 1981; Research Assistant of HDCR at OSU, May 1981 to August 1981; Research Associate of HDCR at OSU, August 1981 to August 1983; presentation of a research report "Development and Evaluation of Design Studio Teaching Modules" in the Oklahoma State HEA, March 1982.

Professional Organizations: Phi Upsilon Omicron; Omicron Nu; Phi Kappa Phi; American Home Economics Association; American Association of Housing Educators; American Society of Interior Designers; Interior Design Educators Council, Inc.