A STUDY OF PERCEPTIONS AND PREFERENCES FOR MULTIPLE-PATTERNED SURFACES USED IN RESIDENTIAL SETTINGS

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PREFACE

This study was undertaken for the purpose of studying human response to simple versus complex visual stimuli in interiors where surfaces of the interiors are treated with patterned materials. The objective of the study was to assess individuals' perceptions of and preferences for simplicity versus complexity of patterned surfaces in residential living room settings and determine if any relationship exists between the dependent variables of perception and preference and the independent variables of personality type, travel, cultural experiences, and sociodemographic variables.

Difficulties encountered in the study included: 1) a lengthy process to produce computer-generated perspective settings in slide form as the stimulus to operationalize the measurement of the variables, 2) homogeneous sample, and 3) the statistical analyses applied to the sociodemographic variables yielding inconclusive evidence of being influential.

This dissertation format deviates from the thesis style generally used by the Graduate College at Oklahoma State University. This deviated style replaces one traditional chapter format with Chapter V, a manuscript for submission

to a refereed journal for publication. The manuscript complies in fulfilling the traditional thesis requirements. The Publication Manual of the American Psychological Association, Edition Three, served as the style source for writing and formatting the manuscript, as well as writing the other chapters. The manuscript written in journal style is for submission to Journal of Interior Design Education Research. Additionally, the research content requires using colored visuals, in the form of color copies of photographs, which are contained in the Appendix. I appreciate the Graduate College allowing this deviation in style.

This research study would not have been possible without the guidance, advice, and support of many individuals. Dr. Margaret Weber served as my advisor throughout the research process. She has very patiently instructed and advised me through the entire lengthy struggle of completing this dissertation; my greatest appreciation is extended to her. Sincere appreciation is also extended to Dr. Dottie Goss, Dr. Beulah Hirschlein, and Dr. William Warde for their willing cooperation and assistance as members of my committee. Dr. Goss and Dr. Hirschlein gave welcome advice about organization and writing processes as well as encouragement to persevere. Dr. Warde gave invaluable advice and counsel in expediting the statistical analysis procedures.

Others have contributed in many ways. I thankfully acknowledge the faculty who taught the courses for my plan

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My greatest love and appreciation, however, goes to my wonderful family-my loving husband, Richard, my two sons, Tory and Tyler, and my daughter-in-law, Jennifer. Richard stood by me and supported me through all my years of pursuing higher education. He has been my best friend and staunchest supporter. He has willingly sacrificed financially and patiently endured my divided attention to reach this monumental, meaningful goal in my life. Tory, Tyler, and Jennifer have encouraged and cheered my efforts. I want to also acknowledge the great sacrifice and contributions to me of my late mother, Mrs. Alice Harris Pyron, to whom my education and career were so important. Her love for me and her pride in me live on.

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CHAPTER I

INTRODUCTION

Man's environment, both exterior and interior, is comprised of many surfaces. These surfaces are physical elements that are either vertical, horizontal, angular or curved; they can be either free-standing or built-in. They serve many purposes, such as dividing and structuring space to meet human needs. Surfaces provide forms with shapes, colors, and textures which assist humans in daily functions of life. They can also be the vehicle for aesthetic expression by decorating in unlimited ways to provide visual delight. When surfaces are decorated the elements of design, which are color, texture, line, form, and shape, are employed, whether consciously or unconsciously. Repetition of these design elements in an infinite variety of arrangements is termed pattern, which is a form of ornamentation.

The environment can be separated into a diversity of components for study of its effects on people. Ornamentation in the form of pattern is one of these components and is a property of many surfaces in behavioral settings (floors, walls, ceilings, and objects such as furniture). Human senses and perceptions are stimulated by

all of these surfaces and surface decoration, through pattern, contributes to visual sensory stimuli.

The person-environment interface, which is a dynamic relationship or relativeness between a person and the environment, is dependent on many factors, one of which is the built environment. Responsible for much of the built environment's design are professionals such as architects, interior designers, and landscape architects. It is rich in "affordances" or stimuli that affects human response and behavior. The word "affordances" expresses a concept coined by Gibson (1966), a psychologist who researched and wrote extensively on the subject of perception of the visual world and the person-environment interface. The elements of a physical setting, their arrangement, and characteristics of the materials of which they are fabricated are what make the setting usable by groups of people or individuals for their daily activities. This combination of properties is what Gibson labels as "affordances" which he says, also affect meaning and aesthetic appreciation of environments.

Using patterned textiles, wallcoverings, and floor coverings is a primary method to introduce into interiors physical elements or "affordances" that provide visual stimulation, variety, and interest. Information about the environment is processed through perception of such physical elements and is guided by an orderly, dependable combination of them as well as personal, human needs. This information processing is partially innate and partially learned; it

forms a link between perception and cognition and guides affective or emotional responses as well (Gibson, 1966; Lang, 1987).

Perception is an active and purposeful process, but several conflicting theories exist that attempt to explain it. The prominent theories of perception used in psychology and environmental science are Gestalt theory (Kohler, 1929; Koffka, 1935), transactional theory (Ittelson, 1960, 1973), and ecological theory (Gibson, 1966). These theories focus on the senses, sensory experiences and how they are put together in the brain, but each differs in the specifics of how the process occurs. Of the three, Gestalt theory has had the most influence in the design fields (Lang, 1987).

These theories approach the subject of meaning that humans attach to, as well as the emotional responses elicited by, the "affordances" of the environment. The emotion of pleasure correlates with feelings of preference--of liking or disliking. Individual attitudes, based on values and beliefs, determine affective or emotional meanings, and therefore, tastes.

Individuals differ in their perceptions and meanings of the environment and attitudes toward it. These differences have been studied and researched within many disciplines such as psychology, environmental behavior, environmental science, sociology and aesthetics. It is generally agreed that factors like culture, socioeconomics, personality, physiology, religion, and a myriad of life experiences all

impact on one's perceptions and meanings attached to component parts of the environment as well as to the environment as a whole. With so many factors impacting individuals it is understandable that attitudinal differences toward the formal aesthetic properties of the man-made environment result from the combined forces of them. It is the general consensus that these are factors impacting affective response in people, but how and to what degree are the questions most research in this area tries to answer. Personality, as a factor in perception and aesthetic preferences, has been the basis of some experimental studies (Barron & Welsh, 1952; Pyron, 1966; Sudalla, Vershure, & Burroughs, 1987). However, little evidence of systematic study of affective behavior and personality in relation to patterned surfaces in home interiors exists.

Interior designers frequently employ patterned materials in a variety of design solutions. However, too much pattern or complexity of visual stimuli, can make a room "busy" and overstimulating to the point of discomfort, and a room with too little pattern may be so simplistic in visual stimulation that it is perceived as stark and monotonous (Allen, 1990). Individuals vary in what they perceive and prefer as degrees of "busyness", as opposed to "starkness". What are the reasons for the variance of opinion?

The current movement in design fields is away from

Modernism's avoidance of visual stimuli and credo of "Less is More" toward Post-Modernism's embracement of ornament as language and credos of "Less is a Bore" and "More is More" (Dean, 1979). Research to date indicates people prefer more complex patterns than Modernism espoused, but such research has primarily focused on two-dimensional patterns (i.e., line drawings) rather than pattern seen in three-dimensional interior spaces. However, although most pattern on upholstery, walls, or floors is two-dimensional, it is viewed in a three-dimensional setting on three-dimensional forms.

Statement of Problem

Sensory stimuli of the environment and man's perception of such stimuli is a complex phenomenon that has been studied and researched from multiple viewpoints by people in a diversity of disciplines. Few studies, however, have addressed the subject of surface pattern as a visual sensory stimulus in interiors and human response to it. Little objective data are available on the subject of pattern and texture (Kleeman, 1981) and their use in interiors.

Home environments comprise much of the built environment; they are the most intimate of environments and have high affective significance (Rapoport, 1985). Therefore, the following questions are relevant. What role does patterned surfacing play in human perception of the environment, specifically the home interior environment?

Does use of pattern or lack of pattern affect human satisfaction with home environment? In what combinations are patterns on surfaces in homes perceived most favorably? Is visual complexity of interior surfaces in homes perceived most favorably? Is visual complexity of interior surfaces preferred over visual simplicity? Does one's exposure to other factors, such as travel or education make a difference in how pattern is perceived and attitude toward it? Do personality traits correlate in any way with an individual's choice of the type and amount of patterning that is preferred on surfaces of their personal home spaces? If so, in what ways? Insufficient answers to such questions is the problem leading to this research proposal. More research and study is needed of the phenomenon of patterned surfaces in interior spaces, human perception of them and human response to them, to assist environmental designers to better meet human needs.

Purpose and Objectives

The purpose of this research is to determine how individuals perceive the use of one or more patterns on surfaces in residential living room settings and their attitude toward the visual result. Other variables such as personality type, socioeconomic background, educational level, stress level, travel, cultural activities, and types of periodicals one reads are examined for relationship to one's perception and preferential attitude of patterned

surfaces in residential living room settings.

Objectives of this study are:

1) To assess individuals' perceptions of visual simplicity versus visual complexity in residential living room settings.

2) To assess individuals' preferences for visual simplicity versus visual complexity in residential living room settings.

3) To determine if a correlation exists between individuals' personality traits and their perceptions of and preferences for visual simplicity versus visual complexity in residential living room settings.

4) To determine if a relationship exists between the dependent variables of perceptions of and preferences for visual simplicity versus visual complexity in residential living room settings and the independent variables of age, socioeconomic factors, general stress level, travel experience, types of periodicals one reads and cultural activities in which one engages.

Assumptions

1) The subjects have the ability to respond accurately to the instrument.

2) Human perception and response to the environment comes through the senses and is influenced by a multiplicity of factors.

3) Man is a sensory creature, needing and responding to sensorial stimuli from the environment.

4) Pattern can be a component of visual stimuli.

Limitations

1) Purposive sample selection restricts the sample from being representative of the general population.

2) The study deals with only residential living room settings.

3) The settings used in the study tend toward depersonalization, incorporating only a few generic types of furnishings and accessory items.

4) The stimuli being used to measure perception and attitude are computer-generated color images in slide form. These visual presentations are less credible to viewers than an actual environment would be (Craik, 1968).

Definitions of Terms

The following defined terms are used in this study:

Aesthetics:

Theories and descriptions of the psychological response to beauty and artistic experiences.

Affordances:

A term, not in the dictionary, but coined by Gibson (1966) to mean all physical elements of an environment that provide visual stimuli through their characteristics of configuration and the materials of

which they are fabricated.

Complexity:

An intricate combination of physical elements in the environment.

Hedonic Value:

A variable used in psychobiological research that measures, through verbal or written judgments, such affective responses as pleasure, preference, or utility.

Interface:

To coordinate to or interact with smoothly.

Motif:

A recurring element in architectural or decorative design.

Pattern:

An artistic or decorative design resulting from the repetition of an element or motif on the surface of an object or material. Motifs that comprise patterns can be categorized into these broad categories:

1) Naturalistic or Realistic: a pattern made up of motifs which are natural and realistically represent nature in form and color.
2) Non-naturalistic, Conventionalized or Stylized: a pattern made up of motifs which are inspired by naturalistic objects, but their forms and colors are altered to negate a realistic appearance; instead, the object's form is simplified to its

basic qualities. It loses realism, yet what the motif is portraying can be discerned. It is derived from human imagination.

3) Geometric: a pattern made up of motifs that are basic geometric shapes and forms, such as plaids, stripes, and dots.

4) Abstract: a pattern made up of motifs that are non-representational.

Pattern Distributions:

1) No-Pattern: All surfaces in an interior space are solid color or no surfaces have applied ornamentation.

2) Single-Pattern: the use of only one patterned material in an interior space. It can be used on only one object/surface or many.

3) Multiple-Patterns:

a. Composite: the use of more than one pattern on surfaces or objects within the same interior space, but with one pattern being dominant and the others subordinate/accenting. The subordinate patterns are derived from the dominate one or are totally different from it, yet complementing it through motif, color, scale, or a combination of the three.

b. Recurrent: the use of only one pattern motif, but having the pattern recur in two or more colorways within the same room setting. The

unifying element is motif.

c. Transposal: the use of two or more differing patterns on surfaces or objects within the same interior space, but every pattern contains all of the colors being used (two or more). The unifying element is color.

An interior space can conceivably contain two or more of the multiple patterns in combination.

Perception:

The process of impressing on the mind or becoming aware of directly through the senses.

Preference:

Exercise of choice; the affective process of giving priority of one thing over another; like or dislike.

Ornament:

Adornment or embellishment of a surface.

Simplicity:

Freedom from complexity, intricacies, and elaborateness; minimal or no ornamentation.

Surface:

The exposed view of an interior plane and its treatment. The technical definition by Gibson (1950a, p. 3) is "a determinate visual surface with specific spatial qualities, i.e., texture, color, shape, slant, capability of being lighted and shadowed...impression of a closed contour."

CHAPTER II

LITERATURE REVIEW

Introduction

The environment is made up of many elements or components and the manipulation of these elements to fulfill a particular function results in design. Elements are generally listed as space, shape, form, line, light, color, texture, ornament, and pattern (Allen, 1990; Bevlin, 1977; Faulkner, Nissen, & Faulkner, 1986). From this postulated list of elements this study concentrates on pattern and its use on interior surfaces.

Pattern in interiors can be used minimally to produce design that is simplified, coherent, and less visually stimulating, or it can be used more profusely to create complex, ambiguous, and sensory stimulating design. People differ in their perceptive, cognitive, and affective responses to varying degrees of visual stimulation, from simple to complex. Aesthetics is a field of study under which the phenomena associated with such differences is studied.

This literature review examines several facets of the concept of pattern; 1) pattern as a visual stimulus and design element; 2) its historical use; 3) how the broad

concepts of aesthetics, perception, meaning, hedonic value, and preference interact to help explain human response to visual stimuli in the environment; and 4) relevant existing theories and research studies that correlate with these concepts. This literature review serves as the base for operationalizing the study for this purpose: to further the understanding of human response to visual stimuli in the narrowed focus of patterned surfaces in interiors. It is hoped that this effort will add to the knowledge base of environmental design, and specifically interior design.

Pattern As a Design Element and Visual Stimulus

Pattern, design, and ornament are words with numerous connotations which leads to some confusion in meaning. They are words that can be used both as nouns or verbs. A pattern can be a model of something one follows to produce an object, such as a dress pattern to produce a garment. The term as used by environmental designers, behavioral scientists, and psychologists means a configuration or array of visual entities, such as the pattern produced by the ordered spacing of bricks in a building facade, or the repetition of motifs in a carpet design. In the design disciplines, it is something the eye follows. It is an arrangement which is usually purposeful; therefore, it is a form of design. The term design connotes logical intention and some degree of originality. Design is inherent and inescapable in all facets of our surroundings, but

differences of opinion exist about what constitutes "good" design from "poor" design. Design enters into life and surroundings at various levels, from patterns of rural and urban design to the flower motifs on a chintz upholstery fabric (Pahlmann, 1960).

Ornamentation is embellishment of a basic structure and is a facet of decorative design (Allen, 1990). Pattern as a form of decorative design is actually one of several aspects of ornament (Camacho & Laughlin, 1985). Pattern results from orderly repetition of an element or motif over the surface of an object or material. It is characterized further by the motifs being large enough in scale, and with enough contrast in color or tone from the background and each other, to allow the eye to see them clearly. When motifs are so small, subtle, or blended as to be indistinguishable the design is transformed into texture rather than pattern (Allen, 1990). Pattern is interrelated with texture and it is often only visual. Alexander (1976) refers to pattern as "visual texture" and its visual quality is what appeals to humans. In subtle tone-on-tone patterns, called "self-tones", the pattern becomes literally part of the texture (Pahlmann, 1960). Damask fabric is a good example. Use of self-tones in the interior design field is prevalent; self-tones used on some objects or surfaces combined with more prominently patterned coverings on other objects or surfaces is frequently employed.

Pattern can be developed in one of two ways and

manifested in many forms. It can be directly applied such as printing on fabric or painting on wood, or it can be manifested through structural properties such as a plaid design woven into fabric or a chevron design laid into a brick wall. Pattern takes many forms and can be constructed from a wide variety of subject matter sources. All patterns, or combinations of patterns, can be placed into one of the following broad categories as sources of motifs: 1) naturalistic, which aims to realistically represent nature, 2) nonnaturalistic or stylized which aims to represent nature unrealistically, often employing human imagination, 3) geometric, and 4) abstract (See Definitions, Chapter I). Combinations of one or more of these categories is also a common mode of producing pattern (Camacho & Laughlin, 1985; Faulkner et al., 1986).

How interior surfaces are handled in respect to the materials and finishes used and whether they should be patterned or unpatterned (solid color) is a subject of debate and a question of aesthetics. That humans desire pattern on surfaces appears to be a valid assumption based on observing photographed interiors of peoples' homes that are featured in the popular "shelter" publications as well as the proliferation of patterned wallcoverings and textiles that manufacturers produce and consumers buy.

Fear of patterned materials, ineffective use of them, and avoidance are common practices by lay persons. Designers generally believe patterned surfacing materials

can enhance an interior space and it takes skill to combine them effectively. Although no definite or mandatory rules govern the use of pattern in interiors, general guidelines, based on formal aesthetics theory, can be followed in achieving pleasing combinations of single pattern or two or more patterns in a single room. The key to harmonious results when using multiple patterns is the function of determinant unifying elements. There needs to be a factor to tie them together and create a harmony of relationship. A statement from Allen (1990) coincides with this premise:

> A room should have no more than one bold pattern of the same type of design, such as a floral, except in rare cases. Once the dominant motif is established, it may be supplemented by a small pattern, a stripe, a check, or plaid, and appropriate plain textures if a common denominator is present throughout (p. 147).

The concept of pattern distributions developed by Myers (1985) creates categories of effective methods that can be used to order disparate elements into a unified whole in an interior. They simplify the task of introducing pattern into interiors and enable one to make combinations aesthetically and within the constraints of affective needs for varying levels of visual stimulation. An explanation of the pattern distributions used in this study are:

<u>No-Pattern (Solid Color) Distribution</u>

This distribution uses no patterned materials in an

interior space. All walls, floor, ceiling, window treatments, and furnishings are in solid colors. Usually a color scheme is established and shades, tints, and tones of the chosen colors are used together, with one color being dominant. This distribution is easy to achieve and usually gives a controlled, orderly sense, with minimal visual stimulation. An example can be seen in Appendix D, Figure 3

Single Pattern Distirbution

This distribution incorporates only one patterned material into an interior space; the single pattern can be used minimally or profusely, on one or many surfaces. A single pattern interior can be simple, coherent, and orderly, or complex and chaotic. It depends on the motif of the pattern, coloration, and number of surfaces covered. Most commonly, however, the single patten distribution uses the patterned material rather sparingly such as upholstery on sofa and chairs or for a window treatment, with all other surfaces being solid-colored using colors derived from the pattern. See Appendix D, Figures 4, 5, and 6 as examples.

Multiple Pattern Distributions (MPD)

The third pattern distribution uses two or more patterned materials together in the same interior or room. Mixing and matching of patterned materials in interior spaces is a common mode of decorating. MPD usually result in an increase of visual stimulation and complexity. The

key to harmonious results is the function of determinant unifying elements to create harmonious relationships. There are three sub-categories of multiple pattern distributions: 1) composite, 2) recurrent, and 3) transposal.

Composite. This is the use of two or more patterns on surfaces where one pattern, which gives the emphasis, is dominant in color, motif(s), scale or any combination of the three. Patterns of succeeding materials are derived directly from the dominant pattern or are totally different from it, yet complement it through either color, motif, or scale, which provides the unifying element. For example, a sofa upholstery fabric may have three different floral motifs in bold scale and it may contain five colors. This is the dominant pattern. Two chairs used in the grouping with it may be upholstered in a fabric using one of the colors from the dominant pattern and containing a curvilinear abstract pattern that is complementary in shape to the floral motif; the scale of the motif may be small or medium. The composite distribution is the most visually complex of the singular MPD. In Appendix D, Figure 8 is an example.

Recurrent. This is the use of only one pattern motif; the motif is in one color and this colored motif is used on different colors of backgrounds within the same room setting. The unifying element is the motif and the background colors should be harmonious. For example, the

same striped geometric pattern (motif) in off-white can be used in more than one background color. The background could be a dark value blue hue (navy) on a sofa, an intermediate value of orange (russet) on the chairs, and a high value of orange (peach) on a window treatment and/or one or more walls.

Transposal. This distribution uses two or more differing patterns on surfaces within the same room setting, but every pattern contains all of the same colors. The unifying element is color. For example, a sofa could be covered in an upholstery with a combination pattern of floral and stripes in three colors. The chairs are covered in a fabric with a different floral pattern, but complementary in scale and mood with the sofa pattern and the same three colors are again used. Window shades could be a small geometric pattern also containing the same three colors. Figure 7 in Appendix D shows an example of this distribution.

Most interiors can be categorized into one of these various pattern distributions. It is also possible to have an interior composed of any two or all of the MPD, which intensifies visual complexity. An example of a combination can be seen in Appendix D, Figure 9. This example combines the recurrent and composite MPD. The MPD are manifest in interior photographs of numerous decorating type periodicals on the market, available to the general public, as well as in professional interior design oriented publications.

Complexity and ambiguity are characteristics of all the multiple pattern distributions, but the complexity of them does not have to be synonymous with chaos. The nature of the distributions provides a structural order and harmony through the methods of combining the colors and motifs. Gestalt theory contends that order is a basic requirement for aesthetic appreciation of the environment; there needs to be some level of continuity in the visual field for order to be maintained (Arnheim, 1977). When different patterned fabrics, such as a drapery fabric and an upholstery fabric, are used in the same room and contain the same colors, yet have different motifs, the repetition and ordering of the colors provides the continuity. If order is perceived in high levels of complexity the pattern is judged as more pleasant, and is better received than if there is not that order (Arnheim, 1977). Learning and experience are said to affect peoples' perceptions of levels of complexity (Lang, 1987). Would multiple pattern distributions in interior spaces be perceived more favorably by people who have traveled extensively or who have higher levels of education?

Although the concept of pattern, as an element of design, has been used in design and art textbooks there has been little systematic analysis of pattern in the environment. However, one research study specifically focuses on pattern as a design component and the visual perception of it. In 1985, Camacho and Laughlin used

thirty-six samples of pliant wallcoverings with non-naturalistic all-over patterns for evaluation by subjects. The purpose was to determine the dimensions and organize the properties into a framework from which a definition for pattern could be formulated. The resulting definition is:

> The repetition of quantitative and qualitative elements in an artistic arrangement. This repetition occurs at regular measureable intervals or at irregular or random intervals. The artistry of arrangement is creative, imitative or a combination of the two (p. 254).

In another study Rodemann (1990) examined human perceptions and responses to selected surfacing patterns and found the higher the perceived movement or contrast of pattern, the greater was the expression of fatigue and distraction. Surface design, through pattern, contributes daily to stimulation of visual and emotional senses affecting physiological reactions such as skin temperature changes, heart rate, hormonal secretions, and time perception. Millions of dollars are spent to develop and promote thousands of pattern choices. Therefore, it seems sensible that environmental designers would make it a goal to develop a fundamental understanding of how humans view and respond to environmental pattern (Rodemann, 1990).

The Historical Perspective of Pattern Use

Historically, visual stimuli in the environment has been achieved by abundant surface ornamentation - applying

pattern and texture to every available surface. Artistic expression, skill, and pride of hand craftsmanship were the hallmarks of fine and applied arts for centuries. Studying the fine arts, decorative arts, architecture, interiors and furniture design from periods of history reveal elaboration of decorative design. Many decorative designs have survived the centuries of world history and continue to be revered and used in current society (Whiton, 1974).

The Industrial Revolution, which flourished in the 1800s, resulted in unprecedented developments in science and engineering, creating new systems for building that utilized steel, concrete, and glass in revolutionary ways. Most architects at the time largely ignored these developments and continued designing in imitative ways. Mass production provided great output of inexpensive, poorly designed "gingerbread" ornament that evolved into a merger of all past historical styles into one complexity of design given the name Victorianism. The character of this eclectic period was indiscriminate overuse and abuse of ornament (Jensen & Conway, 1982; Tate & Smith, 1986).

At the turn of the century ornament for the sake of ornament was the prevailing trend of popular taste. Eclecticism abounded. If ornament made something beautiful, then the more ornament used the more beautiful things would be, reasoned the Victorians! The use of ornament became so misused that Adolf Loos wrote a tract in 1908 titled Ornament and Crime; he believed that ornament was a crime -

a breach of morality (Jensen & Conway, 1982).

Beginning stirrings of rebellion against these excesses began to appear in the late 1800s. The pioneers of this rebellion made the first break away from the eclecticism of the time and were actually ahead of their time in progressive thinking. They are now referred to collectively as "Modernist pioneers" and the design movement for which they are credited is called "The International Style" or "Modernism." Among these pioneers were Josef Hoffman, Adolph Loos, Louis Sullivan, Le Corbusier, Frank Lloyd Wright, Walter Gropius, and Mies van der Rohe.

These early modernists believed in a utopian society. Their goal was to use architecture as a way of attacking social ills, as they saw them, among which were obsolete building techniques and the obsessive, indiscriminate use of ornament. Ornament, in effect, came to symbolize the old order and the excesses against which these creative idealists were fighting (Jensen & Conway, 1982; Wright, 1980).

Emerging theories of the modernists were bound up in the "machine aesthetic" or "functionalism." The Bauhaus, founded in Germany in 1919, became an institution of training in this new ideology of merging the machine and aesthetics. The credo of the Bauhaus and the early modernists was that design should be pure and should expose to view nothing at all that could be described as ornament. Quotes which epitomize the central theory of Modernism are

"The house is a machine for living," credited to Le Corbusier and "Less is more," credited to Mies van der Rohe (Jensen & Conway, 1982).

Characteristics of Modernism are simplicity of form and mass. Large, smooth, unadorned surfaces were to be seen in their pure geometric relationships. Design was devoid of any historical imitation; the basis for design was functional solutions to problems. Ornamentation and pattern were not considered "functional."

The Modernist ideology permeated the design world until the 1960s, at which time the Modern Movement's purist attitude and deliberate attempts to omit ornament and pattern in any form, from the design of both exteriors and interiors, came under serious attack. Venturi (1966) wrote the book Complexity and Contradiction in Architecture which served as a catalyst for Post-Modernism, a term coined to describe the movement in revolt against Modernism. The philosophy of Post-Modernism encompasses, among many other factors, a rejection of strict Modernist theory, particularly the absence of ornament. Therefore, the decades of 1970 and 1980 have witnessed a strong revival of interest in applied decoration of both exteriors and interiors of structures, as well as accoutrements for interiors.

The modernism prevalent in the twentieth century has made no reference to the past and little reference to human scale and human condition. Dean (1979) quotes Robert A. M.

Stern, a leading proponent of Post-Modernism, as saying,

> I think there is a human inclination to ornament one's self and one's surroundings. I am in reaction to the absence of ornamentation in architecture and to the substitution of elegantly patterned materials, such as marble or travertine, for an ornamental program (p.88).

The primary goal of most professional designers of the built environment has been clarity, simplicity, and a high degree of order. Rapoport and Kantor (1967) contend Modernism's simplicity has led to reduced sensory input from the environment. Purity and clean-cut lines have left nothing to divert or hold one's attention - hence, a loss of interest. An excess of order has resulted.

The Post-Modernist Movement has been interpreted by many designers as a statement by the public that they wanted to identify with the past to find meaning in contemporary society. This has been one of the premises on which Post-Modernism has founded its theory and why it espouses historicism. The United States Bicentennial in 1976 fueled this movement as Americans began to think more seriously about their roots and past history. The restoration trend forced designers to confront ornament, study its rules, understand why and how it was used and design anew using it, because ornament was an integral design feature of historical building. Appreciation has heightened for past decorative styles and richness of detail. People are wanting to incorporate this in contemporary design. The

public appears to be demanding more than Modernism's plain surfaces, in favor of "more color and visual intrigue (Jensen & Conway, 1982, p. 15)."

The Dynamic Relationship of the Person-Environment Interface

The person-environment interface, which is a dynamic relationship between a person and the environment, is dependent on many factors, one of which is the built-environment. Responsible for much of the built environment's design are professionals such as architects, interior designers, and landscape architects. It is rich in "affordances" or stimuli that affect human response and behavior. The word "affordances" is not in the dictionary, but is a word coined by Gibson (1966), a psychologist who researched and wrote extensively on the subject of perception of the visual world and the person-environment interface. Objects in the environment take many forms and forms exist through surfaces and edges. Floor, ceiling, walls, and furnishings are major object-forms used to define, divide and structure space to help meet human needs. Their arrangement, and characteristics of the materials of which they are fabricated, are what make the setting usable by groups of people or individuals for daily activities. They create surfaces that become part of the visual fields of spaces. Use of patterned textiles, wallcoverings, and floor coverings is a primary method to introduce into

interiors physical elements or "affordances" that provide visual stimulation, variety, and interest. Since pattern is an integral feature of many interior surfaces, it exerts a force and influence on the behavior, responses, and experiences of those who view and use the setting. Such an influence is part of a person-environment interface.

Information about the environment is processed through perception of physical elements or "affordances." This information-processing is partially innate and partially learned; it forms the link between perception and cognition and guides affective or emotional responses as well (Gibson, 1966; Lang, 1987). Human interaction with the environment is dependent on perception and cognition of one's surroundings. Perception is an active and purposeful process of becoming aware of, directly through the senses (Webster's II Dictionary, 1984). The prominent theories of perception used in environmental science are Gestalt theory (Kohler, 1929; Koffka, 1935), transactional theory (Ittelson, 1960, 1973), and ecological theory (Gibson, 1966). These theories focus on the senses and sensory experiences and how they are put together in the brain, but each differs in the specifics of how the process occurs. Gestalt and transactional theories tend to focus on the reception of sensory experience; ecological theory focuses on the senses as active and interrelated systems (Lang, 1987). Data derived from the senses of taste, hearing, feeling, smelling, and kinesthetics bear on the phenomenon

of perception, but the sense of sight has been the center of emphasis in research on aesthetics and perception of the physical environment in relation to human behavior and response.

The three theories of perception - Gestalt, transactional, and ecological - that have significantly influenced environmental designers help explain cognition and human response. Of the three, Gestalt theory has had the most influence in the design fields (Lang, 1987).

Gestalt theory (Koffka, 1935; Kohler, 1929) of perception is governed by principles of form and predicated on laws of organization of visual elements. Gestalt laws of visual organization form the basis for the analysis of combinations of elements into units that are perceived as either simple or complex. Governing all these laws of organization is the premise that psychological organization of a visual composition is as "good" as prevailing conditions allow. "Good" in this sense is not an evaluative statement, but simply means that "good" figures or elements of composition have characteristics of symmetry, unity, regularity, coherence or "maximal simplicity." Good Gestalt served as the basis of modernist design philosophy and implied that meritorious design occurs when "a form possesses the fewest articulated parts required to maintain its structure" (Lang, 1987, p. 189).

Form is fundamental. It is a closed and structured element of the visual world. The perception of form depends

on "laws" or categories of visual organization such as proximity, similarity, closure, good continuance, closedness, area, and symmetry. The "law of proximity" means objects that are close together are grouped or perceived together visually; this closeness makes interpretation of these sensory units to the brain clearer and easier. The "law of closure" means forms can be visually seen as incomplete, but are registered or perceived in the brain as being complete. Perceptual "constancy" is a phenomenon the Gestalt psychologists, as well as Gibson (1950a) observed, meaning that "perceptions or phenomenal objects kept their identity and their objective size, shape, and color despite variations in the retinal images with which they corresponded" (p. 23).

Gestalt theory also proposes that perceptions are organized into figures composed of lines, planes, and forms, which appear to have "dynamic" qualities. They appear to move, or to have qualities of lightness, heaviness, happiness or sadness (Lang, 1987). An example is line; a vertical line appears to be moving upward; a downwardly directed curvilinear line is associated with sadness (Alexander, 1976; Bevlin, 1977).

Transactional theory stresses the role of association and experience in perception and cognition. In this theory perception is thought to be a transaction between the observer, the environment, and the perception, which are interdependent on one another. Past experiences are

necessary for understanding new ones; there is a building process - a learning process involved. Perceptions are described experientially or structurally. Experiential descriptions refer to affective or feeling reports. Structural descriptions are concrete and report what is actually perceived in the physical world. Environmental designers perceive the world structurally more than other people do. One premise of transactional theory accepted universally is that it is multimodal (Ittelson, 1960, 1973; Lang, 1987). Therefore, peoples' life experiences such as travel and education, are worthy as variables to examine because transactional theory postulates that experiences shape what people pay attention to in the environment, what is important to them and what they respond to, either favorably or unfavorably.

The ecological theory of perception proposed by Gibson, (1966) is psychophysical and focuses on the senses as perceptual systems; it regards "The reality of sensory experience as a by-product rather than a building-block of perception" (Lang, 1987). Each sense is considered as a separate system, through which external information is obtained.

Gibson (1950a) theorized that:

> visual space-perception is reducible to the perception of visual surfaces, and that distance, depth, and orientation, together with the constancy of objects, may all be derived from the properties of an array of

> surfaces...the fundamental sensations of space are assumed to be the impressions of surface and edge (p. 367).

What is a visual surface? According to Gibson (1950a) a "determinate" visual surface is one with specific spatial qualities and a tabletop, a wall, or a floor would be examples of determinate visual surfaces. The qualities deemed essential for such a surface are: texture, color, shape, capability of being lighted and shadowed, impression of closed contour, slant/slope or definite direction (" a surface having the same slope or slant in all parts is flat; one having differing slopes is curved or bent", p. 368), and distance ("any segment of the world has a visible distance, from zero to a maximum" p. 369).

In one experimental study, to test his theory, Gibson (1950a) used wallpaper patterns in two textures - one very regular and one very irregular - photographed at four different degree-angle slants from perpendicular. These were used as the visual stimulus for subjects to view through a special apparatus to determine their perceptions of depth and distance based only on the cue of gradients of texture density in the photographs. The conclusion of these experiments was that there is psychophysical correspondence between retinal image of depth and distance of objects from the viewer and the viewer's perception of that depth and distance.

Surfaces of the environment vary from longitudinal to horizontal because of the property of slant or slope. The

further away from an observer a horizontal surface is, the more dense is its texture. This is an innate function of retinal image. This innate cue Gibson (1950b, 1966) claims, allows a person to recognize depth perception innately rather than through transactions with the environment; therefore, perception is an innate process. His statement reads:

> We do not have to learn that things are external, solid, stable, rigid, and spaced about the environment, for these qualities may be traced to retinal images...the objective world does not require for its explanation a process of construction, translation, or even organization...these impressions do not require any putting together since the togetherness exists on the retina (Gibson, 1950b, p. 187).

The conjectural stance of these contradictory theories of perception must be recognized by environmental designers. Despite differences, each has explanations worthy of study. There appears to be agreement among aesthetic theorists and psychologists on the following: 1) perception is multimodal; 2) movement through the environment affects perception; 3) Gestalt laws of form and organization are valid ways to order the environment, although they are seriously doubted as the basis of perception; 4) differentiating finer details and more classes of phenomena in the visual world is aided by association and experience. Individuals' views or perceptions of their surroundings depend on the physical

condition of the eyes, lighting conditions, motivation, purpose, and experience (Lang, 1987).

The Role of Perception in Relation to Meaning and Preference

The preceding section of this review discusses the technical aspects of physiological perception and theories of perception related to cognition. This section will examine the role of perception in relation to meaning and preference of visual stimuli in the built environment.

Human needs and their fulfillment are motivating factors behind human response and behavior related to the environment. Maslow (1943) suggested a hierarchy of needs which environmental designers have used as a framework for thinking about concerns for the built environment. These levels range from the most necessary needs at the base of the triangle to the level at the triangle's tip which is labeled self-actualization. They encompass needs that are physiological, sociological, psychological or a mixture of the three. The degree to which each need is fulfilled varies from person to person, depending on personality, culture, what one is used to, and philosophy of life. Aesthetic needs, which are psychological, are part of the highest self-actualization level. Pattern and ornamentation on interior surfaces of structures are in the area of aesthetics. For an individual to be concerned or interested in this component, the needs on the lower levels must be

sufficiently met by the standards of the individual.

Perception of the visual world is a physiological process, but retinal images are nothing without meaning attached to them. Some theorists believe meaning has to be supplied to things after the perceiver has registered their structure. "Transactionalists believe meaning is given as a perception takes place and that experience interrupts perception to give a new meaning" (Lang, 1987, p. 95). The visual world..."is meaningful as well as concrete; it is significant as well as literal" (Gibson, 1950b, p. 198).

How symbolic meanings develop is a complex phenomenon. The psychology of meaning is difficult to understand because the world is saturated with various levels or kinds of meaning. Gibson (1950b) lists several kinds: 1) the primitive concrete, 2) use meanings of objects for the satisfaction of needs, 3) meanings of machines, devices, and instruments. Two others listed that are most relevant to this study are: 4) "the values or emotional meanings of things which make the shapes of the world attractive or repulsive...", and 5) "the kind of meaning embodied in symbols...which are abstract. These last two are determined by culture and...are the most complex ...of the list" (p. 199). Things must be substantial before they can be symbolic. Environmental designers must be concerned with symbolism or meaning of the built environment because it is a major factor in how people like or dislike their surroundings (Lang, 1987). One way to achieve meaning in

the world comes through learning and learning is actually seeing and understanding the meanings of things through various life experiences; the two processes of learning and attaching meaning are closely related.

Information-processing and organizing are involved in learning processes because knowing how things are related in categories and how to use the categories is essential for existence. The ability to generalize from past experiences enables humans to function. How people respond to "affordances" in the environment depends on how they categorize the elements in the environment and associations built up over time (Lang, 1987). Spatial properties like color, form, and texture cannot be separated completely from one another; but symbolic (emotional) meanings are detachable from objects and presumably are learned. "Meaning is attached by association" (Gibson, 1950b). One person's symbolic, affective meaning attached to an object can differ from someone else's for the same object. Why do individuals' perceptions and preferences differ on viewing the same visual stimulus? What gives people pleasure and why? Among hypotheses of explanation are personality, organismic character, and social group membership, or culture (Lang, 1987). These are concepts which the field of aesthetics explores to answer these questions.

An understanding of attitude is basic to understanding emotional response. An attitude develops when a belief about something is combined with a value. People respond

with the emotional response of pleasure when patterns in the environment have a positive value for them. If patterns have a negative value the response is one of dislike. Values are the link between motivations, emotions, and behavior (Lang, 1987).

Aesthetics is the term used to describe a concern with the arts or sense of beauty. Perception and preference are active responses associated with exposure to artistic experiences; therefore, they can logically be studied in the context of aesthetics. The word, aesthetics, is derived from the classical Greek verb "aisthanomai", meaning to perceive (Berlyne, 1974; Lang, 1987). As the subject of debate for centuries, aesthetics has evolved into a field of study termed "empirical aesthetics" or "new experimental aesthetics" (Berlyne, 1974; Lang, 1987). The field is divided into three broad categories: 1) sensory aesthetics, 2) formal aesthetics, and 3) symbolic aesthetics, all of which are integral to aesthetic theory (Lang 1987).

Sensory aesthetics is concerned with the messages received through the sensory system. Most research has concentrated on the "higher" senses of vision and hearing because they are the most important in aesthetic appreciation of the environment. The concepts of pleasurableness and preference are bound up in sensory values. Ecological theory appears relevant here.

Formal aesthetics is related to sensory aesthetics by adding order to the sensory messages. It deals with

appreciating the assemblage of the structure or artifact under consideration in relation to "principles of design" such as proportion, rhythm, and balance. "Form follows function" or determinant organization is embodied in formal aesthetics, under which Gestalt theory can be placed.

Symbolic aesthetics refers to the emotional and associative qualities of meaning an observer or user attaches to the sensory and formal qualities of the environment. Positive aesthetic value is the result of something perceived as good or pleasing because of this associative value. People use symbolic material artifacts to communicate non-verbally with one another. Symbols people prefer and use around them may reflect self-perception and personality (Cooper, 1974; Lang 1987; Sudalla, et. al., 1987). Transactional theory appears to correlate to symbolic aesthetics.

From the perspective of these three categories a study of pattern on surfaces, how it is perceived, and exploring such variables as personality traits, socioeconomic levels, and cultural activities for their effect on preferences comes under the province of aesthetics. The field of aesthetics and aesthetics theory building is concerned with two goals: 1) identifying and understanding factors that associate perception of an object or process as beautiful or pleasurable, and 2) understanding the forces that activate humans to create aesthetically pleasing displays.

In studying aesthetics two broad approaches can be

taken: 1) study of the processes of perception, cognition, and explanation of phenomenon which can be placed under the category of "positive" theory; 2) study of aesthetic philosophies, ideologies, attitudes, and creativity which is under the category of "normative" theory. These two classes of theory are proposed by Lang (1987) as the basis for the body of knowledge in environmental design and practice. He asserts positive theory is unbiased, as value-free as possible and uses scientific methods to test ideas. It is concerned with explaining phenomenon associated with the person-environment interface and the formal qualities or structure of the environment. Positive theory also embodies the "praxis" or processes of designing. Normative theory is based on value-laden statements or philosophies of what should be, of what is good or bad. It is a set of ideologies and tenets of belief held by individual designers - both living and deceased - to which many design practitioners espouse. Both types of theory operate in the design disciplines and are part of the foundation knowledge and theoretical structure of them (Lang, 1987).

Another theory base, developed in the sub-field of aesthetics, is called empirical aesthetics; it studies the forms of behavior that are connected to works of art and other aesthetic phenomena. Methods and objectives are empirical with conclusions derived from controlled observation so the effects of one variable can be distinguished from other variables involved. Attention is

given to sampling procedures, research design, and statistical analysis of data (Berlyne, 1974). Most of the psychological research in this area focuses on structural (formal) characteristics of objects as the independent variable(s) and peoples' subjective feelings about them as the dependent variable. Characteristics of the object are correlated to characteristics of the response which are correlated with characteristics of the subjects in the study, such as cultural background, socioeconomic status, and personality (Lang, 1987).

Berlyne (1960, 1974) developed a psychobiological aesthetics theory of human exploratory response to visual stimulus patterns; it has its roots in Gestalt psychology. Much of Berlyne's research used three types of dependent variables, either singularly or together to derive quantitative data. These include verbal ratings, such as semantic differential scales, psychophysiological measures, such as bodily processes, personality traits, electroencephalagram measures, and behavioral measures.

The independent variables take the form of either 1) a synthetic approach or 2) an analytical approach. The synthetic approach consists of variables or factors that might play a role in aesthetic appreciation and designing stimulus patterns that could be isolated, operationalized, and manipulated for study. The objects or settings to which subjects responded would be simulated or artificial and relatively simple, yet be in such a form that they might

easily be associated with elements of the real thing. This often-used approach permits control over the independent variables. Two-dimensional line drawings of various shape and pattern configurations have been used extensively as well as three-dimensional models.

The analytic approach uses real art, music, or settings, not synthetic ones, but control of operative variables is more difficult. It also presents difficulty in knowing which variables affect the subject the most and how to validly measure them. However, both approaches have value and are thought necessary to experimental aesthetics research (Berlyne, 1974; Hunt and Roll, 1987).

Empirical aesthetics theory encompasses not only the concept of beauty, but other conceptual qualities as well, such as hedonic value, arousal, novelty, pleasantness, interest, complexity, simplicity, and even ugliness. These concepts play key roles in psychobiological research and bear on the objective of this study.

Hedonic value is the subjective emotional quality of visual stimuli. Berlyne (1960, 1970) hypothesized that aesthetic patterns produce positive or negative hedonic effects by acting on arousal. Positive hedonic values (i.e., like, pleasantness, interest) are provoked by 1) a moderate increase in arousal or 2) a decrease in arousal when arousal reaches such a high level that negative hedonic value (i.e., dislike, discomfort, disinterest) results. "Busyness" in interiors can create complexity and high

levels of visual stimuli; when stimulus patterns create too sharp a rise in arousal, aversion can result.

Designers are familiar with the design principle of unity with variety. Humans have limited tolerance for diversity, but become easily bored with too much of any one thing. The appeal of an aesthetic object or setting is dependent on the interplay of two sets of factors, one driving arousal upward, and the other to keep arousal within bounds to avert negative hedonic value. Therefore, a degree of visual tension or means of variety is necessary for physical and psychological well being tempered with visual coherence and order (Berlyne, 1974; Ellinger, 1963).

Berlyne (1960, 1970) studied the concepts of novelty, uncertainty, conflict, and complexity in relation to hedonic value. These interrelated concepts exist in interiors in varying degrees.

Novelty relates to new and unfamiliar information that must be processed by the nervous system for perception processes to be completed. Berlyne (1960, 1970) determined that positive hedonic value is provoked, not by maximum novelty, but by an intermediate degree of novelty, where the novelty stimulus is recognized cognitively, but with enough distinction to promote curiosity and interest. Visual stimuli too novel results in negative hedonic value.

Uncertainty and conflict are interrelated and both relate to novelty. Humans have a limit of ability to process environmental information through the nervous system

and so prefer a level of uncertainty which is near the level of ability to process. Stimulation below one's capacity of cognitive processing results in boredom and high levels of unfamiliar or unaccustomed variation can produce conflict through confusion, nervousness, and avoidance, also leading to negative hedonic value (Berlyne, 1960). Munsinger and Kessen (1964) also concluded every individual has an optimal perception rate (OPR) in dealing with visual stimuli, a degree to which one can cope. There is a wide margin of variety in the level of optimal perception rate, but there is probably an average capacity. However, devising methods to measure validly for these levels of OPR is a challenge. One's background and physical, as well as psychological, characteristics limit processing ability of individuals to resolve perceived conflict and greatly determines the degree of hedonic value.

Complexity is the concept related to variety or diversity in a stimulus pattern. Complexity increases with 1) the number of distinguishable elements, 2) dissimilarity between elements, if the number is held constant, or complexity varies inversely with the degree to which several elements are responded to as a unit. Under Gestalt theory (Koffka, 1935; Kohler, 1929) the concepts of simplicity and coherence apply to perception and positive hedonic value, since "good" figures or visual stimuli depend on simplicity, regularity, and symmetry, which are attributes opposite to complexity properties.

Past research suggests that humans are stimulus seeking. Psychological research reviewed by Rapoport and Kantor (1967) led them to believe that humans have an innate need for visual stimuli in their environment. People appear to prefer and choose complexity over simplicity from infancy onward (Cohen & Trostle, 1990; Fantz, 1958; Nachman, Stern and Best, 1986). Complexity should not be confused with chaos of environmental elements, but rather a factor of the unfamiliar, an element of surprise that invites the viewer to participate visually, mentally, and emotionally. There should be an "environmental unfolding"; diversity, variety, and richness of interior spaces help fulfill this need (Pyron, 1971).

Past studies on human perception of visual complexity versus visual simplicity include information from several perspectives not directly related to the purpose of this study, yet having an indirect relationship. Some have focused on the larger urban environment to assess perceptions and responses to its structures and landscapes (Pyron, 1971, 1972; Sanoff, 1974), whereas others have focused on perception of buildings and ways to measure cognitive and emotional levels used to describe these perceptions (Cantor, 1969; Craik, 1968; Kasmar, 1970; Sommer, 1965).

Another approach studied perception and response to popular, classical, and avant-garde literature, painting, and music in relationship to personality differences. In a

study by Pyron (1966) these three art aesthetics and three art mediums were studied as a function of personality factors. Persons highest in rigid attitudes and preference for simplicity of perceptual organization rejected avant-garde art (which is more complex and ambiguous) more than those who accepted change, were more sociable and more complex in perceptual organization.

Correlating to Pyron's study is one by Barron and Welch (1952) in which subjects who were conventional and conservative displayed strong preferences to simple and symmetrical visual stimuli of artistic figures while subjects who were more maverick in attitude and action preferred complex, asymmetrical visual stimuli. Among the second group were some artists; artists and non-artists differed significantly in their preferences, with the artists being more accepting of the complex stimuli.

Pyron (1971, 1972) conducted a study using a scale model of an urban setting with building exteriors to which subjects responded with opinions and perceptions about features of the stimuli. This study concluded that a preference for complexity over simplicity was preferred.

A study by Cohen and Trostle (1990) used simple pictorial contexts of school surroundings and measured for environmental preferences for size, shape, color, complexity, texture, and lighting. Principal findings indicated that boys and girls respond differently to environmental stimuli, with girls showing a stronger

preference for more diverse, complex surroundings.

Research by Sudalla, et al.(1987) on human behavior and affective meaning as a function of both the individual's personality and the environment in which he lives showed that housing attributes, particularly of interiors, are representative of the occupant's social identity and personalities. Owner's personality traits were significantly identified by strangers when shown slides of the home's interiors and exteriors and asked to check scales between a list of bipolar environmental descriptors. People's responses and feelings toward an environment are linked to cues embedded within the environment - cues as to function of the space, personalities of the people inhabiting the space, and appropriate behavior in the space (Kasmar, 1970). Studies to elicit descriptive adjectives by people of various environments have revealed people tend to respond emotionally rather than rationally - a response that is beyond the focus of awareness. They are not sure what it is about a room that affects them; they are unable to express specifics (Sommer, 1965).

Summary

Interior design is a profession concerned with designing interior spaces of structures in such a way that human needs can best be met functionally and aesthetically. There are many devices available to assist in achieving this end result. One of these is using patterned surfacing

materials for walls, ceilings, floors, and upholstered furniture. Patterned surfacing has historical precedent and current society is placing a strong emphasis on this technique following the International Style of decoration in which decoration in any form was considered "a crime."

Patterns for surfaces take many subject matter forms and can be combined in various ways. Patterned surfaces, as opposed to solid colored, can provide varying effects from simplistic to complex. A space can be designed with the use of only one patterned material (Single Pattern Distribution) or with two or more patterned materials (Multiple Pattern Distribution) Methods for combining multiple patterns within the same space can be categorized into the following distributions: composite, recurrent, and transposal. People perceive and respond to these distributions with differing degrees of like and dislike. Because many interior designers utilize these pattern distributions for interiors, it would be helpful to have some insight into how people perceive them and to know if personality traits have any correlation to clients' acceptance or rejection of them.

Perception of the visual world is an active physiological process. There are several theories that exist to explain it, among which are Gestalt theory, transactional theory, and ecological theory. These physiological processes are coupled with affective processes that give symbolic meaning to environmental artifacts. It is the affective process that correlates with feelings and

constitutes individual preference - a like or dislike of something. Affective meaning is influenced by many factors, among which are personality traits and life experiences. There is some research evidence that characteristics of extroversion and introversion affect one's preference for visual stimulus in degrees from complexity to simplicity.

Few research studies directly related to pattern use in interiors were found. Past research studies involving aesthetics and human perception of the environment in relation to personality and preference used two-dimensional object line drawings, or urban scenes emphasizing patterns of structural facades and landscaping. Most have been conducted in the fields of psychology and environmental science. Results of these studies indicate a human preference for visual complexity. Individuals are believed to have an optimal perception rate (OPR) for taking in and adjusting to visual stimuli, but that OPR has not been definitively set, because of problems to validly measure for it (Munsinger & Kessen, 1964; Rapoport & Kantor, 1967).

Complexity is one of the characteristics of pattern (Camacho & Laughlin, 1985); therefore, complexity characterizes the multiple pattern distributions. These distributions can introduce a high degree of visual stimulation, yet each has structure and orderliness because of the coordinating factors of color and motif. Humans can tolerate and even prefer complex visual fields if there is perceived order to them. Patterns will be perceived as less

pleasurable or disliked if order is missing or the person cannot discern the order (Lang, 1987).

Contributions of the behavioral sciences to environmental design theory is primarily in the area of visual qualities of the environment. Research in the interior design field can benefit from theories generated by behavioral scientists and make application of their theories to study phenomena in design. This study is an attempt to use Berlyne's theory of hedonic value from empirical aesthetics and apply it to interior design. This study incorporates Berlyne's theory, by expanding the operational parameters of two-dimensional figures which Berlyne used in many experiments, to patterned surfaces typically seen in residential interiors. Examination is made of the concepts of complexity versus simplicity of visual stimuli in living room settings to test the theory of human perception of novel and complex forms over simple ones. If humans have an innate need for complexity over simplicity, then a study examining the use of multiple pattern distributions in interiors, which create a form of visual complexity, could benefit the body of knowledge existing on this subject.

CHAPTER III

METHODOLOGY

Introduction

Few research studies have explored human perceptions and preferences of visual stimulation in the form of pattern on surfaces in three dimensional interior settings, in relation to other variables such as personality traits, demographics and cultural background information. A primary obstacle in such a study involves the problem of how to operationalize the visual stimulus for the measurement of response. Individuals are believed to have an optimal perception rate (OPR) for taking in and adjusting to visual stimuli, but that OPR has not been definitively set because of problems to validly measure for it (McReynolds, 1960; Munsinger & Kessen, 1964; Rapoport & Kantor, 1967). This study attempts to operationalize measurement of individuals' perceptual and preference responses for complexity of visual stimulation in interior settings, rather than using two-dimensional shapes or objects, landscapes, and exterior facades of structures as past studies have used (Barron & Welsh, 1952; Berlyne, 1960, 1974; Bierderman, 1986; Nachman, et al., 1986; Pyron, 1966, 1971, 1972).

The purpose of this study is to determine if

relationships exist between individuals' personality traits, selected cultural experiences, socioeconomic status and their perceptions and preferences for simplicity versus complexity of visual stimulus in interior settings. Variables used in this study are identified in diagrammatic form in Figure 1. These variables are inspired by past research in the fields of aesthetics, psychology, and environmental behavior, but they are operationalized differently for the purpose of application to the field of interior design. It is hypothesized that human perception of and preference for varying degrees of visual complexity in interiors is influenced by factors such as patterned surfacing materials used in interiors, personality traits, frequency and destination of travel experiences, cultural experiences and activities, types of magazines one reads, stress levels, and socioeconomic factors.

Research Design

This study is descriptive as it describes and interprets what is. Descriptive studies try to assess conditions, relationships, opinions, effects, or trends. Descriptive studies are non-experimental and require extensive previous knowledge of the problem to be researched or described (Best, 1981). It is assumed that the researcher will be able to appropriately measure the problem under study (Adams & Schvaneveldt, 1985). A pilot study, using a random sample of 50 adult women from a large

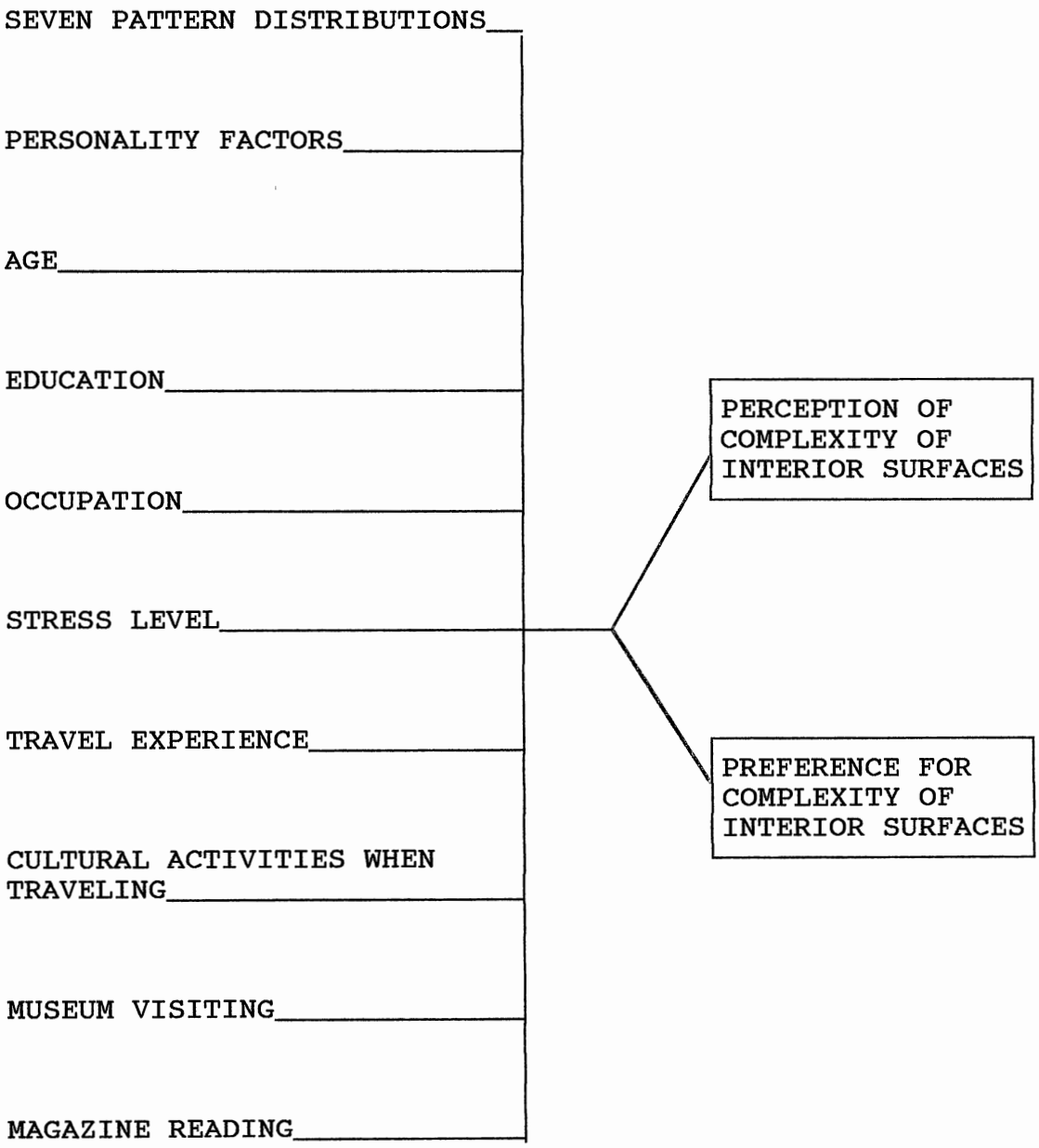

Figure 1 Variables of the Study

metropolitan church was carried out prior to initiating the actual study. This procedure aided in 1) verifying the length of time required for subjects to complete the questionnaire, 2) refining the verbal instructions, and 3) randomly arranging the slide order.

Sample Selection

This study utilizes a non-probability sample which is "a procedure for building a sample based on cases, individuals or communities judged as being appropriate or very informative for the purpose of the research" (Adams & Schvaneveldt, 1985, p. 183). Females 20 years old or older comprise the age group ($\bar{X}$ = 46 years). According to an American Society of Interior Designers (ASID) Residential Design Survey (1988), females are the principal decision makers about decorating decisions for residential settings. The survey revealed that in the West and South regions of the United States the living room was cited as the most frequently redesigned room. The typical client for 53% of the designers surveyed was married (84%) and in the 40-49 age group, with age 47 being the average. The rationale for using females for the sample and using living room settings for this study is based on the results of this ASID survey.

The non-probability sample consists of 250 volunteer adult female subjects who are members of various women's organizations in a large southwestern city. Subjects are from such groups as Cooperative Extension Homemaker Groups,

a PEO chapter, a Pen Women chapter, Quilter's Guild, museum docents, and Christian women's groups. Prior to contacting groups to gain their interest and participation in the study the researcher applied for and was granted permission to use human subjects by the university's Institutional Review Board (see Appendix F). The researcher personally contacted the presidents of various women's groups and explained the research study and requested the club's participation. A $2.00 per participant donation was made to club treasuries as an incentive for members to participate.

This non-random method of obtaining subjects and restricting the sample to females 20 years old or older limits the findings for generalization purposes. Nevertheless, insight is provided into people's perceptions of interior settings designed with either no-pattern, single pattern, or multiple pattern surface materials.

Instrument Development and Procedure

The data-gathering instrument involved an intensive development process. It is a self-administered questionnaire in two parts (see Appendix A). The first part is a professional personality instrument to assess personality traits and the second part is a questionnaire developed by the researcher to obtain demographic and background data and assess perceptions of and preferences for visual simplicity versus visual complexity toward patterned surfaces in the design of living room settings.

The study objectives guided the decisions of what items to include and wording of them.

The personality trait instrument used for the study is Cattell's Sixteen Personality Factor Questionnaire, (16PF) Form C, developed by Cattell (1969) for ages 16 and over. It is designed to measure traits of normal functioning adults which become independent variables for the study. The 16 primary independent factors (traits) that can be measured are: reserved versus outgoing; less intelligent versus more intelligent; affected by feelings versus emotionally stable; humble versus assertive; sober versus happy-go-lucky; expedient versus conscientious; shy versus adventuresome; tough-minded versus tender-minded; trusting versus suspicious; practical versus imaginative; forthright versus shrewd; self assured versus apprehensive; conservative versus experimental; group-dependent versus self sufficient; undisciplined versus controlled, and relaxed versus tense.

In the 16PF the structure of personality can be described either in terms of the 16 primary factors (traits) stated above, or of eight broader second-stratum or secondary factors. The primary factors give the most information and it is advocated that higher strata structure be used only as supplementary concepts (Cattell, Eber, & Tatsuoka, 1970). "Second-stratum source traits can be recognized only so far as our primary trait analyses are sensitive enough to define the correlations which exist

among primaries" (Cattell, et al, 1970, p. 111). The second-stratum factors are: introversion versus extroversion; low anxiety versus high anxiety; emotional sensitivity versus tough poise; subduedness versus independence; low ego control versus high ego control; neuroticism versus adjustment; low leadership versus high leadership, and low creativity versus high creativity.

Subjects' primary factor scores were first derived from hand scoring each subject's response sheet on the 16PF. From these primary factor scores the eight second-stratum scores were computer-generated for each subject. These scores were coded into these categories of sten scores as: 1 = Low; 2 = Average; 3 = High (Administrator's Manual for the 16PF, 1986).

These eight second-stratum factors are based on or correlated to scores from specific primary factors. For example, the first second-stratum factor of introversion versus extroversion is derived from the scores of these primary factors: cool versus warm; shy versus bold; sober versus enthusiastic, and group-oriented versus self-sufficient.

Many previous studies have used Cattell's 16PF in which personality traits were independent variables. The reported reliability estimates exceed r =.70. Form C is written at reading level 6.5, contains 105 items, and takes 25-35 minutes working time (Administrator's Manual for the 16PF, 1986).

The format of the instrument is in the form of two booklets with 8 1/2" X 11" pages. Booklet #1 is the reusable 16PF test booklet, originally bound with a black plastic binder. Booklet #2 is the set of response sheets for the questionnaire, bound in a white plastic binder. The reason for using the two colors of binders is to color code the booklets for ease of reference when oral instructions are given for how to use them. Plastic binders enable pages to lie flat when opened. The first page of the response booklet is the 16PF answer sheet, on which subjects record answers to the items as they read and respond from the reusable test booklet. These response sheets from the 16PF test provide the independent variables of personality traits.

Following the personality test answer sheet in Booklet #2 is the section designed to determine the dependent variables of subjects' perceptions of and preferences for the various pattern distributions, which correlates to Objectives #1 and #2. Perception measurement uses the semantic differential technique (Osgood, Suci, & Tannenbaum, 1957) of bipolar adjective pairs with a Likert scale for each pair. It is recommended for research that uses the semantic differential technique, and which is statistically analyzed with factor analysis, that there be a minimum of ten subjects per bipolar adjective pair of scales (Kerlinger, 1985). The questionnaire contains 22 such pairs to be factor analyzed. Therefore, the total number of 250

subjects meets this criterion for performing factor analysis on the data. Selection of the 22 adjective pairs was based on a list developed by Kasmar (1970) as descriptors to measure environmental settings. The questionnaire contains a page of the 22 bipolar scales for each of the seven slides to which subjects respond as each slide is shown. A random selection process determined the order of the 22 adjective pairs for each slide, to help alleviate a possible problem of subjects responding to succeeding slides without a cognitive thought process. Subjects also respond to a seven-point Likert scale at the bottom of each page to indicate the affective function of like versus dislike. Following the semantic differential sheets for each slide is a sheet to rank preferences for the settings as slides are viewed in pairs.

The final three pages in Booklet #2 are designed to obtain demographic (e.g., age, education, income, occupation) and background information on each subject (e.g., stress level ranking, travel experience, cultural activities, and types of magazines read).

A challenging problem arose over deciding the best method to use to create a visual image of interior living room settings to which subjects would respond, yet eliminate as many sources of bias as possible. Consideration of several solutions led to experimenting with computer-generated images for the settings. An architect with a large architectural firm that uses state-of-the-art

computer-aided drafting equipment agreed to be hired to execute the seven interior settings. The elements in all the settings remain identical with the exception of surface materials on walls, floor, window covering, and upholstered furniture. Through the technique of scanning images into the computer, the architect was able to make the settings change visually by scanning-in images of various patterned materials for upholstery fabric, window treatment fabric, area rugs, and wall treatments in the seven settings. The materials used were selected to produce the pattern distributions the study uses to test hedonic value theory explained in the literature review. The pattern distributions range in visual stimulation from simple to complex. Slides of these computer images of living room settings can be projected onto a large white surface for subjects to view and respond to on the questionnaire.

This method of achieving the environmental displays, although expensive and synthetic, seemed the best for 1) physical practicality and 2) internal validity and lessening the problem of bias. The best solution to the problem of bias was to keep all the elements and arrangements identical and use as generic a style as possible in all the settings, such as furniture, accessories, window treatment style, view outside the window, and lighting levels/sources. The only changeable elements from setting to setting were the patterns of materials on the surfaces. Therefore, the assumption is that the subjects' responses are to pattern

distribution changes rather than other visual factors. The final result of the computer-generated settings is that they appear remarkably like realistic photographs (see Appendix B).

The basic color scheme of the settings uses shades of red (burgundy) and blue (navy). The rationale for this choice is because the order of color preference by subjects ranks blue as first choice and red as second choice (Wagner, 1986). Earlier consideration to use black and white color settings to eliminate the bias of color was rejected in favor of using color, based on the fact that the natural environment, whether exterior or interior, is in color; therefore, color in the settings would be perceived with less negativism than an unnatural black and white view. Another factor that favored using color in the slides of room settings is that the visual effect and success of the multiple pattern distributions is dependent on color usage.

The researcher administered the distribution and collection of the instrument. Verbal instructions were given (see Appendix C), as well as written instructions included on each response page.

A large seminar room, with tiered levels of seating and dimmable lighting served as the data collection site. The lighting was at high level for subjects to enter and take their seats. The light level was dimmed as low as possible, yet high enough for subjects to see the response sheets to read and mark them. The rationale for using 8 1/2" X 11"

white pages and #12 font size is to enable seeing the pages and print in the lowered light level. Slides were projected onto the viewing surface in a 5' X 7' size. A random selection of numbers one to seven provided the random order for slide projection. Slide 1, the most simple No-Pattern (solid color) Distribution, for example, was viewed by subjects sixth in the viewing order. The average length of time for each subject to complete the questionnaire was one hour and fifteen minutes. Upon completing the questionnaire each subject received a handout booklet which contains information about pattern motif classifications and pattern distributions. A cover letter on the front of the booklet states the basic topic of the research, thanks the participant, and states assurance of confidentiality in written results. Naming the research university assists in giving credibility to the project (see Appendix D).

Data Analysis

To measure for relationships among the dependent and independent variables of this study several statistical methods were used. They are factor analysis with varimax rotation, analysis of variance, Duncan's multiple range test, Pearson product moment correlation, and cluster analysis.

Factor analysis is an appropriate analysis technique to use to analyze the dependent variable of perception of visual simplicity versus visual complexity of pattern on

interior surfaces. When the semantic differential technique (Osgood, et al, 1957) is used in a questionnaire to obtain subjective data from subjects (e.g., opinions and perceptions) factor analysis is a method which can be used to reduce and summarize such data and determine items that factor together (Kerlinger, 1985; Rummel, 1968). These reduced factors become the independent variables against which perception and preference can be measured for possible relationships. The 22 bipolar adjective scales used in this study were reduced to three factors after factor analysis and varimax rotation. The three factors which emerged were named 1) aesthetics, 2) stimulation, and 3) organization.

Analysis of variance was used to analyze if differences existed in subjects' perceptions of each of the three factors that emerged to each of the seven slides that represented a progression of visual stimulation of pattern on surfaces from most simple to most complex. Results showed significant differences existed. Duncan's multiple range test discerned the specific differences which are discussed in Chapter IV.

Analysis of variance was also used to analyze if differences existed in subjects' preferences for each of the seven slides, using one bipolar adjective pair - like versus dislike. Results showed significant differences of preference did exist. Duncan's multiple range test determined the specific differences. These results are recorded in Chapter V.

Internal validity of this subjective preference rating of the seven settings was tested by showing the slides of the settings in pairs and asking subjects to choose, by checking which one in the pair was the most preferred or liked. The mean scores of preference for each slide setting, using the pairs, were summed and analysis of variance revealed significant differences in these mean scores for preference. Duncan's multiple range test revealed very similar results to the first method of data collection and analysis for preference. These results are recorded in Chapter V.

Pearson product moment correlation method of analysis was used to determine if any correlation exists between subjects' personality traits and their preferences of visual simplicity versus visual complexity of patterned surfaces in interiors. Results, as recorded in Chapter V, show that few personality traits correlate significantly with the variables of perception and preference and those that do have low positive or negative correlation.

Analysis of variance was applied to each of the sixteen primary and eight secondary personality factors and three perception factors to determine any differences in means. Each personality trait was assigned three levels of high, medium, and low. For example, for the trait of cool versus warm, the high level applies to all who score 8 through 10 on a ten-point scale; this is the "warm" end of the scale, meaning warm in personality or more extroverted. Low

indicates those whose scores are 0 - 4 meaning "cool" in personality or more introverted. The medium level scores are 5 - 7 and refer to an average or balance between warm and cool. Very few differences in means of these three levels to each of the three factors of perception were revealed in the analysis of variance. Results are discussed in Chapter V.

Cluster analysis was applied to the socioeconomic data. The rationale for this decision and the findings, which did not produce usable results, are discussed in Chapter VI.

Summary

Past psychological and environmental behavioral research has been conducted to examine human perception of and preference for degrees of complexity in visual stimulus; however, in none of these research efforts have interior settings and use of pattern through patterned interior materials been used as variables. Therefore, this descriptive research study is designed to apply theory from these fields of research and operationalize these variables to the field of interior design. Operationalization of independent variables is done through:
1) computer-generated interior settings made into slides with each setting progressing, through the use of patterned surface materials, from simple to complex in visual stimuli, 2) Cattell's 16PF personality factor test and, 3) a questionnaire to determine perceptions and preferences of

subjects and obtain demographic and background information.

The sample consists of 250 adult women 20 years old or older who served as volunteer subjects. Data collection took place in seminar rooms with dimmable lighting, where the slides of the settings were projected onto a large white surface for subjects to view, respond to and complete the questionnaire.

Methods used to analyze data were factor analysis, analysis of variance, Duncan's multiple range test, Pearson product moment correlation, and cluster analysis. Results are discussed in-depth in Chapters V and VI.

CHAPTER IV

CHARACTERISTICS OF THE SAMPLE

Frequency distribution tables show the characteristics of the sample. Demographic and socioeconomic variables reveal the following:

For the age distribution of the 250 subjects, 17 (6.8%) were age 20-29, and 18 (7.2%) were age 70 or older (see Table 1). These two categories represent the two extremes of youngest and oldest and are almost equal in number. The remaining four groups are also closely equal to one another, and more than double the size of the two extreme age groups. In the age 30-39 range are 45 subjects (18%). In the 40-49 range are 53 subjects (21.2%); it is this age range that the ASID Residential Survey (1988) found to comprise the typical client, with age 47 being the average. The average age for this study is 46 years. In the 50-59 range there are 61 subjects (24.4%). This is the range that comprises the highest number of subjects in the study. There are 56 in the 60-69 age group (22.4%).

TABLE 1

FREQUENCY DISTRIBUTION OF AGE

VARIABLES	n	%
1. 20 - 29	17	6.8
2. 30 - 39	45	18.0
3. 40 - 49	53	21.2
4. 50 - 59	61	24.4
5. 60 - 69	56	22.4
6. 70 and above	18	7.4

This sample is well educated with over one-half (136) or 54.47% holding B.S., M.S., or Ph.D. degrees. Only two subjects (0.8%) did not complete high school. Of the remaining 112 subjects, 88 went beyond high school graduation to pursue some higher academic training, but did not complete a four year college degree (see Table 2).

TABLE 2

FREQUENCY DISTRIBUTION OF EDUCATION LEVEL

VARIABLES	n	%
1. Below High School	2	0.8
2. High School	24	9.6
3. Vocational/Technical	5	2.0
4. Some College; no degree	77	30.8
5. Associate Degree	6	2.4
6. B. S. or B. A Degree	84	33.6
7. Master's Degree	44	17.6
8. Ph.D. Degree	8	3.2

Table 3 reveals the majority of the subjects have a higher than average financial status with 142 (57.3%) having household incomes of $40,000 or above. Fifty-five (22.2%) have incomes of $60,000 or above. Only 25 (10.1%) have annual incomes below $20,000.

TABLE 3

FREQUENCY DISTRIBUTION OF INCOME LEVEL

VARIABLES	n	%
1. Below $10,000	3	1.2
2. $10.000 - $19,999	22	8.9
3. $20,000 - $29,999	39	15.7
4. $30,000 - $39,999	42	16.9
5. $40,000 - $49,000	54	21.8
6. $50,000 - $59,000	33	13.3
7. $60,000 - Or Above	55	22.2

N = 248

By studying Table 4 it is seen that occupations cited by subjects in item #4, Part II, of the questionnaire show a broad range from professional categories to homemakers. Subjects' responses were categorized into ten different categories, taken from the listing used by United States Bureau of the Census (1990). The categories with the largest percentages of respondents are 1) Professional/ Technical, with 62 subjects (24.8%), 2) Manager/ Administrator, with 23 subjects (9.2%), 3) Service Worker, with 47 subjects (18.8%), 4) Retired, with 30 subjects (12%), and 5) Homemaker, with 78 subjects or 31.2%. Only

ten subjects fit into the remaining five categories of Salesworker, Clerical, Craftsworker, Government, or Student. These statistics reveal subjects fitting into two extremes of occupations, 1) professional/service and 2) retired and/or homemaker. Homemakers comprised 31% of the total sample.

TABLE 4

FREQUENCY DISTRIBUTION OF OCCUPATION

VARIABLES	n	%
1. Professional/Technical	62	24.8
2. Manager/Administrator	23	9.2
3. Sales Worker	3	1.2
4. Clerical	2	0.8
5. Crafts Worker	1	0.4
6. Service Worker	47	18.8
7. Government	2	0.8
8. Retired	30	12.0
9. Student	2	0.8
10. Homemaker	78	31.2

These statistics on age, income, education, and occupation show consistency among these variables. Professional occupations are most often filled by persons who have pursued and achieved higher educational levels and this in turn leads to higher income levels. Ages between 30 and 60 are ages for greatest earning power. The number of retirees in the sample may be reflected in the 29.6% who are age 60 or above.

Spouse's occupations, (see Table 5), tended to cluster among three categories, 1) Professional/Technical, 2) Manager/Administrator, and 3) Retired. These clusters also coincide with and help explain the high household income levels of the sample. Only 196 subjects listed a spouse's occupation, leading to the conclusion that 54 subjects are single.

TABLE 5

FREQUENCY DISTRIBUTION OF SPOUSE OCCUPATION

VARIABLES	n	%
1. Professional/Technical	94	48.0
2. Manager/Administrator	35	17.9
3. Sales Worker	5	2.6
4. Clerical	3	1.5
5. Crafts Worker	2	1.0
6. Machine Operator	1	0.5
7. Laborer	1	0.5
8. Farmer	2	1.0
9. Service Worker	7	3.6
10. Government	3	1.5
11. Retired	38	19.4
12. Student	5	2.6

N = 196

Table 6 shows stress level, scored on a seven-point bipolar scale of low to high, is in the high range for 116 or almost half (46.4%) of the subjects; the low range accounted for 71 subjects or 28.4%, and the moderately stressed subjects numbered 63 for 25.2%. These figures

indicate more subjects are victims of stress in their lives than those who are not. The high stress levels may be an indicator of the pressure and responsibility felt from high level jobs, income, and many other factors of current society.

TABLE 6

FREQUENCY DISTRIBUTION OF STRESS LEVEL

VARIABLES	n	%
1. Very Low	10	4.0
2. Low	34	13.6
3. Moderately Low	27	10.8
4. Moderate	63	25.2
5. Moderately High	58	23.2
6. High	43	17.2
7. Very High	15	6.0

The independent variables of travel experience, for one week or more at a time, are divided into the categories of 1) travel inside the United States, and 2) travel outside the United States. The four levels of these factors are 1) 0 times, 2) 1-4 times, 3) 5-8 times, and 4) often or over 8 times. Results, shown in Table 7, indicate a well-traveled sample with 186 (74.4%) having traveled over eight times inside the United States. Of the 250 subjects only 2 have not traveled outside their state of residence for one week or more in their lifetime. Travel outside the United States

also shows a well-traveled sample. Only 70 or 28% have never traveled outside the United States. Twenty nine or 11.6% have traveled outside the country for one week or more at a time over eight times. The remaining 60.4% have traveled outside the States between one and seven times.

TABLE 7

FREQUENCY DISTRIBUTION OF TRAVEL EXPERIENCE

VARIABLES	n	%
TRAVEL INSIDE U. S. (One week or more at a time)		
1. Never	2	0.8
2. Occasionally (1 - 4 times)	27	10.8
3. Moderately (5 - 8 times)	35	14.0
4. Often (over 8 times)	186	74.4
NO. TRAVEL OUTSIDE U. S. (One week or more at a time)		
1. Never	70	28.0
2. Occasionally (1 - 4 times)	114	45.6
3. Moderately (5 - 8 times)	37	14.8
4. Often (over 8 times)	29	11.6

Fifty five or 22% have lived outside the States for one month or more in their lifetime. (see Tables 8 and 9). Of the continents lived in outside the United States 52.7% or 29 of the 55 subjects listed living in Europe and 20% or 11 listed living in the Far East (see Table 10). Comparison of travel experience to the demographic variables of education,

income, and occupation leads one to conclude that this degree of travel may not be surprising for this sample.

TABLE 8

FREQUENCY DISTRIBUTION OF EXPERIENCE

LIVING OUTSIDE THE U. S.

VARIABLES	n	%
1. Yes	55	22.0
2. No	195	78.0

TABLE 9

FREQUENCY DISTRIBUTION OF LENGTH OF TIME

LIVED OUTSIDE THE UNITED STATES

VARIABLES	n	%
1. 1 to 3 months	21	38.2
2. 4 to 6 months	3	5.5
3. 7 to 12 months	4	7.3
4. 1 year	5	9.1
5. 2 years	8	14.5
6. 3 years	1	1.8
7. 4 years	4	7.3
8. 5 years	2	3.6
9. 6 to 8 years	2	3.6
10. 9 to 11 years	3	5.5
11. 12 or more years	2	3.6

N=55

TABLE 10

FREQUENCY DISTRIBUTION OF CONTINENTS WHERE LIVED OUTSIDE THE U. S.

VARIABLES	n	%
1. Africa	1	1.8
2. Australia	1	1.8
3. North America (Canada)	4	7.3
4. Central America	3	5.5
5. Europe	29	52.7
6. Far East	11	20.0
7. Middle East	3	5.5
8. South America	3	5.5

N = 55

Cultural activities in which subjects engaged while traveling show many take advantage of culturally enriching opportunities. Results are listed in Table 11. Museum visiting shows high percentage response; art museums were checked by 54% of subjects and other types of museums were checked by 72%. Art gallery visits were made by 39.6% of subjects. Tours of architecture shows the third largest percentage response with 48.8% of the sample listing this activity. Concerts and seminars/lectures received positive response from 42.8% and 36.4 % respectively.

TABLE 11

FREQUENCY DISTRIBUTIONS OF CULTURAL ACTIVITIES WHEN TRAVELING

VARIABLES	n	%
1. Art Gallery Visiting	99	39.6
2. Art Museum Visiting	135	54.0
3. Other Museum Visiting	180	72.0
4. Concerts	6	22.2
5. Seminars, Lectures, Educ. Studies	107	42.8
6. Tours of Architecture	122	48.84
7. Other (Please specify)		
Garden Tours	13	5.2
Theater	11	4.4
Native Craft Fairs	16	6.4
Outdoor Activities	27	10.8
Antique Shops	3	1.2
Sporting Events	4	1.6
Visiting Historical Sites	39	15.6

Subjects were allowed to respond to the open-ended category of "Other" and list any other cultural activities in which they engage while traveling. Responses were activities such as garden tours, theater, craft shows, outdoor activities, antique shopping, sports events, and visiting historical sites. Thirty nine subjects (15.6%) indicated visiting historical sites to be an important cultural activity to them when they travel. Some overlap between tours of architecture and visiting historical sites is likely.

The variable of visiting art museums and/or art galleries regularly when not traveling, revealed 40.4% of the subjects visit art museums and/or art galleries once or more per year. A higher percentage (52%) visit every two to

four years and 7.6% have never visited an art museum or gallery (Table 12).

TABLE 12

FREQUENCY DISTRIBUTION OF VISITING ART MUSEUMS

VARIABLES.	n	%
1. Never	19	7.6
2. Every 4 years or more	56	22.4
3. Every 2 to 3 years	74	29.6
4. Once a year	53	21.2
5. Every 7 to 12 months	24	9.6
6. Every 1 to 6 months	24	9.6

For statistical analysis the magazine reading listings are collapsed into five broad categories of nominal data: 1) high-end (expensive) shelter/home decor, 2) Moderate-end (less expensive) shelter/home decor, 3) women's general interest, 4) general interest, and 5) news. The rationale for these groupings is that those who regularly read the high-end or moderate-end shelter/home decor periodicals would have exposure to interiors photographs in which multiple-patterned and highly visually stimulating interiors are frequently featured. Including this variable in the study is for the purpose of determining if such an influence bears on perceptions of and preferences for simplicity versus complexity of visual stimuli in living room settings.

Responses to the types of magazines read indicate few subjects (27.2%) read high-end shelter publications while 62.4% responded to reading moderate-end shelter/home decor periodicals. The category of women's general interest publications show that 64.4% of the subjects read ones in this group. The general interest periodicals category has high subject response, with 78.4% checking listings in this group. National and world news publications are read by 37.2% of the subjects. An open-ended space for "Other" allowed subjects to write-in names of periodicals they read but which were not listed on the questionnaire. Responses to this item established these other categories: professional journals, religious reading matter, business and finance, travel, and special interest/hobbies. Refer to the questionnaire, Part II in Appendix A for the specific periodical titles to which subjects responded.

TABLE 13

FREQUENCY DISTRIBUTION OF MAGAZINE READING CATEGORIES

VARIABLES	n		%
	Yes	No	for Yes
1. High-End Shelter/Aesthetics Publications	68	182	27.2
2. Moderate-End Shelter/Aesthetics Publications	156	94	62.4
3. Women's General Interest	161	89	64.4
4. General Interest	196	54	78.4
5. National and World News	93	157	37.2
6. Professional Journals	14	236	5.6
7. Religious Publications	27	223	10.8
8. Business and Finance	3	247	1.2
9. Travel Publications	6	244	2.4
10..Specific Interest/Hobbies	56	194	22.4

CHAPTER V

PERCEPTIONS AND PREFERENCES OF VISUAL COMPLEXITY OF SURFACE PATTERNS IN INTERIORS

MANUSCRIPT FOR PUBLICATION

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PERCEPTIONS AND PREFERENCES OF VISUAL COMPLEXITY OF SURFACE PATTERNS IN INTERIORS

ABSTRACT

This study examined the perception and preference responses, from 250 adult female subjects, of visual complexity of surface materials used in living room settings. Slides of seven computer generated perspectives of a living room setting were rated on 22 semantic differential 7-point scales of bipolar adjective pairs, including like/dislike. Providing a second method to determine preferences, subjects viewed the slides in pairs and checked preference between the two in each pair. Basic elements within the room settings depicted in the slides were identical. The slides varied in complexity as each successive slide depicted a gradual increase in the number of patterned materials and number of surfaces covered. Through factor analysis three factors emerged: 1) aesthetics, 2) stimulation, and 3) organization. Analysis of variance and Duncan's multiple range test discerned specific differences in means among the three factors for perception, as well as differences in means for preference. The extremes of simplicity and complexity were rejected by subjects both perceptually and preferentially. This indicates that both the most visually

simple and complex settings were perceived as the least aesthetic, least organized and least preferred. The simplest setting was perceived as the least visually stimulating; the most complex setting was viewed as the most stimulating. One multiple-patterned complex setting was perceived as highly aesthetic, stimulating, organized, and most preferred. Results suggest that individuals favorably perceive moderate visual complexity over extreme complexity or simplicity. These findings correlate with past research in other fields.

INTRODUCTION

The built environment can be separated into many components for the purpose of studying its effects on people. One such component, ornamentation in the form of pattern, is a property of many surface elements (e.g., floor, walls, ceiling, doors, windows, and furniture) that divide and structure space. These elements, their arrangement, and characteristics of the materials from which they are fabricated, serve to make settings usable to meet human needs. Using patterned materials on these surface elements is a primary method for introducing textural properties into interior spaces that assist people in their daily functions of life. Interior surfacing materials can also be the vehicle for aesthetic expression by providing innumerable ways to provide visual stimulation, variety, and interest. When surfaces are decorated, the design elements, (i.e., color, texture, line, form, and shape), are automatically employed, whether consciously or unconsciously. Repetition of these design elements in infinite varied arrangements is termed pattern, which is a form of ornamentation.

Rodemann (1990) examined human perceptions and responses to selected surfacing patterns and found the higher the perceived movement or contrast of pattern, the

greater was the expression of fatigue and distraction. Surface design, through pattern, contributes daily to stimulation of visual and emotional senses affecting physiological reactions such as skin temperature changes, heart rate, hormonal secretions, and time perception. Millions of dollars are spent to develop and promote thousands of pattern choices. Therefore, it seems sensible that environmental designers would make it a goal to develop a fundamental understanding of how humans view and respond to environmental pattern.

Individuals differ in their perceptions and meanings attributed to the environment. Information about the environment is processed through the perception of physical elements as well as personal human needs. This information processing forms a link between perception and understanding (cognition) and guides emotional responses (Lang, 1987). The attitudinal differences among people are theorized to be the result of such things as cultural and social background, personality, physiological traits, and environment (Lang, 1987; Rodemann, 1990). Continuing research attempts to better understand the attitudinal and perceptual differences in people. However, there has been very little systematic study of these variables in relation to patterned surfaces in the design of interiors (Kleeman, 1981).

The purpose of this study is to examine individuals' perceptions of and preferences for surface patterns used in the design of residential living room settings. The

specific objective is to assess individuals' perceptions of and preference for visual simplicity versus complexity in residential living room settings, using the pattern distributions (Myers, 1985) of: 1) no-pattern (solid color), 2) three levels of single pattern, that is, a) on sofas only, b) on sofas and window, and c) on sofas, window, and one wall), and 3) three levels of multiple patterns (i.e., transposal, composite, and recurrent/composite combination).

LITERATURE REVIEW

The environment is comprised of many objects or components, all of which consist of surfaces which can be handled many ways. Surfaces of home environments, such as walls, floors, and furniture, are treated or covered with materials and finishes for purposes like safety, ease of maintenance, and fire retardancy. Another express purpose is for beautifying or making the environment aesthetically pleasing to human visual perceptions. Frequently the surfacing materials and finishes will be designed with the elements of color, texture, line, shape, and form to produce pattern. Pattern results from orderly repetition of an element or motif over the surface of an object or material (Allen, 1990; Camacho & Laughlin, 1985).

Cognition, or recognition of pattern on surfaces is sensorially perceived primarily through sight and touch. Individuals' views or perceptions of their surroundings depend on the physical condition of the eyes, on motivation,

purpose, needs, and experience (Lang, 1987). Human response to the environment is also predicated on affective function which is emotion-based and a determinant for opinions and preferences (Lang, 1987). Two theory bases of perception - Gestalt theory and psychobiological aesthetics theory - relate to the objective of this study and help explain cognition and perception as well as affective function as applied to aesthetics.

Perception and Aesthetic Theories

Gestalt theory (Koffka, 1935; Kohler, 1929) is predicated on laws of organization of visual elements. Gestalt laws of visual organization form the basis for the analysis of combinations of elements into units that are perceived as either simple or complex. Governing all these laws of organization is the premise that psychological organization of a visual composition is as "good" as prevailing conditions allow. "Good" in this sense is not an evaluative statement, but simply means that "good" figures or elements of composition have characteristics of symmetry, unity, regularity, coherence or "maximal simplicity." Good Gestalt served as the basis of Modernist design philosophy and implied that meritorious design occurs when "a form possesses the fewest articulated parts required to maintain its structure" (Lang 1987, p. 189).

Rapoport and Kantor (1967) contend Modernism's simplicity led to reduced sensory input from the

environment, leaving nothing to divert and hold one's attention. The public appears to be demanding more than Modernism's plain surfaces, in favor of "more color and visual intrigue" (Jensen & Conway, 1982, p. 15).

A study of pattern on environmental surfaces and how it is perceived can come under the broad field of aesthetics to which architecture and interior design are closely connected. During the 20th century the discipline of aesthetics has grown rapidly with the underlying goal of understanding what gives people pleasure and why (Lang, 1987). Through research conducted over several decades some understanding has evolved (Attneave & Arnoult, 1956; Barron & Welch, 1952; Berlyne, 1960, 1970, 1974; Birkoff, 1933; Cohen & Trostle, 1990; Munsinger & Kessen, 1964; Rapoport & Kantor, 1967; Pyron, 1966, 1971, 1972). Empirical aesthetics studies the forms of perception and behavior that are connected to works of art and other aesthetic phenomena. Most of the psychological research in this area focuses on structural (formal) characteristics of objects as well as cultural background, socioeconomic status, and personality as independent variable(s); peoples' subjective feelings about them serve as the dependent variable(s) (Lang, 1987).

Berlyne (1960, 1970, 1974) developed a psychobiological aesthetics theory of human exploratory response to visual stimulus patterns; it has its roots in Gestalt psychology. Much of Berlyne's research used types of dependent variables that include verbal ratings, such as semantic differential

scales, psychophysiological measures, such as bodily processes, personality traits, electroencephalogram measures, and behavioral measures. Aesthetics theory encompasses not only the concept of beauty, but other conceptual qualities as well, such as hedonic value, arousal, novelty, pleasantness, interest, complexity, simplicity, and even ugliness.

Hedonic value is the subjective emotional quality of visual stimuli. Berlyne (1960, 1970) hypothesized that aesthetic patterns produce positive or negative hedonic effects by acting on arousal. Positive hedonic values (i.e., like, pleasantness, interest) are provoked by 1) a moderate increase in arousal or 2) a decrease in arousal when arousal reaches such a high level that negative hedonic value (i.e., dislike, discomfort, disinterest) results. "Busyness" in interiors can create complexity and high levels of visual stimuli; when stimulus patterns create too sharp a rise in arousal, aversion can result.

Designers are familiar with the design principle of unity with variety. Humans have limited tolerance for diversity, but become easily bored with too much of any one thing. The appeal of an aesthetic object or setting is dependent on the interplay of two sets of factors, one driving arousal upward, and the other to keep arousal within bounds to avert negative hedonic value. Thus, a degree of visual tension or means of variety is needed for physical and psychological well being tempered with visual coherence

and order (Berlyne 1960, 1970, 1974; Ellinger, 1963). Berlyne studied the concepts of novelty, uncertainty, conflict, and complexity in relation to hedonic value. These interrelated concepts exist in interiors in varying degrees.

Novelty relates to new and unfamiliar information that must be processed by the nervous system for perception processes to be completed. Berlyne (1960, 1970) determined that positive hedonic value is provoked, not by maximum novelty, but by an intermediate degree of novelty, where the novelty stimulus is recognized cognitively, but with enough distinction to promote curiosity and interest. Visual stimuli that are too novel result in uncertainty and conflict or negative hedonic value. Humans have a limit of ability to process environmental information through the nervous system, - an optimal perception rate (OPR) - and so prefer a level of uncertainty which is near the OPR. Stimulation below one's capacity of cognitive processing results in boredom and high levels of unfamiliar or novel variation can produce conflict through confusion, also leading to negative hedonic value (Berlyne, 1960; Munsinger & Kessen, 1964). One's background and physical/psychological characteristics limit processing ability of individuals to resolve perceived conflict and greatly determines the degree of hedonic value.

Complexity is the concept related to diversity or variety in a stimulus pattern. Complexity increases with 1) the number of distinguishable elements, 2) dissimilarity

between elements, if the number is held constant, or complexity varies inversely with the degree to which several elements are responded to as a unit. Under Gestalt theory (Koffka, 1935; Kohler, 1929) the concepts of simplicity and coherence apply to perception and positive hedonic value, since "good" figures or visual stimuli depend on simplicity, regularity, and symmetry, which are attributes opposite to complexity properties.

Past research suggests that humans are stimulus seeking. Psychological research reviewed by Rapoport & Kantor (1967) led them to believe that humans have an innate need for visual stimuli in their environment. People appear to prefer and choose complexity over simplicity from infancy onward (Cohen & Trostle, 1990; Fantz, 1958; Nachman, Stern & Best, 1986). Complexity is not chaos, but rather an element of surprise - "an environmental unfolding" - that invites the viewer to participate visually, mentally, and emotionally. Diversity, variety, and richness of interior spaces help fulfill this need (Pyron, 1971; Rapaport & Kantor, 1967).

In summary, it can be postulated that if humans innately have a need for visual stimulation as studies cited indicate, then a study to investigate humans' perceptions of patterned surfaces in environments is logical and warranted. Research in the interior design field can benefit from theories generated by behavioral scientists and make application of their theories to study phenomena in design.

This study is an attempt to apply, to interior design, Berlyne's theory of human perception and preference of novel and complex forms over simple ones, by applying it to patterned surfaces typically seen in residential interiors.

Validly measuring variables has presented and continues to present a problem in this type of research. Using familiar environmental artifacts as independent variables, even though they are synthetic visual displays in the form of slides, has the advantage of obtaining a more natural and true perceptual and preference response from subjects than using the nonsense, or abstract two-dimensional shapes as independent variables used in so much past research. The pattern distributions used as independent variables for this study meet the criteria of properties on which to base complexity of a stimulus pattern (Berlyne, 1960).

METHODOLOGY

Research Design

The study used a descriptive research design, described as a method to assess conditions, relationships, opinions, or effects (Best, 1991). Descriptive studies require extensive previous knowledge of the problem to be researched or described (Adams and Schvaneveldt, 1985). In this study the independent variables of pattern on surfaces (pattern distributions) changed with each room setting. Subjects' opinion responses to the stationary elements in each setting were assessed.

Sample

The study used a non-probability sample of 250 volunteer adult female subjects 20 years or older ($\bar{X}$ = 46 years) who were members of various women's organizations in a large southwestern city. This non-random method of obtaining subjects and restricting the sample to females 20 years old or older specifically limits the findings. Nevertheless, insight is provided into perceptions of and preferences for interior settings designed with either no-pattern, single pattern or multiple pattern surfacing materials.

Instrument Development and Data Collection

The questionnaire developed by the researcher obtained demographic data and assessed perceptions of and preferences for visual simplicity versus complexity of patterned surfaces in the design of living room settings. Measurement of the dependent variables of perception and preference utilized seven slides of one-point perspective, computer-generated drawings. The elements in all the settings remain identical with the exception of surfacing materials on the walls, window, floor, and upholstered furniture. Through the technique of scanning images into the computer, the settings changed visually by scanning various patterned materials for upholstery fabrics, window treatments, area rugs, and wall treatments into the seven settings. This produced the pattern distributions used to test hedonic

value theory. Pattern distributions can be used as effective methods to order disparate elements into a unified whole in interiors.

The following information explains the categories of pattern distributions (Myers, 1985):

1) No-Pattern: This distribution uses solid colored materials/finishes on all walls, floor, ceiling, window treatments, and furnishings rather than patterned ones in an interior space. Usually a color scheme is established and shades and tints of the chosen colors are used together, with one color being dominant. This distribution is easy to achieve and usually gives a controlled, orderly sense.

2) Single Pattern: This distribution incorporates only one patterned material into an interior space; the single pattern can be used minimally or profusely, on one or many surfaces. A single pattern interior can be simple, coherent, and orderly, or complex. It depends on the motif of the pattern, coloration, and number of surfaces covered. Most commonly, however, the single patten distribution uses the patterned material rather sparingly such as upholstery on sofa and chairs or for a window treatment, with all other surfaces being solid-colored using colors derived from the pattern.

3) Multiple Pattern Distributions (MPD): This third category of pattern distribution uses two or more patterned materials together in the same interior or room. Mixing and matching of patterned materials in interior spaces is a

common mode of decorating. MPD usually result in an increase of visual stimulation and complexity. The key to harmonious results is the function of determinant unifying elements to create harmonious relationships.

There are three sub-categories of multiple pattern distributions: composite, recurrent, and transposal.

Composite uses two or more patterns on surfaces where one pattern, which gives the emphasis, is dominant in color, motif(s), scale or any combination of the three. Patterns of succeeding materials are derived directly from the dominant pattern or are totally different from it, yet complement it through either color, motif, or scale, which provides the unifying element. The composite distribution is the most visually complex of the singular MPD.

Recurrent uses only one pattern motif; the motif, as the unifying element, is in one color, and used on different harmonious background colors within the same room setting.

Transposal uses two or more differing patterns on surfaces or objects within the same room setting, but every pattern contains all of the same colors. The unifying element is color.

Most interiors can be categorized into one of these pattern distributions. It is also possible to have an interior composed of any two or all of the MPD, which intensifies visual complexity. The MPD are manifest in interior photographs of many professional interior design-oriented publications, as well as decorating type

periodicals on the public market. This study uses the no-pattern, three levels of single pattern, composite MPD, transposal MPD, and a combination of recurrent/composite MPD as the distributions for the room settings.

The basic color scheme of the settings uses shades of red (burgundy) and blue (navy). Earlier consideration to use black and white color settings to eliminate the bias of color was rejected, based on the fact that the environment is naturally in color. Another rationale for using color in the room settings is that the visual effect and success of the multiple pattern distributions depends on color usage.

Using slides to achieve the environmental displays, although synthetic, seemed the best for internal validity and lessened the problem of bias. The best solution to the problem of bias was keeping all the arrangements and elements identical and using as generic a style as possible in all the settings for furniture, accessories, window treatment style, view outside the window, and lighting levels/sources. Since the only changeable elements from setting to setting were the patterns of materials on the surfaces, the assumption is that the subjects responded to pattern distribution changes rather than other visual factors. The final result of the computer-generated settings is that they appear remarkably like realistic photographs. Figure 2 illustrates the transposal distribution setting.

Insert Figure 2 about here

The instrument used the semantic differential technique (Osgood, Suci, & Tannenbaum, 1957) to assess subjects' perceptions of and preferences for the variables of pattern distributions depicted in the seven slides. Twenty-three sets of bipolar adjective pairs, developed from a listing by Kasmar (1970), contained a seven point scale for each pair. To alleviate subjects' responding to succeeding slides without a cognitive thought process a random selection determined the order of the first twenty-two adjective pairs for each slide, to measure perception. The twenty-third bipolar adjective pair was like/dislike to assess preference. This semantic differential scaling method correlates with Berlyne's (1974) use of the method.

The data were collected in a large seminar room, with tiered levels of seating, dimmable lighting, and a large surface for projection of slides. A random selection of numbers one to seven provided the random order for slide projection. Slide 1, the most simple no-pattern setting for example, was viewed by subjects sixth in the viewing order.

Data Analysis, Results and Discussion

To assess perception, the adjective pairs for each slide were factor analyzed using the principal components method (unrotated), then factor analyzed again using varimax rotation to identify the underlying constructs (Aaker & Day,

1980; Kerlinger, 1985; Rummel, 1968). These processes resulted in extracting three factors whose eigenvalues were greater than 1.00. Variables which loaded 0.60 or higher were used to identify the factors. Because confusing/ understandable did not load 0.60 or higher on any factor, it was deleted, leaving 21 adjective pairs.

The factors which emerged included: 1) aesthetics, 2) stimulation, and 3) organization and represent distinct categories of perception evaluation of the subjects (Table 14). The aesthetics factor portrays subjects' concern for the overall look or beauty of the settings, their degree of appeal, interest, comfort, attractiveness, and beauty. The stimulation factor represents subjects' perception of the degree of visual stimulation or activity generated by the settings, such as their degree of liveliness, ornateness, clutter, crowdedness, and complexity. This factor represents the novelty, uncertainty, and conflict type of arousal characteristics that Berlyne (1960, 1970, 1974) used in aesthetics research to help determine rationale for peoples' hedonic values. Since the aesthetics and stimulation factors account for 25.47% and 25.39%, respectively, of the total variance, one can assume that both factors, though independent of one another, are important to subjects in affective function for hedonic value. The organization factor accounts for 17.52% of the variance and represents viewers' perceptions of how ordered or unordered are all the disparate elements of the settings.

The degree of harmony, clarity, coordination, and perception of designed versus undesigned form this factor. Two of the

Insert Table 14 about here

bipolar variables - cluttered/uncluttered and crowded/uncrowded - had negative correlation coefficients, indicating an inverse relationship; the more cluttered and crowded a setting was perceived to be, the more stimulating was its rating (Table 14).

To verify the validity of the factors that emerge Aaker and Day (1980) suggest a random split of the data with factor analysis using varimax rotation on each half independently. If the same factors emerge in each half, as emerged initially, the results are more reliable. Using this procedure the same three factors emerged thus strengthening confidence that the factors indicate the underlying constructs.

Analysis of variance (ANOVA), a method to compare groups by mean scores to determine if differences exist (Huck, Cormier, & Bounds, 1974), was applied to each one of the three factors to determine if subjects' perceptions of the seven living room settings differed. Significant differences in mean scores of perception resulted on each of the seven settings for each of the three factors (Table 15). Duncan's multiple range test was applied to each of the three factors (Table 16).

Insert Tables 15 and 16 about here

In the *aesthetics factor*, the *no-pattern* setting and *recurrent/composite combination* setting both differed significantly from each other and all the other settings as well. This implies subjects rated the most visually simple and the most visually complex settings as less aesthetic than all the others. The most complex setting, the recurrent/composite combination, was perceived the most negatively aesthetically, with the lowest mean value.

The *transposal* multiple pattern setting was rated as the most aesthetic by mean value, but did not differ significantly in aesthetic perception from any of the single patterns, each of which gradually increased in visual complexity, but not to excess. Subjects appeared to perceive these settings as unified, pleasing, and interesting rather than as boring and chaotic. The visual change between them must have been perceived so slight it made no real difference aesthetically.

In the *stimulation factor* the *no pattern, transposal, and recurrent/composite combination* settings differed significantly from each other and all the remaining ones. The subjects perceived all three of the *single pattern settings* plus the *composite* setting as exhibiting almost the same moderately low level of stimulation. They perceived both the *recurrent/composite and transposal* settings as

highly visually stimulating. The *no-pattern* setting was perceived as the least visually stimulating. The *transposal* setting differs significantly from all the other settings; it is viewed as highly stimulating and complex, yet aesthetically appealing.

In the *organization factor* the three settings, *single pattern A, no-pattern, and recurrent/composite combination* have the lowest mean values, respectively, and differ significantly from each other as well as from all others. They illustrate the extremes of simplicity and complexity. Subjects perceived these three distributions as the most unharmonious, uncoordinated, vague, unorganized and undesigned of all the settings.

Single pattern settings B and C and the transposal multiple pattern setting show no significant difference in *organization;* these three settings are viewed as organized, clear, coordinated, and designed even though each becomes gradually more visually complex. *Single pattern C* is the most complex single pattern distribution and the *transposal MPD* setting contains even more visual stimuli. There is also a perceived difference between the composite MPD and single pattern B settings. The *composite MPD* is viewed as highly organized, but only moderately stimulating and aesthetic. The *single pattern B* setting is viewed as moderately organized and stimulating, and more aesthetic than the *composite*. This suggests that organization over chaos is preferred, but aesthetic perception of visual

stimulation can be positive even with less perceived organization.

The *no-pattern* and *recurrent/composite combination* are the only settings significantly different from all the others in all three factors. They are the most rejected and disliked of all the settings and represent the two extremes of low and high stimulation as well as simplicity and complexity. People appear to reject interior settings with little visual stimulation, but just as vehemently reject too much visual overload.

The *transposal MPD* is perceived as significantly more stimulating than all settings except for the *recurrent/composite combination*, which is the most stimulating MPD, containing the most patterns and surfaces covered in patterned materials. The *transposal* setting is consistently viewed favorably on all three factors, which leads to the conclusion that visual complexity is preferred, but not to a degree that overloads the visual sense.

The instrument used the semantic differential technique (Osgood, et al., 1957) to also assess subjects' preferences for complexity depicted in the seven slide settings. The bipolar adjective pair of like/dislike, on a seven point scale, provided the first measure of preference for each setting. A second technique to measure affective feelings of preference was projecting the slide settings in a random order of pairs for subjects to check their choice of each pair (21 pairs). This cross-check method of obtaining

quantifiable data helped verify internal validity.

Analysis of variance was applied to the bipolar adjective pair of like/dislike to determine if subjects' feelings of preference differed for the seven room settings. Significant differences in mean scores of preference resulted on each of the seven settings (Table 17). Duncan's multiple range test was applied to determine specifically which settings were significantly different.

Insert Table 17 about here

The *transposal MPD* was rated as the most preferred setting by mean value, but did not differ significantly from the *single pattern C*, which is the most visually complex of the three single pattern distributions. The hedonic values of these two settings was favorably perceived and almost equally liked. Both settings have a moderately high level of visual complexity and stimulation.

Results show no significant difference in preference for the three levels of *single pattern distributions* and the *composite MPD*. Subjects rated each of these four settings with a moderate degree of positive hedonic value. None were as favorably liked as the *transposal MPD* setting, but neither were they rejected.

The *no-pattern* setting and the *recurrent/composite MPD*, representing the extremes of simplicity and complexity, differ significantly from all the other settings, but do not

differ significantly from one another. Subjects subjectively rejected both settings. This further enforces that negative hedonic value results from too little visual stimulation, monotony, and simplicity, but too much visual stimulation and complexity is equally rejected.

The mean scores of preference for each slide pairing were summed and analysis of variance revealed significant differences in these mean scores for preference (Table 18). Duncan's multiple range test revealed very similar results to the like-dislike method. The *transposal MPD* was again rated as the most preferred setting by mean value, but did not differ significantly from the *single pattern C* setting - the most visually complex of the three single pattern distributions. These two settings were perceived with the most positive hedonic value of all the others. This further reinforces the assumption that humans respond favorably to visual stimulation elements of novelty, and interest in interiors, but in moderation.

In the pairs viewing, results showed no significant difference between the *single pattern C* distribution and the *composite MPD*, yet the *composite MPD* is not as favorably perceived as the *transposal MPD*. This suggests that there is a fine line of visual stimulation and complexity that divides hedonic value perceptions and preferences, above and below which negative hedonic value results. The quantitative measurement of this fine line of visual discernment becomes the challenge in research of this

nature.

Insert Table 18 about here

No significant difference resulted between the *composite MPD* and the *single pattern B* distribution, yet each is less favorably perceived than the *transposal MPD* and the most complex *single pattern C* distribution. This again suggests that subjects tend not to prefer interior settings that are too simple or too complex.

The *single pattern A* setting is the most simple patterned setting, with only one floral patterned fabric used to upholster the sofas. This distribution setting is the only one that significantly differed from all the other settings. It was negatively perceived in hedonic value. Its mean score was the lowest compared to all but the *no-pattern* distribution setting (the most simple) and the *recurrent/composite combination MPD* (the most complex setting), again being the most rejected and negatively preferred. They differed significantly from all other settings, but not from each other. This coincides with the findings of slides responded to individually. The premise is once more strengthened that visual complexity in interiors is preferred, but not to a degree that overloads the visual sense.

CONCLUSIONS AND IMPLICATIONS

The assumption that there are differences in how individuals perceive and feel about levels of visual stimuli in interiors is supported by this study. Results provide insight about the specific variables of visual complexity of interior settings and how those variables are perceived and liked by individuals. The findings reinforce the premise from past research that humans are stimulus seeking and have an innate need for visual stimuli in their environment. People appear to favor and choose complexity over simplicity, but with certain conditional characteristics. Too much simplicity and complexity are extremes rejected aesthetically by subjects. Moderate degrees of complex stimulation and organization, however, were perceived and liked the most favorably. This finding correlates with Berlyne's (1960, 1970) hypotheses that positive hedonic value is provoked by a moderate increase in arousal.

Professional designers can benefit from the insights this study provides. As they work with clients and make choices of surface materials and finishes they must consider the kind and amount of visual stimulation being introduced into settings to avoid the mistake of too much or too little stimuli or negative hedonic value. It becomes imperative to work closely with clients to determine the most optimal degree of visual complexity without crossing the fine line of too much or too little. Even though the range for "moderation" of visual stimuli is not quantifiable or

definitively specified by this study, it can be concluded that patterned materials used tastefully, moderately, and with perceived organization are judged with positive hedonic value.

Design practitioners and design educators can constructively utilize the various pattern distributions used as independent variables in this study. They are excellent parameters for successfully executing the use of many variations based on the innumerable patterned materials available on the market. Students in design programs can be taught about the pattern distributions and have the experience of incorporating them into projects.

This topic of study is worthy of further research since visual stimuli of the interior environment surrounds humans daily and almost constantly. Pattern, in some form, is an integral design constant in interiors, and humans are affectively, as well as cognitively influenced by it. Areas that could be explored further by a replication of the study could compare perceptions and preferences of 1) males to females, 2) professional designers to the lay public, 3) younger aged persons to elderly, and 4) a random sampling of subjects in several various geographical areas of the country. Such approaches would provide data that could be generalized to the public and provide more specific usable information to designers.

Another study on this topic could be devised by using another set of patterned materials, as well as a different

furniture style and arrangement. Continuing developments in computer technology make it feasible to develop adequate visual displays in this mode. The settings would remain consistent in all elements except changes of patterned materials on surfaces. If similar results occurred, the findings of this study would be further validated.

The optimal perception rate (OPR) range has not yet been defined through research. A challenging research assignment would be to find a way to operationalize measurement of variables to more specifically define or quantify what constitutes OPR of visual stimulation in interior spaces. Such a challenge would likely involve a series of studies over time.

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Figure 2 Example of Transposal Pattern Distribution

TABLE 14

FACTOR ANALYSIS OF PERCEPTION RESPONSES
TO INTERIOR SETTINGS

Adjective Pairs	Factor 1 (Aesthetics)	Factor 2 (Stimulation)	Factor 3 (Organization)
1. Unattractive - Attractive	0.81795*	0.09481	0.28293
2. Unappealing - Appealing	0.80499*	0.08254	0.34358
3. Ugly - Beautiful	0.79869*	0.11444	0.29303
4. Unpleasant - Pleasant	0.76314*	-0.08034	0.40832
5. Uncomfortable - Comfortable	0.66704*	-0.17716	0.30175
6. Stressful - Relaxing	0.66807*	-0.40427	0.26338
7. Distracting - Soothing	0.64333*	-0.40032	0.38052
8. Uninteresting - Interesting	0.62223*	0.45235	0.26972
9. Passive - Active	0.03627	0.84576*	-0.13110
10. Plain - Ornate	0.06928	0.83052*	0.01939
11. Simple - Complex	-0.14718	0.81081*	-0.14611
12. Calm - Lively	-0.10710	0.80222*	-0.19539
13. Commonplace - Unique	0.21690	0.73023*	-0.05208
14. Cluttered - Uncluttered	0.33519	-0.68150*	0.23778
15. Boring - Stimulating	0.46724	0.67975*	0.01141
16. Crowded - Uncrowded	0.37056	-0.61668*	0.11089
17. Uncoordinated - Coordinated	0.34216	-0.10015	0.78867*
18. Unorganized - Organized	0.21890	-0.27626	0.76188*
19. Undesigned - Designed	0.37505	0.15375	0.71547*
20. Unharmonious - Harmonious	0.46624	-0.17987	0.67464*
21. Vague - Clear	0.36982	-0.26505	0.64442*
22. Confusing - Understandable	0.40182	-0.48127	0.54017

* Only factor loadings over 0.60
considered for statistical purposes.

TABLE 15

ANALYSIS OF VARIANCE SUMMARY TABLE OF PERCEPTION FACTORS COMPARED TO THE SEVEN PATTERN DISTRIBUTIONS

Source	df	SS	MS	F	Pr > F
Model (Aesthetic Factor)	6	37999.942	63333.32	67.36	0.0001
Error	1730	162666.51	94.03		
Corrected Total	1736	200666.45			
Model (Stimulation Factor)	6	127534.88	21255.81	441.71	0.0001
Error	1731	83297.98	48.12		
Corrected Total	1737	210832.87			
Model (Organization Factor)	6	20422.74	3403.79	80.64	0.0001
Error	1734	73189.57	42.21		
Corrected Total	1740	93612.31			

N=244-248

TABLE 16

RESULTS OF DUNCAN'S MULTIPLE RANGE TEST FOR PERCEPTION FACTORS COMPARED TO PATTERN DISTRIBUTIONS

AESTHETICS FACTOR Pattern Distributions	Mean	STIMULATION FACTOR Pattern Distributions	Mean	ORGANIZATION FACTOR Pattern Distributions	Mean
Transposal Multiple Pattern	35.2661 a	Recurrent/Composite Multiple Pattern Combination	45.5363 a	Composite Multiple Pattern	26.5645 a
Single Pattern C	34.7912 a b	Transposal Multiple Pattern	33.1053 b	Single Pattern C	25.5060 a b
Single Pattern A	34.0200 a b	Single Pattern A	23.4940 c	Transposal Multiple Pattern	25.3629 a b
Single Pattern B	33.5020 a b	Composite Multiple Pattern	23.2863 c	Single Pattern B	25.1044 a b
Composite Multiple Pattern	33.1260 b	Single Pattern C	22.9600 c	Single Pattern A	23.0320 c
No Pattern	27.2510 c	Single Pattern B	22.7328 c	No Pattern	21.3253 d
Recurrent/Composite Combination	21.6760 d	No Pattern Multiple Pattern	18.4819 d	Recurrent/Composite Combination	15.8629 e

Means with the same letter are not significantly different.
N = 246-250

TABLE 17

ANALYSIS OF VARIANCE SUMMARY TABLE OF PREFERENCE BY THE LIKERT SCALE OF LIKE/DISLIKE COMPARED TO THE SEVEN PATTERN DISTRIBUTIONS

Source:	df	SS	MS	F	Pr > F
Model (Pattern Distributions)	6	605.16	100.86	39.24	0.0001
Error	1735	4459.57	2.57		
Corrected Total	1741	5064.73			

Duncan's Multiple Range Test

Pattern Distributions (By Like/Dislike Scale)	n	Mean
Transposal MPD	249	3.97 a
Single Pattern C	249	3.69 a b
Composite MPD	249	3.57 b
Single Pattern A	249	3.49 b
Single Pattern B	249	3.40 b
No Pattern	249	2.52 c
Composite/Recurrent MPD	248	2.25 c

Means with the same letter are not significantly different at Pr < .05.

N = 248-249

TABLE 18

ANALYSIS OF VARIANCE SUMMARY TABLE OF PREFERENCE VIEWED BY SLIDE PAIRS COMPARED TO THE SEVEN PATTERN DISTRIBUTIONS

Source:	df	SS	MS	F	Pr > F
Model (Pattern Distributions)	6	2244.40	374.0666	159.58	0.0001
Error	1743	4085.60	2.3440		
Corrected Total	1749	6330.00			

Duncan's Multiple Range Test

Pattern Distributions (By Pairs)	n	Mean
Transposal MPD	250	4.24 a
Single Pattern C	250	4.07 a b
Composite MPD	250	3.80 b c
Single Pattern B	250	3.56 c
Single Pattern A	250	2.53 d
No Pattern	250	1.50 e
Composite/Recurrent MPD	250	1.31 e

Means with the same are not significantly different at $p \leq .05$.

CHAPTER VI

PERCEPTION AND PREFERENCE OF PATTERNED INTERIOR SURFACES RELATED TO PERSONALITY FACTORS, SOCIOECONOMIC, AND CULTURAL VARIABLES

Introduction

The person-environment interface, which is a dynamic relationship between a person and the environment, is dependent on many factors, one of which is the built environment. Information about the environment is processed through the perception of physical elements as well as personal human needs. This information processing forms a link between perception and cognition and guides emotional or affective responses. The affective differences among people are theorized to be the result of such things as cultural and social background, personality, physiological and organismic traits, and environment (Barker, 1968; Gibson, 1966; Ittelson, 1960, 1973; Lang, 1987; Rodeman, 1990).

Many surface elements of interior environments (e.g., floor, walls, ceiling, doors, windows, and furniture) serve a primary function of dividing and structuring space to meet human daily needs and activities, but they can also be a

means of aesthetic expression. Through the use of patterned materials on surfaces visual sensory stimulation, variety, and interest are introduced. Much expense and effort is expended to develop and promote thousands of pattern choices for surfacing materials. What role, then, does surface pattern play in human perception of the environment, specifically the home environment? Is visual complexity, over simplicity, of interior surfaces preferred? Does exposure to other factors such as travel or education make a difference in perception of pattern and attitude toward it?

Sensory stimuli of the environment and man's perception of such stimuli is a complex phenomenon that has been studied and researched from multiple viewpoints by people in a diversity of disciplines. Few studies, however, have addressed the subject of surface pattern as a visual sensory stimulus in interiors and human response to it. Little objective data are available on the subject of pattern and texture and their use in interiors (Kleeman, 1981).

Another purpose of this study is to examine variables that could be influencing perception and preference of surface pattern used in the design of living room settings. The specific objective is to determine if a relationship exists between individuals' personalities, age, socioeconomic background, educational level, travel, reading material, or art museum visiting and their perceptions and preferences for visual complexity versus simplicity in living room settings, using specific pattern distributions.

Literature Review

Human needs and their fulfillment are motivating factors behind human response and behavior related to the environment. Maslow (1943) suggested a hierarchy of needs which environmental designers have used as a framework for thinking about concerns for the built environment. These levels range from the most necessary needs at the base of the triangle to the level at the triangle's tip which is labeled self-actualization. The hierarchy encompasses needs that are physiological, sociological, psychological or a mixture of the three. The degree to which each need is fulfilled varies from person to person, depending on personality, culture, what one is used to, and philosophy of life. Aesthetic needs, which are psychological, are part of the highest self-actualization level. Pattern and ornamentation on interior surfaces of structures are in the area of aesthetics. For an individual to be concerned or interested in this component, the needs on the lower levels must be sufficiently met by the standards of the individual.

Perception of the visual world is a physiological process, but retinal images are nothing without meaning attached to them. Some theorists believe meaning has to be supplied to things after the perceiver has registered their structure. "Transactionalists believe meaning is given as a perception takes place and that experience interrupts perception to give a new meaning" (Lang, 1987, p. 95). The visual world...is meaningful as well as concrete; it is

significant as well as literal" (Gibson, 1950b, p. 198).

How symbolic meanings develop is a complex phenomenon. The psychology of meaning is difficult to understand because the world is saturated with various levels or kinds of meaning. Gibson (1950b) lists several kinds: 1) the primitive concrete, 2) use meanings of objects for the satisfaction of needs, and 3) meanings of machines, devices, and instruments. Two others listed that are most relevant to this study are: 4) "the values or emotional meanings of things which make the shapes of the world attractive or repulsive...", and 5) the kind of meaning embodied in symbols...which are abstract." These last two are determined by culture and...are the most complex ...of the list" (p. 199). Things must be substantial before they can be symbolic. Environmental designers must be concerned with symbolism or meaning of the built environment because it is a major factor in how people like or dislike their surroundings (Lang, 1987).

An understanding of attitude is basic to understanding emotional response. An attitude develops when a belief about something is combined with a value. People respond with the emotional response of pleasure when patterns in the environment have a positive value for them. If patterns have a negative value the response is one of dislike. Values are the link between motivations, emotions, responses, and behavior (Lang, 1987). One way to achieve meaning in the world comes through learning and learning is

actually seeing and understanding the meanings of things through various life experiences; the two processes of learning and attaching meaning are closely related.

Transactional theory (Ittelson, 1960, 1973) stresses the role of association and experience in perception and cognition. In this theory, perception is thought to be a transaction between the observer, the environment, and the perception itself; they are interdependent on one another. Past experiences are necessary for understanding new ones; there is a building process - a learning process involved. Perceptions are described experientially or structurally. Experiential descriptions refer to affective or feeling reports. Structural descriptions are concrete and report what is actually perceived in the physical world. Environmental designers perceive the world structurally more than other people do.

Information-processing and organizing are involved in learning processes because knowing how things are related in categories and how to use the categories is essential for existence. The ability to generalize from past experiences enables humans to function. How people respond to artifacts in the environment depends on how they categorize the elements in the environment and associations built up over time (Lang, 1987). Spatial or structural properties like color, form, and texture cannot be separated completely from one another; but symbolic (emotional) meanings are detachable from objects and presumably are learned.

"Meaning is attached by association" (Gibson, 1950b). One person's symbolic, affective meaning attached to an object can differ from someone else's for the same object. Why do individuals' perceptions and preferences differ on viewing the same visual stimulus? What gives people pleasure and why? Among hypotheses of explanation are personality, organismic character, and social group membership, or culture (Lang, 1987). These are concepts which the field of aesthetics explores to try and answer these questions.

Aesthetics is the term used to describe a concern with the arts or sense of beauty. Perception and preference are active responses associated with exposure to artistic experiences; therefore, they can logically be studied in the context of aesthetics. The field is divided into categories, one of which is symbolic aesthetics. Symbolic aesthetics refers to the emotional and associative qualities of meaning an observer or user attaches to the sensory and formal qualities of the environment. Positive aesthetic value is the result of something perceived as good or pleasing because of this associative value. People use symbolic material artifacts to communicate non-verbally with one another. Symbols people prefer and use around them may reflect self-perception and personality (Cooper, 1974; Lang 1987; Sudalla, et al., 1987).

A study by Sudalla, et al., (1987) showed that housing attributes, particularly of interiors, are representative and symbolic of occupants' attributes of social identity and

personalities. Pyron (1966) studied perception of, and response to, popular, classical, and avant-garde literature, painting, and music in relationship to personality differences. These three art aesthetics and three art mediums were studied as a function of personality factors. Persons high in rigid attitudes and preference for simplicity of perceptual organization rejected avant-garde art (which is more complex and ambiguous) more than those who accepted change, who were more sociable, and more complex in perceptual organization. Correlating to Pyron's study is one by Barron and Welch (1952) in which subjects who were conventional and conservative displayed strong preferences to simple and symmetrical visual stimuli while subjects who were more maverick in attitude and action preferred complex, asymmetrical visual stimuli. Artistic persons differed significantly from less-artistic ones in preference, with the artistic people being much more accepting of complexity. Personality typing includes the characteristics of extroversion and introversion (Briggs & Myers, 1976; Cattell, 1969). There is some evidence that these traits affect differences in preference of environmental stimulation. Extroverts tend to prefer more environmental visual stimulus than introverts (Eysenck, 1973).

Humans are stimulus seeking. Psychological research reviewed by Rapoport and Kantor (1967) led them to believe that humans have an innate need for visual stimuli in their environment. People appear to prefer and choose complexity

over simplicity of visual stimulation from infancy onward (Cohen & Trostle, 1990; Fantz, 1958; Nachman, et al., 1986).

Symbolic aesthetics appears to correlate to transactional theory. One premise of transactional theory accepted universally is that it is multimodal (Ittelson, 1960, 1973; Lang, 1987) with many varied experiences shaping what people pay attention to in the environment, what they deem is important to them and what they respond to, either favorably or unfavorably. Therefore, worthy variables to examine for their effect on perceptions and preferences of pattern on interior surfaces are: personality factors, peoples' life experiences, (e.g., travel, cultural activities while traveling, like visiting art galleries, museums, historic and architectural sites), as well as types of popular periodicals one reads and specific demographics.

Methodology

Data Collection

The questionnaire was developed for two purposes. The first purpose was to assess perceptions of and preferences for visual simplicity versus visual complexity of patterned surfaces in the design of living room settings. Chapter V gives the results that fulfill this first purpose and serve as the basis on which the second purpose is fulfilled. The second purpose of the questionnaire was to obtain demographic and background data to use as independent variables to analyze for relationship as influencing factors

to perception and preference. Each subject responded to Cattell's PF16 personality factor instrument to determine personality factors. Subjects also supplied category information for age, educational level, and household annual income. Occupation for self and spouse was an open-ended question; responses were categorized into United States Bureau of the Census (1990) occupation categories. A semantic differential seven-point scale between low (1) and high (7) gave a general stress level rating. Frequency of travel inside and outside the United States, how many years and where one lived outside the United States, cultural activities when traveling, frequency of museum visiting, and types of magazines read were the other categories of background information obtained in the questionnaire (see Appendix A).

Data Analysis, Results, and Discussion

Analysis of data is based on findings in Chapter V in which the measures for perceptions and preferences for simplicity versus complexity of patterned surfaces in interiors were analyzed. The perception factors, achieved through factor analysis of selected bipolar adjective pairs produced three factors named 1) *aesthetics*, 2) *stimulation*, and 3) *organization*. The preference measures compared to the three perception factors through analysis of variance resulted in subjects rejecting the most simple and complex settings on all three factors and preferring two settings

that were moderately complex. Using these findings, the data of personality factors and socioeconomic data from the other variable measures are the independent variables to which the dependent variables of perception and preference are compared to determine if relationships exist.

Primary and Secondary Personality Traits Correlated to Perception Factors. The sixteen primary and eight secondary personality factor scores were placed into three levels of high, medium and low. Analysis of variance (AOV) was performed for each of these factors for each of the three perception factors of 1) aesthetics, 2) stimulation, and 3) organization. Few significant F values resulted.

Application of Duncan's multiple range test on comparisons with significant F values depends on equal cell sizes. Since cell sizes were distinctly unequal it was necessary to use Kramer's approximation and Duncan's multiple range test in order to evaluate differences among the means.

The *aesthetics* factor compared to the personality levels of *sober versus enthusiastic* resulted in a significant difference in means among the levels (see Table 19). Subjects who scored high, meaning enthusiastic, differed significantly from the low and medium scores on this test; there was no significant difference between the low and medium levels. This means that subjects with high scores are enthusiastic rather than sober and perceive the aesthetics of the slide settings more keenly than the

remaining subjects.

TABLE 19

ANALYSIS OF VARIANCE SUMMARY TABLE OF AESTHETICS PERCEPTION FACTOR COMPARED TO SOBER/ENTHUSIASTIC PERSONALITY FACTOR

Source	df	SS	MS	F	Pr > F
Model (Sober/ Enthusiastic PF)	2	1655.64	827.82	7.21	0.0008
Error	1734	199010.81	114.77		
Corrected Total	1736	200666.45			

Duncan's Multiple Range Test

Levels For Sober/Enthusiastic PF	n	Aesthetics Perception Factor Mean
High	167	34.27[a]
Low	458	31.46[b]
Medium	1112	30.90[b]

Means with the same letter are not significantly different at $p < .05$.

The F value was significant for the *organization factor* compared to the personality factor of *expedient versus conscientious*. Results show persons scoring low (expedient) and medium do not differ significantly, but both groups differ from those scoring high (conscientious) (see Table 20). Expedient persons tend to be casual, self-indulgent and refuse to be bound by the rules; conscientious persons

are conforming, rule-bound, moralistic, persevering and plan well. These results suggest that the expedient personalities and those balanced between the extremes perceived organization of the settings differently from the conscientious individuals.

The personality factor - *trusting versus suspicious* - when compared to both the *aesthetics and organization factors* showed a significant F value of mean differences (Tables 21 and 22). Results in Table 21, for the *aesthetics factor*, show no significant difference between high and low scores, but there is a significant difference between them and those scoring medium on this trait. High scores denote traits of being mistrustful, doubtful, self-opinionated, and unconcerned about other people. Low scores denote those who are cheerful, uncompetitive, adaptable, and concerned for others. Medium scores denote those who are neither extreme, but a balance between the two. The results of this analysis indicate that those in the two extremes of the trait tend to be more aware of the aesthetics of the settings than those who scored medium on this trait. For the *organization perception factor* (Table 22) the mean of high scores is significantly different from the low and medium between which there is no significant difference. This indicates that persons who tend to be suspicious perceived the organization of the settings more strongly than others on this trait.

TABLE 20

ANALYSIS OF VARIANCE SUMMARY TABLE OF ORGANIZATION PERCEPTION FACTOR COMPARED TO EXPEDIENT/ CONSCIENTIOUS PERSONALITY FACTOR

Source	df	SS	MS	F	Pr > F
Model (Expedient/ Conscientious PF)	2	397.01	198.51	3.70	0.0249
Error	1738	93215.29	53.63		
Corrected Total	1740	93612.30			

Duncan's Multiple Range Test

Levels For Expedient/Conscietious PF	n	Organization Perception Factor Mean
Low	91	24.2[7a]
Medium	1344	23.40[a]
High	306	22.31[b]

Means with the same letter are not significantly different at $p < .05$.

TABLE 21

ANALYSIS OF VARIANCE SUMMARY TABLE OF AESTHETICS PERCEPTION FACTOR COMPARED TO TRUSTING/SUSPICIOUS PERSONALITY FACTOR

Source	df	SS	MS	F	Pr > F
Model (Trusting/Suspicious PF)	2	1161.65	580.83	5.05	0.0065
Error	1734	199504.80		115.06	
Corrected Total	1736	200666.45			

Duncan's Multiple Range Test

Levels For Trusting/Suspicious PF	n	Trusting/Suspicious Perception Factor Mean
High	231	32.87[a]
Low	336	32.27[a]
Medium	1170	30.81[b]

Means with the same letter are not significantly different at $p < .05$.

Self-assured versus apprehensive is another personality factor that produced a significant F value when compared to the *organization perception factor* (Table 23). High scorers tend to worry, feel a strong sense of obligation, set high goals and standards for themselves, whereas low scorers have the capacity to deal with things. There is a significant difference in means between high scores over low; there is no significant difference between high and medium or medium

and low. This suggests that apprehensive persons perceive the organization of the settings as more important than those who are self-assured. Those who are apprehensive may need more organization to cope with worries and difficulties of life.

TABLE 22

ANALYSIS OF VARIANCE SUMMARY TABLE OF ORGANIZATION PERCEPTION FACTOR COMPARED TO TRUSTING/ SUSPICIOUS PERSONALITY FACTOR

Source	df	SS	MS	F	Pr > F
Model (Trusting/ Suspicious PF)	2	605.28	302.64	5.66	0.0036
Error	1738	93007.03	53.51		
Corrected Total	1740	93612.31			

Duncan's Multiple Range Test

Levels For Trusting/Suspicious PF	n	Organization Perception Factor Mean
High	231	24.68[a]
Low	335	23·41[b]
Medium	1175	22·93[b]

Means with the same mean are not significantly different at $p < .05$.

TABLE 23

ANALYSIS OF VARIANCE SUMMARY TABLE OF ORGANIZATION PERCEPTION FACTOR COMPARED TO SELF-ASSURED/ APPREHENSIVE PERSONALITY FACTOR

Source	df	SS	MS	F	Pr > F
Model (Self-assured/ Apprehensive PF)	2	344.28	172.14	3.21	0.0407
Error	1738	93268.03	53.66		
Corrected Total	1740	93612.31			

Duncan's Multiple Range Test

Levels For Self-Assured/Apprehensive PF	n	Organization Perception Factor Mean
High	360	24.02[a]
Medium	1102	23.17[ab]
Low	279	22.59[b]

Means with the same letter are not significantly different at $p < .05$.

Also compared to the *organization perception factor* and showing a significant difference in mean scores is the personality factor *undisciplined self-conflict versus following self-image*. Low scores on this factor indicate those who are lax and impetuous, with a tendency to be careless of social rules. High score traits mean being compulsive and socially precise. Medium scores connote those who are not extreme on either end of the scale, but are more balanced between the two. Results show a

significant difference between low and medium or high, as seen in Table 24. The meaning of this may be that undisciplined persons are perceiving the organization of the settings much differently than the other scorers on this trait.

TABLE 24

ANALYSIS OF VARIANCE SUMMARY TABLE OF ORGANIZATION PERCEPTION FACTOR COMPARED TO UNDISCIPLINED SELF-CONFLICT/FOLLOWING SELF-IMAGE PERSONALITY FACTOR

Source	df	SS	MS	F	Pr > F
Model (Undisciplined Self-Conflict/ Following Self-Image PF)	2	1046.82	523.41	9.83	0.0001
Error	1738	92565.49	53.26		
Corrected Total	1740	93612.31			

Duncan's Multiple Range Test

Levels For Sober/Enthusiastic PF	n	Organization Perception Factor Mean
Low	160	25.65[a]
Medium	1147	23.10[b]
High	434	22.77[b]

Means with the same letter are not significantly differenty at $p < .05$.

The secondary personality factor of *introversion versus extroversion* produced a significant difference in means when compared to the *organization perception factor*. High scores represent extroverted, uninhibited, social persons and low scorers are the opposite, being shy, self-sufficient, and inhibited. The mean on those scoring high showed a significant difference from those scoring low; there was no significant difference between medium and high or low scores (see Table 25). Extroverts, then, may the perceive the organization of the settings more distinctly than do introverts.

TABLE 25

ANALYSIS OF VARIANCE SUMMARY TABLE OF ORGANIZATION PERCEPTION FACTOR COMPARED TO INTROVERSION/EXTROVERSION PERSONALITY FACTOR

Source	df	SS	MS	F	Pr > F
Model (Introversion/ Extroversion PF))	2	374.07	187.04	3.49	0.0308
Error	1738	93238.23	53.65		
Corrected Total	1740	93612.30			

Duncan's Multiple Range Test

Levels For Introversion/Extroversion PF	n	Organization Perception Factor Mean
High	273	24.04[a]
Medium	931	23.37[ab]
Low	537	22.65[b]

Means with the same letter are not significantly different at $p < .05$.

Low versus high anxiety is another secondary personality factor, that when compared to the *organization perception factor* yielded a significant difference in means. The mean score of those scoring high on anxiety showed a significant difference from the means of medium and low scorers on this factor. Those high in anxiety indicate a greater degree of perception of organization than do others on this trait. Perhaps this is because they desire a greater amount of organization around them since they have trouble meeting the demands of life and achieving what they desire (Table 26).

TABLE 26

ANALYSIS OF VARIANCE SUMMARY TABLE OF ORGANIZATION PERCEPTION FACTOR COMPARED TO LOW VERSUS HIGH ANXIETY PERSONALITY FACTOR

Source:	df	SS	MS	F	Pr > F
Model (Low Versus High Anxiety PF)	2	624.94	312.47	5.841	0.0030
Error	1738	92987.37	53.50		
Corrected Total	1740				

Duncan's Multiple Range Test

Levels For Low Versus High Anxiety PF		Organization Perception Factor Mean
High	264	24.53[a]
Medium	1197	23.16[b]
Low	280	22.44[b]

Means with the same letter are not significantly different at $p \leq .05$.
N = 248-250

When the *aesthetics perception factor* was compared to the secondary personality factor of *emotionally sensitive versus tough poise*, significant mean differences resulted. Table 27 indicates that there is no significant difference between the two extremes of high and low, but that the persons scoring in the middle range on this trait do differ significantly. Those who score high are influenced by facts more than feelings (tough poise); they tend to be bold, decisive, and enterprising. At the opposite end of the scale are low scorers meaning people who are strongly influenced by their emotions and tend to be gentle, cultured, and artistic. These results indicate that the aesthetics of the settings are more keenly perceived by persons with strong degrees of the extremes of this trait, while those who are in the mid-range on this personality factor scale may be passive, and unobserving or not very cognitive of aesthetic qualities.

The same *emotionally sensitive versus tough poise* secondary factor showed a significant F value when compared to the *organization perception factor*. The results show both the high and low extremes of this factor have no significant difference in means, but the low scorers being significantly different from the mid-scale group of scorers (see Table 28). Those scoring low on this trait (who are more inclined to be cultured and artistic) may be more cognizant of the organization of the elements in the settings than those balanced in this trait, who may not be

as interested or responsive to it perceptually.

TABLE 27

ANALYSIS OF VARIANCE SUMMARY TABLE OF AESTHETICS PERCEPTION FACTOR COMPARED TO EMOTIONALLY SENSITIVE/TOUGH POISE PERSONALITY FACTOR

Source	df	SS	MS	F	Pr > F
Model (Emotionally Sensitive/Tough Poise PF)	2	1373.17	686.59	5.97	0.0026
Error	1734	199293.28	114.93		
Corrected Total	1736	200666.45			

Duncan's Multiple Range Test

Levels For Sensitive/Tough Poise PF	n	Aesthetics Perception Factor Mean
Low	332	32.55[a]
High	486	32.13[a]
Medium	919	30.54[b]

Means with the same letter are not significantly different at $p < .05$.

TABLE 28

ANALYSIS OF VARIANCE SUMMARY TABLE OF ORGANIZATION PERCEPTION FACTOR COMPARED TO EMOTIONALLY SENSITIVE/TOUGH-POISE PERSONALITY FACTOR

Source	df	SS	MS	F	Pr > F
Model (Emotionally Sensitive/Tough Poise PF)	2	436.58	218.29	4.07	0.0172
Error	1738	93175.72	53.61		
Corrected Total	1740	93612.30			

Duncan's Multiple Range Test

Levels For Sensitive/Tough Poise PF	n	Organization Perception Factor Mean
Low	334	24.13[a]
High	487	23.44[ab]
Medium	920	22.83[b]

Means with the same letter are not significantly different at $p < .05$.

The only instance of the *stimulation perception factor* showing a significant difference in means to a personality factor is to *low (neuroticism) versus high adjustment*. Those who score high on this factor are apt to be self-confident, assertive, well-adjusted, relaxed, adaptive, and flexible. Low scorers would be the opposite in these traits. Results (Table 29) show high scorers on adjustment differ significantly from those who score low or in the mid-

range on the scale. This could be interpreted to mean that the well-adjusted persons viewing the settings were more cognizant and perceptive of the stimulus elements contained in them.

TABLE 29

ANALYSIS OF VARIANCE SUMMARY TABLE OF STIMULATION PERCEPTION FACTOR COMPARED TO LOW VERSUS HIGH ADJUSTMENT PERSONALITY FACTOR

Source	df	SS	MS	F	Pr > F
Model (Stimulation Factor)	2	950.44	475.22	3.93	0.0199
Error	1735	209882.43	120.97		
Corrected Total	1737	210832.87			

Duncan's Multiple Range Test

Levels For Low Versus High Adjustment PF	n	Stimulation Perception Factor Mean
High	313	34.27[a]
Medium	1020	31.46[b]
Low	405	30.90[b]

MEANS WITH THE SAME LETTER ARE NOT SIGNIFICANTLY DIFFERENT at $p \leq .05$.
N = 248-250

Very few significant relationships were found between the three perception factors compared to the sixteen primary and eight secondary personality factors. The aesthetics factor showed significant mean differences on only two

primary and one secondary personality factor. The stimulation factor significantly compared to only one secondary personality factor. The third perception factor - organization - had the largest number of personality factors that showed statistical significance (Table 30).

TABLE 30

THE PRIMARY AND SECONDARY PERSONALITY FACTORS THAT COMPARED TO PERCEPTION FACTORS

Perception Factors	Personality Factors
1. Aesthetics	Primary: Sober versus Enthusiastic Trusting versus Suspicious Secondary: Emotionally Sensitive versus Tough Poise
2. Stimulation	Secondary: Low versus High Adjustment
3. Organization	Primary: Expedient versus Conscientious Trusting versus Suspicious Self-Assured versus Apprehensive Undisciplined Self-Conflict versus Following Self-Image Secondary: Introversion versus Extroversion Low versus High Anxiety Emotionally Sensitive versus Tough Poise

This suggests that personality factors in this study do not appear to be strong indicators of perception for visual stimulus in interior settings. This finding has both positive and negative aspects. It is disappointing that more personality factors did not show statistical significance when compared to the dependent variables; however, it can be positive from the viewpoint of inability to categorize people by certain traits for which they have little control. Such traits are so innate and ingrained that it becomes difficult to alter them. Personality factors are ambiguous and abstract; each person is a unique mixture of several traits in varying degrees. This makes it very difficult to make distinctions that are clearly defined enough to compare to other abstract phenomena such as perceptions and affective opinions. Perhaps the positive side of these findings is that they defend the unique individualism of each person. Also, design perceptions vary greatly and personality may not be a predictor for perception.

Chapter III explains Cattell's 16PF personality factors instrument and the sixteen primary and eight secondary factors it measures. Pearson's product moment correlation method was used to assess possible relationship of personality factors to preference of simplicity versus complexity of visual stimuli in living room settings. Degrees of simplicity to complexity were operationalized through seven pattern distributions where visual stimuli was

gradually increased in each successive setting. Measurement of the affective dependent variable of preference used two modes. The first mode was by response to a seven-point Likert scale of like/dislike for each of the settings shown independently and in a random selection order. The second mode was choosing the most preferred setting as slides of the settings were shown in 21 randomly selected pairs.

Primary and Secondary Personality Factors in Relation to Preference of Complexity Measured by Response on a 7-Point Likert Scale of Like/Dislike. The Pearson product moment correlation results showed low, weak levels of correlation between personality and preference scores obtained from the seven-point Likert scale of like/dislike; many showed negative correlation. The highest coefficient value used in the analysis is .23 and the lowest is .12. The study used a two-tailed region of rejection at .05 level of significance. The rationale for this is that both positive and negative correlations are of interest and .05 alpha level is commonly used in social science research (Roscoe, 1975). Tables 31 and 32 give the correlations of primary (1 - 16) and secondary (1 - 8) personality factors, respectively, to preference, measured by this mode. Results show few significant relationships.

TABLE 31

PEARSON PRODUCT MOMENT CORRELATION MATRIX OF PRIMARY PERSONALITY FACTORS TO PREFERENCE MEASURED BY THE LIKERT SCALE OF LIKE/DISLIKE

	Pattern Distribution Settings: 1	2	3	4	5	6	7
Primary Personality Factors:							
1. Cool/Warm	-.03	-.11	-.02	-.12	.03	-.03	.11
2.Concrete/Abstract Thinking	-.06	.08	-.04	.09	.23*	.13*	-.10
3.Affected by Feelings/Stable & Mature	.02	.04	.08	.15*	.11	.03	-.07
4.Submissive/Dominant	.02	.02	-.02	-.09	.08	.09	.03
5.Sober/Enthusiastic	.08	.10	-.01	.07	.09	.04	.02
6.Expedient/Conscientious	-.09	-.06	-.05	-.05	-.05	-.03	-.00
7.Shy/Bold	.11	-.00	-.06	-.02	.06	-.00	-.02
8.Tough-minded/Tender-minded	.05	-.02	-.01	.06	-.04	.03	-.04
9.Trusting/Suspicious	-.03	.04	-.06	-.14*	.00	-.06	.10
10.Practical/Imaginative	.00	-.13*	-.06	-.06	.05	-.06	.04
11.Forthright/Shrewd	-.04	.07	.11	-.01	-.03	.02	.04
12.Self-assured/Apprehensive	-.08	-.10	-.10	-.11	.01	.00	.13*
13.Conservative/Experimenting	-.06	-.04	.04	.03	.07	-.06	.01
14.Group-oriented/Self-sufficient	-.05	-.04	.00	.04	-.07	-.10	-.06
15.Socially lax/ Socially precise	.06	.04	.04	-.00	.04	.03	-.10
16.Relaxed/Tense	-.15*	-.03	-.04	-.10	-.02	.04	.13*

N=250
* Significant at the .05 level.
Minus sign indicates an inverse correlation.

The factor of *concrete versus abstract thinking* has a low positive correlation to preference of settings #5, the *transposal MPD* and #6, which is the *composite MPD*; the individuals scoring high in abstract thinking preferred these settings representing complexity. Persons scoring high in abstract thinking are intelligent, fast learners and this trait shows some correlation with level of culture and alertness. Concrete thinking persons are said to be slower to learn and given to literal interpretation (Administrator's Manual for the 16PF, 1986).

Personality factor #3, *affected by feelings versus emotionally stable* has a low positive correlation to setting #4, meaning subjects with high scores (emotionally stable) indicate a preference for *Setting #4*, the most complex of the single pattern distributions and moderate in complexity. Those subjects scoring high on this trait are considered emotionally stable, realistic about life, calm, and possessing ego strength as opposed to low scorers on this factor being prone to frustration, fretful and evasive of reality (Administrator's Manual for the 16PF, 1986).

The ninth of the 16PF, *trusting versus suspicious*, also shows low, but negative, correlation to setting #4. This means that the lower the scores on the factor (or the more trusting one is) the greater the preference for a moderately complex setting.

The 10th personality factor - *practical versus imaginative* - shows a low negative correlation to preference

of *setting #2*, which is the *most simple of the single pattern distributions*. Subjects scoring lowest on this trait are practical minded, unimaginative, steady, and follow what is obviously possible. In contrast, people scoring high on this trait are imaginative, unconventional, oblivious of physical realities, and inner-directed (Administrator's Manual for the 16PF, 1986). The correlation can be interpreted to mean that setting #2, representative of simple visual stimuli is preferred by those who are practical and unimaginative.

The twelfth factor of *self-assured versus apprehensive* has a low positive correlation to *setting #7, the recurrent-composite combination* setting which is representative of the greatest visual complexity. This could be interpreted to mean that persons scoring high on this trait are apprehensive, worry, feel insecure, have high expectations of themselves, and a strong sense of obligation, but show preference for the most complex visual stimuli. This finding might appear illogical, but perhaps complexity of visual stimuli for these people represents some degree of security and fulfillment of high expectation and obligation to succeed. Low scores indicate the traits of being self-assured, free of guilt, untroubled, mature, self-confident and ability to deal with things (Administrator's Manual for the 16PF, 1986), all of which appear logical to associate with preference for complexity in stimuli; but perhaps a rationale is that these traits also suggest very organized,

methodical persons and more simplistic surroundings may be more comfortable for them.

Personality factor #16, *relaxed versus tense*, indicates correlation to two settings - *#1, the most simple, and #7, the most complex*. This trait has a low positive correlation to *setting #7, the recurrent-composite combination*. Subjects scoring high on this factor are tense, restless, impatient, and hard driving; their frustration represents an excess of stimulated, but undischarged drive. Low scores on this factor are sedate, relaxed, composed, satisfied, perhaps lazy and low performing (Administrator's Manual for the 16PF, 1986). The meaning of this correlation is that the high scorers who are tense, restless, and possess stimulated drive indicate preference for the highest level of visual complexity. Perhaps it can be postulated that people with a lot of nervous energy and drive are motivated and energized by complexity of visual stimuli and simplicity may be viewed negatively as boring and unchallenging. This factor has a low negative correlation to setting #1, the most visually simple one. This indicates that individuals who are relaxed and possess lower drive prefer simplicity of visual stimuli. They may prefer settings that are easily understood and do not require effort expended to derive meaning and understanding. This finding is curious and raises the possibility for future research to explore if this connection is evidenced in other applications of these variables. There were no significant correlations of this

factor to settings when the settings were responded to in pairs.

The factors of *self-assured versus apprehensive* and *relaxed versus tense* can be confused with one another, but are independent and differ somewhat in meaning from one another in this 16PF instrument. Both include worry, but tenseness is more related to assertiveness and intensity of purpose, an inner self-directed drive toward some end, whereas anxiety reflects a disposition to fretfulness, moodiness, and guilt over inability to cope with difficulties.

The secondary traits derived from the sixteen primary ones are interesting to examine and compare correlation results against one another. This serves as an internal validity check.

Anxiety shows a low positive correlation to *setting #7* (Table 32), meaning that subjects who scored high on anxiety showed a preference for visual complexity. This corresponds to the findings on the two primary factors (affected by feelings versus emotionally stable and self-assured versus apprehensive) which are within the group that combine to produce this secondary factor. The primary factors that combine to form the secondary trait of anxiety are: affected by feelings versus emotionally stable, shy versus bold, trusting versus suspicious, self-assured versus apprehensive, and undisciplined self-conflict versus following self-image. Relaxed versus tense is not included.

TABLE 32

PEARSON PRODUCT MOMENT CORRELATION MATRIX OF SECONDARY PERSONALITY FACTORS TO PREFERENCE MEASURED BY THE LIKERT SCALE OF LIKE/DISLIKE

	Pattern Distribution Settings:						
	1	2	3	4	5	6	7
Secondary Personality Factors:							
1. Introversion/Extroversion	.05	-.00	-.05	.02	.12	.03	.05
2. Low Anxiety/High Anxiety	-.07	-.01	-.08	-.11	-.03	-.00	.15*
3. Emotional Sensitivity/Tough Poise	-.03	.08	.02	-.04	.05	.04	.04
4. Subduedness/Independence	.01	-.05	-.04	-.07	.14*	.03	.02
5. Low Ego Control/High Ego Control	-.02	-.04	-.00	-.08	.07	.00	-.09
6. Neuroticism/Adjustment	.07	.07	.10	.10	.08	.01	-.13*
7. Low Leadership/High Leadership	.11	.15*	.04	.05	.13*	.09	-.07
8. Low Creativity/High Creativity	.03	.01	.02	.07	.13*	.02	-.12*

* Significant at the .05 level.
Minus sign indicates inverse relationship.

N=250

Independence shows a low positive correlation to *setting #5* (Table 32), *the transposal MPD,* which represents a moderate degree of visual stimulation. Those who score high, meaning independent rather than subdued, indicate a higher preference for the transposal MPD than the other settings. The primary factors that form the secondary factor of independence are: submissive versus dominant; expedient versus conscientious; shy versus bold; trusting

versus suspicious; forthright versus shrewd; self-assured versus apprehensive; conservative versus experimenting; and group-oriented versus self sufficient. Of these eight primary factors only two - trusting versus suspicious and self-assured versus apprehensive - showed significant correlations as primary factors. The low correlations of them as primary factors show some correspondence to the secondary correlation (e.g., like preferring moderate complexity over simplicity).

Adjustment is the secondary factor of *neuroticism versus adjustment*. Those who score high on this trait are considered well-adjusted, self-confident, and assertive; they are relaxed, adaptive and flexible. Those who score low on this factor tend to be apprehensive, emotionally reactive, sensitive, and find it difficult to cope with daily life. The primary factors that cluster to produce this secondary factor are: concrete versus abstract thinking, affected by feelings versus emotionally stable, submissive versus dominant, sober versus enthusiastic, expedient versus conscientious, shy versus bold, tough-minded versus tender-minded, self-assured versus apprehensive, conservative versus experimenting, relaxed versus tense. *Adjustment* shows a low negative correlation to *setting #7* (Table 32), the *recurrent-composite MPD*, which contains the greatest degree of visual stimulation. This could be interpreted to mean that those subjects who scored lowest on this factor - toward neuroticism - are the ones

indicating preference for the most visually complex setting This correlation confirms the findings from the two primary factors of self-assured versus apprehensive and relaxed versus tense, but counters the correlation of concrete thinking versus abstract thinking.

The secondary factor of *leadership* shows a low positive correlation to *settings #2 and #5* (Table 32), meaning that subjects who scored high on leadership show a preference for moderate to low levels of complexity. *Setting #5, the transposal MPD* is moderately complex and *setting #2 is the simplest of the three single pattern distributions*. The following primary factors are the basis upon which this secondary factor is based: concrete versus abstract thinking, affected by feelings versus emotionally stable, submissive versus dominant, sober versus enthusiastic, expedient versus conscientious, shy versus bold, tough-minded versus tender-minded, practical versus imaginative, forthright versus shrewd, self-assured versus apprehensive, group-oriented versus self-sufficient, and relaxed versus tense. Of this list of primary factors only these five showed any significant correlation to preference for any of the settings: concrete versus abstract thinking, affected by feelings versus emotionally stable, practical versus imaginative, self-assured versus apprehensive, and relaxed versus tense. High leadership scores would coincide with abstract thinking, emotionally stable, imaginative, self-assured and relaxed. The degree of preference of visual

stimuli on the factor of leadership appears to correlate with the correlation findings of these five primary factors.

Creativity is a secondary factor based on these primary factors: cool versus warm, concrete versus abstract thinking, submissive versus dominant, sober versus enthusiastic, practical versus imaginative, forthright versus shrewd, conservative versus experimenting, group-oriented versus self sufficient, and relaxed versus tense. Of these eleven primary factors only these three showed any correlation to preference of the settings: concrete versus abstract thinking, practical versus imaginative, and relaxed versus tense. *Creativity* shows a low positive correlation to *setting #5, the transposal MPD*, which contains a moderate degree of visual complexity. The findings of Barron and Welsh, (1952), Munsinger and Kessen (1964), Pyron, (1966), or Rapoport and Kantor, (1967) indicate creativity is associated with a preference of complexity over simplicity. This appears consistent to current findings. The mode of operationalization in the current study differs from the modes used in these former studies. More research using interior elements is needed to further extend knowledge and understanding about personality and complexity to use in the design fields.

Primary and Secondary Personality Factors in Relation to Preference of Complexity Measured by Viewing Slide Settings in Pairs. The following data analysis also uses Pearson's product moment correlation to assess relationships between the primary personality factors and preference for complexity in interiors; the preference scores for this set of correlations are those derived from viewing slides in pairs. This second mode of obtaining preference scores served as an internal validity check. Mean scores of preference for the settings, from both the Likert scale and by slide pairs can be seen in Table 33.

TABLE 33

MEAN SCORES FOR PREFERENCE OF PATTERN DISTRIBUTIONS IN LIVING ROOM SETTINGS

PREFERENCE	DISTRIBUTION MEANS (SCALE =1 to 7)						
	#1	#2	#3	#4	#5	#6	#7
LIKE VS DISLIKE	2.52	3.49	3.40	3.69	3.97	3.57	2.25
SLIDES BY PAIRS	1.50	2.53	3.56	4.07	4.24	3.80	1.31

N = 249-250

TABLE 34

PEARSON PRODUCT MOMENT CORRELATION MATRIX OF PRIMARY PERSONALITY FACTORS TO PREFERENCE MEASURED BY SLIDE PAIRS

	Pattern Distribution Settings:						
	1	2	3	4	5	6	7
Primary Personality Factors:							
1.Cool/Warm	-.10	-.13*	-.13*	-.14*	.09	.18*	.10
2.Concrete/Abstract Thinking	-.10	-.10	-.05	.04	.17*	.09	-.04
3.Affected by Feelings/Stable & Mature	-.01	-.01	-.11	-.01	-.00	.11	-.01
4.Submissive/Dominant	-.06	-.01	.04	.08	-.01	.12	-.11
5.Sober/Enthusiastic	.01	-.03	-.08	-.02	-.03	.05	-.00
6.Expedient/Conscientious	-.02	-.06	-.01	-.04	.01	-.04	.03
7.Shy/Bold	.01	.03	-.02	-.04	-.00	.08	-.06
8.Tough-minded/Tender-minded	.02	-.01	-.03	.01	-.08	-.04	-.04
9.Trusting/Suspicious	-.09	.01	-.02	-.02	.02	.04	.03
10.Practical/Imaginative	-.00	-.06	-.18*	-.07	.07	.08	.07
11.Forthright/Shrewd	.03	.02	.01	-.05	.01	-.02	.00
12.Self-assured/Apprehensive	-.18*	-.09	-.08	-.14*	.09	.11	.17*
13.Conservative/Experimenting	.02	-.08	-.14*	-.05	.07	.12	-.02
14.Group-oriented/Self-sufficient	.04	.04	.03	.07	-.03	-.04	-.05
15.Socially lax/Socially precise	.07	.02	.13*	.05	-.05	-.07	-.08
16.Relaxed/Tense	-.11	-.07	-.00	-.05	.08	.04	.06

* Significant at the .05 level.

Minus sign indicates an inverse correlation.

The first personality factor - *cool versus warm* - did not show any significant correlation to any of the slide settings viewed individually and responded to on the Likert scale of like/dislike. However, this factor shows significant, although low, correlation to slide settings #2, 3, 4, and 6, when viewed in pairs (Table 34). There is a low negative correlation to *settings #2, 3, and 4*, all of which are *single pattern distributions*, but gradually increasing in complexity from #2 to #4. These represent simplicity of visual stimuli. The correlations, being negative, indicate that subjects who score toward the cool end of this factor scale prefer the simpler settings. The fourth correlation, which is low positive rather than negative, is to setting #6, which is the *composite MPD* and represents complexity. This indicates that subjects who score high toward the warm end of the factor scale show a preference for complex stimuli, which appears consistent with past research (Eysenck, 1973). Cool on this factor means stiff, skeptical, aloof, preference for working alone and avoidance of compromising viewpoints; these persons are likely to be precise, or rigid in their way of doing things. Warm persons tend to be good natured, easy-going, cooperative, softhearted, adaptable and sociable (Administrator's Manual for the 16PF, 1986).

The second factor of *concrete versus abstract thinking* shows one low positive correlation to *setting #5, the transposal MPD* (Table 34). One with the trait of abstract

thinking shows a preference for moderate visual complexity. This corresponds to the findings for this factor when measured by the like/dislike scale for preference.

The next factor to show any correlation to preference is PF #10 - *practical versus imaginative*. It shows a low negative correlation for *setting #3*, meaning subjects who scored low on this factor, which means practical, indicate a preference for simplicity which setting #3 represents. This coincides with the result of this factor to the settings when responded to on the Likert scale of like/dislike.

Three significant correlations occur for PF #12 - *self-assured versus apprehensive* - to preference for *settings #1, #4, and #7* (Table 34). Low negative correlations are seen for settings #1 and #4; *#1 is the most simple no-pattern setting* and *#4 represents a moderately high level of complexity*. The meaning of this is that self-assured, unruffled subjects appear to prefer simplicity and/or a moderation of visual stimuli. The low positive correlation to setting #7 indicates those who are apprehensive and insecure are more likely to prefer complexity of visual stimuli, which concurs with the results from scoring preference on the Likert scale of like/dislike.

The trait of *conservative versus experimenting* shows a correlation of preference to setting #3. A low negative correlation to *setting #3, representing simplicity* rather than complexity, indicates that conservative tendencies in personality relate to a preference for simplicity of visual

stimuli (Table 34). This corresponds to the findings of Barron and Welch, (1952) and Pyron, (1966). Conservatism describes those who are cautious, compromising about new ideas, respectful of tradition, and tend not to be interested in intellectualism. In contrast, experimenting persons tend to be more liberal, critical, open to change, and intellectual and well informed. This factor did not show any significant correlations to preference of settings when subjects responded to the Likert scale of like/dislike.

The 15th trait of *undisciplined self-conflict (socially lax) versus following self-image (socially precise*) shows a low positive correlation to *setting #3* (Table 34). This could mean that one who is following self-image, is precise and compulsive shows a preference for simplicity. This factor did not show correlation to any of the slide settings on the Likert scale of like/dislike.

Of the eight secondary personality factors only three show any significant correlation of preference to settings when viewed by pairs (see Table 35). Five of the eight showed significant correlation to the settings when the settings were responded to on the Likert scale of like/dislike (Table 32).

Extroversion showed a low positive correlation to *setting #6, the composite MPD*, representing a high degree of complexity. This means subjects whose scores were high on this factor - toward extroversion rather than introversion - appear to have a preference for complexity over simplicity

(Table 35). This finding parallels past research findings (Eysenck, 1973) .

TABLE 35

PEARSON PRODUCT MOMENT CORRELATION MATRIX OF SECONDARY PERSONALITY FACTORS TO PREFERENCE MEASURED BY SLIDE PAIRS

	Pattern Distribution Settings:						
	1	2	3	4	5	6	7
Secondary Personality Factors:							
1. Introversion/Extroversion	-.08	-.09	-.12	-.09	.09	.16*	.02
2. Low Anxiety/High Anxiety	-.14*	-.04	-.01	-.05	.06	.05	.07
3. Emotional Sensitivity/Tough Poise	-.07	.03	.08	-.09	-.07	.00	-.00
4. Subduedness/Independence	-.03	-.09	-.10	.00	.10	.13*	-.07
5. Low Ego Control/High Ego Control	.03	-.04	-.08	.00	.00	.03	-.09
6. Neuroticism/Adjustment	.05	.00	-.00	.04	-.04	.04	-.08
7. Low Leadership/High Leadership	.05	-.01	.02	.03	-.01	.04	-.10
8. Low Creativity/High Creativity	.00	.03	.01	.07	.04	-.01	-.11
* Significant at the .05 level.							

The factor of *anxiety* shows a low negative correlation to *setting #1, the most simple no-pattern setting* (Table 35). This can be interpreted to mean that subjects low on anxiety tend to prefer simplicity. This coincides, in inverse relationship, with the finding when the settings

were viewed and responded to on the Likert scale of like/dislike; the results showed those who scored high on the anxiety scale preferred setting #7, the most complex one.

The secondary trait of *independence* shows a low positive score for *setting #6, the composite MPD*, with a high degree of complexity (Table 35). Therefore, subjects who scored high on independence seem to prefer complexity over simplicity of visual stimuli. This also parallels the finding for this factor when settings were checked for preference with the Likert scale of like/dislike.

Socioeconomic Variables in Relation to Perception and Preference of Visual Complexity. Following analysis of personality factors to perception and preference of visual stimuli in the seven settings, data analysis proceeded to the socioeconomic variables of thestudy corresponding to Objective #4. The socioeconomic variables to be tested for their influence on the dependent variables of perception and preference for complexity of visual stimuli are: age, annual household income, education level, occupation, general stress level, travel experience inside and outside the United States, cultural activities while traveling, museum visiting frequency, and types of magazines one reads. The decision was made to use cluster analysis, a program that reads the data and divides it into clusters or groups of data that relate to one another in the best fit possible. There are several methods of cluster analysis;

the two used for this data are the unweighted pairs group average and flexible linkage procedures.

In the flexible method the individuals who fell in each of the clusters were formulated into two-way tables, which revealed no consistency in the clustering using the two measures (preference scores and perception scores). The data indicates that the respondents were homogeneous with respect to their demographic background.

The UPG average method of clustering gave no usable or logical clusters with which to work. The flexible method, however, gave results that appeared promising. For preference data, as measured on the Likert scale of like/dislike, the data emerged in the form of data "trees" to show a possibility of three, four, five or more clusters. For preference data, as determined by measures of preference scores of the settings shown in slide pairs, the data "trees" emerged to show a possible three, four, or seven clusters; the data, in this instance, showed no logic in dividing into five or six clusters, but seven clusters were viable. For perception data, as measured by the variables of perception for each setting, the data emerged into a possible three, four or five clusters.

A frequency procedure print-out was executed for each method of obtaining preference scores, as well as the perception factor scores, for each cluster possibility (see Table 36). The distribution that emerged appeared promising, but after execution of the frequency procedure print-out the

data values were processed for comparison as matrix tables with cells. Five matrix tables were produced: 1) three clusters of preference by the Likert scale of like/dislike compared to three clusters of preference by slide pairs; 2) three clusters of preference by the Likert like/dislike scale compared to three clusters of perception factors; 3) three clusters of preference by slide pairs compared to three clusters of perception factors; 4) four clusters of preference by the Likert scale of like/dislike compared to four clusters of preference by slide pairs; 5) four clusters of preference by the Likert scale of like/dislike compared to the perception factors. The values in each cell of each table were reviewed for a logical pattern of relationship, but none were observed that appeared strong enough to pursue through further analytical processes (see Tables 37 through 41).

TABLE 36

CLUSTER ANALYSIS FREQUENCIES FOR PREFERENCE AND PERCEPTION

Preference Clusters By Likert Scale of Like/Dislike		
Three Clusters	Frequency	Percent
First Cluster	81	32.7
Second Cluster	116	46.8
Third Cluster	51	20.6
Four Clusters		
First Cluster	81	32.7
Second Cluster	92	37.1
Third Cluster	24	9.7
Fourth Cluster	51	20.6
Five Clusters		
First Cluster	81	32.7
Second Cluster	62	25.0
Third Cluster	30	12.1
Fourth Cluster	24	9.7
Fifth Cluster	51	20.6
Preference Clusters By Viewing Slides In Pairs		
Three Clusters		
First Cluster	87	34.8
Second Cluster	115	46.0
Third Cluster	48	19.2
Four Clusters		
First Cluster	26	10.4
Second Cluster	61	24.4
Third Cluster	115	46.0
Fourth Cluster	48	19.2
Seven Clusters		
First Cluster	26	10.4
Second Cluster	39	15.6
Third Cluster	22	8.8
Fourth Cluster	92	36.8
Fifth Cluster	23	9.2
Sixth Cluster	37	14.8
Seventh Cluster	11	4.4

TABLE 36 (Continued).

Clusters for Perception Factors

Three Clusters	Frequency	Percent
First Cluster	71	31.1
Second Cluster	113	49.6
Third Cluster	44	19.3
Four Clusters		
First Cluster	71	31.1
Second Cluster	113	49.6
Third Cluster	21	9.2
Fourth Cluster	23	10.1
Five Clusters		
First Cluster	56	24.6
Second Cluster	15	6.6
Third Cluster	113	49.6
Fourth Cluster	21	9.2
Fifth Cluster	23	10.1

Missing Frequencies = 22

TABLE 37

THREE CLUSTER MATRIX FOR PREFERENCE BY THE LIKERT SCALE OF LIKE/DISLIKE TO PREFERENCE BY SLIDE PAIRS

Preference By Like/Dislike	Preference By Slide Pairs			
Frequency Percent Row Pct Col Pct	1	2	3	Total
1	15 6.05 18.52 17.44	54 21.77 66.67 47.37	12 4.84 14.81 25.00	81 32.66
2	43 17.34 37.07 50.00	46 18.55 39.66 40.35	27 10.89 23.28 56.25	116 46.77
3	28 11.29 54.90 32.56	14 5.65 27.45 12.28	9 3.63 17.65 18.75	51 20.56
Total	86 34.68	114 45.97	48 19.35	248 100.00

Missing Frequencies = 2

TABLE 38

THREE CLUSTER MATRIX FOR PREFERENCE BY THE LIKERT SCALE OF LIKE/DISLIKE TO PERCEPTION FACTORS

Preference By Like/Dislike	Perception Factors			
Frequency Percent Row Pct Col Pct	1	2	3	Total
1	24 10.62 32.43 34.29	37 16.37 50.00 33.04	13 5.75 17.57 29.55	74 32.74
2	43 19.03 39.81 61.43	54 23.89 50.00 48.21	11 4.87 10.19 25.00	108 47.79
3	3 1.33 6.82 4.29	21 9.29 47.73 18.75	20 8.85 45.45 45.45	44 19.47
Total	70 30.97	112 49.56	44 19.47	226 100.00

Missing Frequencies = 24

TABLE 39

THREE CLUSTER MATRIX FOR PREFERENCE BY SLIDE PAIRS TO PERCEPTION FACTORS

Preference By Slide Pairs	Perception Factors			
Frequency Percent Row Pct Col Pct	1	2	3	Total
1	6 2.63 7.59 8.45	58 25.44 73.427 51.33	15 6.58 18.99 34.09	79 34.65
2	45 19.74 42.06 63.38	43 18.86 40.19 38.05	19 8.33 17.76 43.18	107 46.93
3	20 8.77 47.62 28.17	12 5.26 28.57 10.62	10 4.39 23.81 22.73	42 18.42
Total	71 31.14	113 49.56	44 19.30	228 100.00

Missing Frequencies = 22

TABLE 40

FOUR CLUSTER MATRIX FOR PREFERENCE BY THE LIKERT SCALE OF LIKE/DISLIKE TO PREFERENCE BY SLIDE PAIRS

Preference By Like/Dislike	Preference By Slide Pairs				
Frequency Percent Row Pct Col Pct	1	2	3	4	Total
1	6 2.42 7.41 23.08	9 3.63 11.11 15.00	54 21.77 66.67 47.37	12 4.84 14.81 25.00	81 32.66
2	11 4.44 11.96 42.31	46 18.55 39.66 40.35	39 15.73 42.39 34.21	16 6.45 17.39 33.33	92 37.10
3	2 0.81 8.33 7.69	14 5.65 27.45 12.28	9 3.63 17.65 18.75	11 4.44 45.83 22.92	24 9.68
4	7 2.82 13.73 26.92	21 8.47 41.18 35.00	14 5.65 27.45 12.28	9 3.63 17.65 18.75	51 20.56
Total	26 10.48	60 24.19	114 45.97	48 19.35	248 100.00

Missing Frequencies = 2

TABLE 41

FOUR CLUSTER MATRIX FOR PREFERENCE BY THE LIKERT SCALE OF LIKE/DISLIKE TO PREFERENCE BY SLIDE PAIRS

Preference By Like/Dislike	Perception Factors				
Frequency Percent Row Pct Col Pct	1	2	3	4	Total
1	24 10.62 32.43 34.29	37 16.37 50.00 33.04	8 3.54 10.81 38.10	5 2.21 6.76 21.74	74 32.74
2	32 14.16 38.10 45.71	45 19.91 53.57 40.18	2 0.88 2.38 9.52	5 2.21 5.95 21.74	84 37.17
3	11 4.87 45.83 15.71	9 3.98 37.50 8.04	0 0.00 0.00 0.00	4 1.77 16.67 17.39	24 10.62
4	3 1.33 6.82 4.29	21 9.29 47.73 18.75	11 4.87 25.00 52.38	9 3.98 20.45 39.13	44 19.47
Total	70 30.97	112 49.56	21 9.29	23 10.18	226 100.00

Missing Frequencies = 24

Discussion

Discussion of what direction to take led to the decision that further analysis attempts would not yield usable or consistent results. These are possible reasons for this data giving inconclusive results after attempts to statistically analyze it.

A sample size of 250 is not considered a small sample, but given the large number of variables with which the study deals the sample size may be too small. The sample is homogeneous in nature on the majority of the sociodemographic variables. Such homogeneity prevents distinct differences from emerging in high enough numbers to be analyzed as being influencing or non-influencing on perceptions and preferences for visual stimuli. The sample gender may be another factor that bears on the socioeconomic and personality factors data producing unusable results. An all female group of subjects may also be preventing more definitive differences from being present. Perhaps the female viewpoints and opinions, though composed of some differences are too close to give distinct influences. Design preferences vary greatly and these sociodemographic variables may not be predictors for preference.

Another possible reason for data not giving usable results are the slide settings themselves. The simulated settings are rigid, and uninviting compared to real-life living room settings, which are more personalized and warm-feeling. Even though some settings were statistically more

preferred than others, none of the settings were rated so well accepted that mean scores were much above the neutral mid-point of the 7-point scale. The settings were also so alike in the conformity of the coloration, styles, arrangement, and accessories that it made it difficult to discern differences, especially among the no-pattern and three single pattern ones, when subjects viewed them individually and in random order. It was also difficult for a clear distinction to be made between the transposal and composite settings.

A familiarization phase might have been beneficial. The slides could have been projected individually with a viewing time, perhaps of five seconds each, to allow a familiarization process, after which they would have been viewed the second time for subjects to respond to them on the answer sheets. Another mode of familiarization that could have been used is a sample board on which the materials samples showing the pattern and colorations depicted in the slides could have been displayed and the sample board placed on view for subjects to see prior to responding. The primary reason for not doing this was the concern of controlling bias and intentionally not giving subjects any information that could have biased their reactions and responses.

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APPENDIXES

APPENDIX A

DISSERTATION QUESTIONNAIRE

Form C

16 PF™

WHAT TO DO: Inside this booklet are some questions to see what interests you have and how you feel about things On most items there are no "right" or "wrong" answers because people have the right to their own views All you have to do is answer what is true for *you*

If a separate answer sheet has *not* been given to you, turn this booklet over and tear off the answer sheet on the back page Write your name and other information asked for on the answer sheet

First, read the four EXAMPLES below and mark your answers *on the answer sheet* where it says *EXAMPLES* Fill in the box completely

EXAMPLES

1 I like to watch team games
a. yes (often),
b. sometimes,
c. no (never).

2 People say I'm impatient
a. true, b. uncertain, c. false.

3 I prefer friends who are
a. quiet,
b. in between,
c. lively.

4 Adult is to child as cat is to
a. kitten, b. dog, c. baby.

In the last example there *is* a right answer—kitten But there are very few such reasoning items

Ask *now* if something isn't clear

When the examiner tells you, start with number 1 and answer the questions Keep these four things in mind

1 Give only answers that are true *for you* It is best to say what you really think

2 Don't spend too much time thinking over each question **Give the first, natural answer as it comes to you.** Of course, the questions are too short to give you *all* the information you might like, but give the best answer you can under the circumstances

3 Answer *every* question one way or the other Don't skip any

4 You should mark the *a* or *c* answer *most* of the time Mark the middle *b* answer *only* when you feel you have to, because neither *a* nor *c* seems to be right for you

DO NOT TURN PAGE UNTIL TOLD TO DO SO

Catalog No SC 051

1. I think my memory is better than it ever was.

   a. yes, b. in between, c. no.

2 I could happily live alone, far from anyone, like a hermit.

   a. yes, b. occasionally, c. no.

3. If I say the sky is "down" and winter is "hot," I would call a criminal:

   a. a gangster, b. a saint, c. a cloud.

4. When going to bed, I:

   a. drop off to sleep quickly,
   b. in between,
   c. have difficulty falling asleep.

5. When driving a car in a line of traffic, I feel satisfied:

   a. to remain behind most of the other cars,
   b. in between,
   c. only after I've reached the front of the line.

6. At a party I let others keep the jokes and stories going.

   a. yes, b. sometimes, c. no.

7 It's important to me not to live in messy surroundings.

   a. true, b. uncertain, c. false.

8 Most people I meet at a party are undoubtedly glad to see me.

   a. yes, b. sometimes, c. no.

9. I would rather exercise by:

   a. fencing and dancing,
   b. in between,
   c. wrestling and baseball.

10. I smile to myself at the big difference between what people do and what they say they do.

    a. yes, b. occasionally, c. no.

11. In reading about an accident I like to find out exactly how it happened.

    a. always, b. sometimes, c. seldom.

12. When friends play a joke on me, I usually enjoy it as much as the others, without feeling at all upset.

    a. true, b. in between, c. false.

13. When someone speaks angrily to me, I can forget the matter quickly

    a. true, b. uncertain, c. false.

14 I like to "dream up" new ways of doing things rather than to be a practical follower of well-tried ways.

    a. true, b. uncertain, c. false.

15 When I plan something, I like to do so quite alone without *any* outside help.

    a. yes, b. occasionally, c. no.

16. I consider myself less "high strung" than most people.

    a. true, b. in between, c. false.

17. I get impatient easily with people who don't decide quickly.

    a. true, b. in between, c. false.

18 I have sometimes, even if briefly, had hateful feelings towards my parents

    a. yes, b. in between, c. no.

19. I would rather tell my innermost thoughts to:

    a. my good friends,
    b. uncertain,
    c. a diary.

20. I think the opposite of the opposite of "inexact" is·

    a. casual, b. accurate, c. rough.

21 I always have lots of energy at times when I need it.

    a. yes, b. in between, c. no.

22. I am more annoyed by a person who:

    a. tells off-color jokes and embarrasses people,
    b. uncertain,
    c. is late for an appointment and inconveniences me.

23. I greatly enjoy inviting guests and amusing them.

    a. true, b. uncertain, c. false.

24. I feel that:

    a. some jobs just don't have to be done so carefully as others,
    b. in between,
    c. any job should be done thoroughly if you do it at all.

25. I have always had to fight against being too shy.

    a. yes, b. in between, c. no.

26. It would be more interesting to be:

    a. a bishop, b. uncertain, c. a colonel.

27. If people cheat me in small things, I'd rather humor them than show them up.

    a. yes, b. occasionally, c. no.

28. I like friends who:

    a. are efficient and practical in their interests,
    b. in between,
    c. seriously think out their feelings about life.

29. It bothers me if I hear others expressing ideas that are contrary to those that I firmly believe.

    a. true, b. in between, c. false.

30. I'm over-conscientious and worry over my past acts or mistakes.

    a. yes, b. in between, c. no.

31. If I were good at both, I'd rather:

    a. play chess,
    b. in between,
    c. go bowling.

32. I like to join with people who show lively group enthusiasm

    a. yes, b. in between, c. no.

33. I put my faith more in.

    a. insurance,
    b. in between,
    c. good fortune.

34 I can forget my worries and responsibilities whenever I need to.

    a. yes, b. sometimes, c. no.

35. It's hard for me to admit it when I'm wrong.

    a. yes, b. sometimes, c. no.

36. In a factory it would be more interesting to be in charge of:

    a. machinery or keeping records,
    b. in between,
    c. talking to and hiring new people.

37. Which word does not belong with the other two?

    a. cat, b. near, c. sun.

38. Minor distractions seem:

    a. to irritate me,
    b. in between,
    c. not to bother me at all.

39. I am quite happy to be waited on, at appropriate times, by personal servants.

    a. often, b. sometimes, c. never.

40. I would rather live in a town:

    a. artistically laid out, but relatively poor,
    b. uncertain,
    c. that is rough, prosperous, and booming.

41. People should insist more than they now do that moral laws be followed

    a. yes, b. sometimes, c. no.

42. I have been told that, as a child, I was rather:

    a. quiet and kept to myself,
    b. in between,
    c. lively and always active.

43. I enjoy routine, constructive work, using a good piece of machinery or apparatus.

a. yes, b. in between, c. no.

44. I think most witnesses tell the truth even if it becomes embarrassing.

a. yes, b. in between, c. no.

45. When I meet new people, I'd rather:

a. discuss politics and social views,
b. in between,
c. have them tell me some good, new jokes.

46. I try to make my laughter at jokes quieter than most people's.

a. yes, b. in between, c. no.

47. I never feel so wretched that I want to cry.

a. true, b. uncertain, c. false.

48 In music I enjoy:

a. military band marches,
b. uncertain,
c. violin solos.

49. I would rather spend two weeks in the summer:

a. bird-watching and walking in the country with a friend or two,
b. uncertain,
c. being a leader of a group in a camp.

50. The effort taken in planning ahead:

a. is never wasted,
b. in between,
c. is not worth it.

51. Inconsiderate acts or remarks by my neighbors do *not* make me touchy and unhappy.

a. true, b. uncertain, c. false.

52. When I know I'm doing the right thing, I find my task easy.

a. always, b. sometimes, c. seldom.

53. I would rather be:

a. in a business office, organizing and seeing people,
b. in between,
c. an architect, drawing plans in a quiet room.

54. "House" is to "room" as "tree" is to:

a. forest, b. plant, c. leaf.

55. Things go wrong for me:

a. rarely, b. occasionally, c. frequently.

56. In most things in life, I believe in:

a. taking a gamble,
b. in between,
c. playing it safe.

57. Some people may think I talk too much.

a. likely, b. uncertain, c. unlikely.

58. I admire more people who are:

a. clever, but undependable,
b. in between,
c. average, but strong to resist temptations.

59. I make decisions:

a. faster than many people,
b. uncertain,
c. slower than most people.

60. I am more impressed by.

a. acts of skill and grace,
b. in between,
c. acts of strength and power.

61. I am considered a cooperative person.

a. yes, b. in between, c. no.

62. I enjoy talking more with polished, sophisticated people than with outspoken, down-to-earth individuals.

a. yes, b. in between, c. no.

63. I prefer to:

a. keep my problems to myself,
b. in between,
c. talk about them to my friends.

64. If a person doesn't answer when I make a suggestion, I feel I've said something silly

a. true, b. in between, c. false.

65. I learned more in my school days by:

a. going to class,
b. in between,
c. reading books.

66. I avoid getting involved in social responsibilities and organizations

a. true, b. sometimes, c. false.

67. When a problem gets hard and there is a lot to do, I try:

a. a different problem,
b. in between,
c. a different attack on the same problem.

68 I get strong emotional moods—anxiety, anger, laughter, etc.—that seem to arise without much actual cause.

a. yes, b. occasionally, c. no.

69. My mind doesn't work so clearly at some times as it does at others

a. true, b. in between, c. false.

70 I am happy to oblige people by making appointments at times they prefer, even if it is a bit inconvenient to me

a. yes, b. sometimes, c. no.

71 I think the proper number to continue the series 1, 2, 3, 6, 5, is.

a. 10, b. 5, c. 7.

72 I have occasionally had a brief touch of faintness, dizziness, or light-headedness for no apparent reason

a. yes, b. uncertain, c. no.

73. I would rather do without something than put a waiter or waitress to a lot of extra trouble

a. yes, b. occasionally, c. no.

74 I live for the "here and now" more than most people do

a. true, b. uncertain, c. false.

75 At a party, I like.

a. to get into worthwhile conversation,
b. in between,
c. to see people relax and completely let go.

76. I speak my mind no matter how many people are around

a. yes, b. sometimes, c. no.

77 If I could go back in time, I'd rather meet:

a. Columbus,
b. uncertain,
c. Shakespeare.

78 I have to stop myself from getting too involved in trying to straighten out other people's problems.

a. yes, b. sometimes, c. no.

79. In a store or market, I would prefer to:

a. design and do window displays,
b. uncertain,
c. be a cashier.

80. If people think poorly of me, I can still go on calmly in my own mind.

a. yes, b. in between, c. no.

81. If people seem cold and reserved to me, I usually:

a. just think they're in a bad mood,
b. uncertain,
c. worry about what I may have done wrong.

82. More trouble arises from people:

a. changing and meddling with ways that are already satisfactory,
b. uncertain,
c. turning down new, promising methods.

83 I greatly enjoy talking to people about local problems

a. yes, b. sometimes, c. no.

84 Prim, strict people don't seem to get along well with me

a. true, b. sometimes, c. false.

85. I guess I'm less irritable than most people.

a. true, b. uncertain, c. false.

86. I may be less considerate of other people than they are of me.

a. true, b. sometimes, c. false.

87. I would just as soon let someone else have all the worry of being in charge of an organization of which I am a member.

a. true, b. uncertain, c. false.

88. If the two hands on a watch come together exactly every 65 minutes (according to an accurate watch), the watch is running:

a. slow, b. on time, c. fast.

89. I am bored:

a. often, b. occasionally, c. seldom.

90. People say that I like to have things done my own way.

a. true, b. occasionally, c. false.

91. I find it wise to avoid too much excitement because it tends to wear me out.

a. yes, b. occasionally, c. no.

92. At home, with a bit of spare time, I:

a. use it chatting and relaxing,
b. in between,
c. arrange to fill it with special jobs.

93. I am shy, and careful, about making friendships with new people.

a. yes, b. occasionally, c. no.

94. I think that what people say in poetry could be put just as exactly in plain prose.

a. yes, b. sometimes, c. no.

95. I suspect that people who act friendly to me can be disloyal behind my back.

a. yes, generally,
b. occasionally,
c. no, rarely.

96. I think that even the most dramatic experiences during the year leave my personality much the same as it was.

a. yes, b. sometimes, c. no.

97. It would seem more interesting to be a:

a. naturalist and work with plants,
b. uncertain,
c. public accountant or insurance salesperson.

98. I get unreasonable fears or distastes for some things, for example, particular animals, places, and so on.

a. yes, b. sometimes, c. no.

99. I like to think out ways in which our world could be changed to improve it.

a. yes, b. in between, c. no.

100. I prefer games where:

a. you're on a team or have a partner,
b. uncertain,
c. people are on their own.

101. At night I have rather fantastic or ridiculous dreams.

a. yes, b. occasionally, c. no.

102. If left in a lonely house I tend, after a time, to feel a bit anxious or fearful.

a. yes, b. sometimes, c. no.

103. I may deceive people by being friendly when I really dislike them.

a. yes, b. sometimes, c. no.

104. Which word does not belong with the other two?

a. think, b. see, c. hear.

105. If Mary's mother is Fred's father's sister, what relation is Fred to Mary's father?

a. cousin, b. nephew, c. uncle.

ipat

ANSWER SHEET: THE 16PF™ TEST, FORM_____ (C OR D)

EXAMPLES

1 I like to watch team games
a yes, (often),
b sometimes,
c no (never) — a ☐ b ☐ c ☐

2 People say I'm impatient
a true, b uncertain, c false — a ☐ b ☐ c ☐

3 I prefer friends who are
a quiet, b in between, c lively — a ☐ b ☐ c ☐

4 Adult is to child as cat is to
a kitten, b dog, c baby — a ☐ b ☐ c ☐

NAME _____ (FIRST) _____ (MIDDLE INITIAL) _____ (LAST)

ADDRESS _____ (OR OCCUPATION OR AS INSTRUCTED)

SEX _____ (WRITE M OR F) AGE _____ (NEAREST YEAR) DATE _____

OTHER _____ (AS INSTRUCTED)

Do not write here

★

Factor	SCORE Raw	SCORE Std
MD		
A		
B		
C		
E		
F		
G		
H		
I		
L		
M		
N		
O		
Q1		
Q2		
Q3		
Q4		

1	a ☐	b ☐	c ☐	18	a ☐	b ☐	c ☐	35	a ☐	b ☐	c ☐	52	a ☐	b ☐	c ☐	69	a ☐	b ☐	c ☐	86	a ☐	b ☐	c ☐	103	a ☐	b ☐	c ☐
2	a ☐	b ☐	c ☐	19	a ☐	b ☐	c ☐	36	a ☐	b ☐	c ☐	53	a ☐	b ☐	c ☐	70	a ☐	b ☐	c ☐	87	a ☐	b ☐	c ☐	104	a ☐	b ☐	c ☐
3	a ☐	b ☐	c ☐	20	a ☐	b ☐	c ☐	37	a ☐	b ☐	c ☐	54	a ☐	b ☐	c ☐	71	a ☐	b ☐	c ☐	88	a ☐	b ☐	c ☐	105	a ☐	b ☐	c ☐
4	a ☐	b ☐	c ☐	21	a ☐	b ☐	c ☐	38	a ☐	b ☐	c ☐	55	a ☐	b ☐	c ☐	72	a ☐	b ☐	c ☐	89	a ☐	b ☐	c ☐				
5	a ☐	b ☐	c ☐	22	a ☐	b ☐	c ☐	39	a ☐	b ☐	c ☐	56	a ☐	b ☐	c ☐	73	a ☐	b ☐	c ☐	90	a ☐	b ☐	c ☐				
6	a ☐	b ☐	c ☐	23	a ☐	b ☐	c ☐	40	a ☐	b ☐	c ☐	57	a ☐	b ☐	c ☐	74	a ☐	b ☐	c ☐	91	a ☐	b ☐	c ☐				
7	a ☐	b ☐	c ☐	24	a ☐	b ☐	c ☐	41	a ☐	b ☐	c ☐	58	a ☐	b ☐	c ☐	75	a ☐	b ☐	c ☐	92	a ☐	b ☐	c ☐				
8	a ☐	b ☐	c ☐	25	a ☐	b ☐	c ☐	42	a ☐	b ☐	c ☐	59	a ☐	b ☐	c ☐	76	a ☐	b ☐	c ☐	93	a ☐	b ☐	c ☐				
9	a ☐	b ☐	c ☐	26	a ☐	b ☐	c ☐	43	a ☐	b ☐	c ☐	60	a ☐	b ☐	c ☐	77	a ☐	b ☐	c ☐	94	a ☐	b ☐	c ☐				
10	a ☐	b ☐	c ☐	27	a ☐	b ☐	c ☐	44	a ☐	b ☐	c ☐	61	a ☐	b ☐	c ☐	78	a ☐	b ☐	c ☐	95	a ☐	b ☐	c ☐				
11	a ☐	b ☐	c ☐	28	a ☐	b ☐	c ☐	45	a ☐	b ☐	c ☐	62	a ☐	b ☐	c ☐	79	a ☐	b ☐	c ☐	96	a ☐	b ☐	c ☐				
12	a ☐	b ☐	c ☐	29	a ☐	b ☐	c ☐	46	a ☐	b ☐	c ☐	63	a ☐	b ☐	c ☐	80	a ☐	b ☐	c ☐	97	a ☐	b ☐	c ☐				
13	a ☐	b ☐	c ☐	30	a ☐	b ☐	c ☐	47	a ☐	b ☐	c ☐	64	a ☐	b ☐	c ☐	81	a ☐	b ☐	c ☐	98	a ☐	b ☐	c ☐				
14	a ☐	b ☐	c ☐	31	a ☐	b ☐	c ☐	48	a ☐	b ☐	c ☐	65	a ☐	b ☐	c ☐	82	a ☐	b ☐	c ☐	99	a ☐	b ☐	c ☐				
15	a ☐	b ☐	c ☐	32	a ☐	b ☐	c ☐	49	a ☐	b ☐	c ☐	66	a ☐	b ☐	c ☐	83	a ☐	b ☐	c ☐	100	a ☐	b ☐	c ☐				
16	a ☐	b ☐	c ☐	33	a ☐	b ☐	c ☐	50	a ☐	b ☐	c ☐	67	a ☐	b ☐	c ☐	84	a ☐	b ☐	c ☐	101	a ☐	b ☐	c ☐				
17	a ☐	b ☐	c ☐	34	a ☐	b ☐	c ☐	51	a ☐	b ☐	c ☐	68	a ☐	b ☐	c ☐	85	a ☐	b ☐	c ☐	102	a ☐	b ☐	c ☐				

(Use only for 1969 edition of these tests.)

PART I: SLIDE # 1

Look at the living room setting shown on the viewing screen. Please indicate your **PERCEPTION** of this setting by placing an **X** on the scale at the point that best describes your feelings for the room.

EXAMPLE:

Inviting ____:____:__X__:____:____:____:____: Uninviting

****

Boring ____:____:____:____:____:____:____: Stimulating

Stressful ____:____:____:____:____:____:____: Relaxing

Harmonious ____:____:____:____:____:____:____: Unharmonious

Active ____:____:____:____:____:____:____: Passive

Interesting ____:____:____:____:____:____:____: Uninteresting

Soothing ____:____:____:____:____:____:____: Distracting

Commonplace ____:____:____:____:____:____:____: Unique

Understandable ____:____:____:____:____:____:____: Confusing

Lively ____:____:____:____:____:____:____: Calm

Ugly ____:____:____:____:____:____:____: Beautiful

Coordinated ____:____:____:____:____:____:____: Uncoordinated

Clear ____:____:____:____:____:____:____: Vague

Unattractive ____:____:____:____:____:____:____: Attractive

Crowded ____:____:____:____:____:____:____: Uncrowded

Ornate ____:____:____:____:____:____:____: Plain

Simple ____:____:____:____:____:____:____: Complex

Appealing ____:____:____:____:____:____:____: Unappealing

Cluttered ____:____:____:____:____:____:____: Uncluttered

Comfortable ____:____:____:____:____:____:____: Uncomfortable

Organized ____:____:____:____:____:____:____: Unorganized

Designed ____:____:____:____:____:____:____: Undesigned

Pleasant ____:____:____:____:____:____:____: Unpleasant

Indicate your **PREFERENCE** for this room setting by placing an **X** in the space on the scale that best describes your feeling of Like/Dislike.

Like ____:____:____:____:____:____:____: Dislike

PART I: SLIDE #2

Look at the living room setting shown on the viewing screen. Please indicate your **PERCEPTION** for this setting by placing an **X** on the scale at the point that best describes your feelings for the room:

EXAMPLE:

Inviting ____:____:__X__:____:____:____:____: **Uninviting**

****

Interesting ____:____:____:____:____:____:____: Uninteresting

Coordinated ____:____:____:____:____:____:____: Uncoordinated

Designed ____:____:____:____:____:____:____: Undesigned

Organized ____:____:____:____:____:____:____: Unorganized

Pleasant ____:____:____:____:____:____:____: Unpleasant

Simple ____:____:____:____:____:____:____: Complex

Active ____:____:____:____:____:____:____: Unactive

Stressful ____:____:____:____:____:____:____: Relaxing

Understandable ____:____:____:____:____:____:____: Confusing

Lively ____:____:____:____:____:____:____: Calm

Crowded ____:____:____:____:____:____:____: Uncrowded

Unattractive ____:____:____:____:____:____:____: Attractive

Cluttered ____:____:____:____:____:____:____: Uncluttered

Harmonious ____:____:____:____:____:____:____: Unharmonious

Boring ____:____:____:____:____:____:____: Stimulating

Clear ____:____:____:____:____:____:____: Vague

Soothing ____:____:____:____:____:____:____: Distracting

Appealing ____:____:____:____:____:____:____: Unappealing

Comfortable ____:____:____:____:____:____:____: Uncomfortable

Commonplace ____:____:____:____:____:____:____: Unique

Ornate ____:____:____:____:____:____:____: Plain

Ugly ____:____:____:____:____:____:____: Beautiful

Indicate your **PREFERENCE** for this room setting by placing an **X** in the space on the scale that best describes your feeling of LIKE/ DISLIKE.

Like ____:____:____:____:____:____:____: **Dislike**

PART I: SLIDE # 3

Look at the living room setting shown on the viewing screen. Please indicate your **PERCEPTION** for this setting by placing an **X** on the scale at the point that best describes your feelings for the room.

EXAMPLE:

Inviting	____:____:__X__:____:____:____:____:	Uninviting

****

Understandable	____:____:____:____:____:____:____:	Confusing
Harmonious	____:____:____:____:____:____:____:	Unharmonious
Lively	____:____:____:____:____:____:____:	Calm
Simple	____:____:____:____:____:____:____:	Complex
Organized	____:____:____:____:____:____:____:	Unorganized
Interesting	____:____:____:____:____:____:____:	Uninteresting
Crowded	____:____:____:____:____:____:____:	Uncrowded
Boring	____:____:____:____:____:____:____:	Stimulating
Designed	____:____:____:____:____:____:____:	Undesigned
Comfortable	____:____:____:____:____:____:____:	Uncomfortable
Ugly	____:____:____:____:____:____:____:	Beautiful
Pleasant	____:____:____:____:____:____:____:	Unpleasant
Soothing	____:____:____:____:____:____:____:	Distracting
Clear	____:____:____:____:____:____:____:	Vague
Unattractive	____:____:____:____:____:____:____:	Attractive
Stressful	____:____:____:____:____:____:____:	Relaxing
Commonplace	____:____:____:____:____:____:____:	Unique
Cluttered	____:____:____:____:____:____:____:	Uncluttered
Ornate	____:____:____:____:____:____:____:	Plain
Coordinated	____:____:____:____:____:____:____:	Uncoordinated
Active	____:____:____:____:____:____:____:	Passive
Appealing	____:____:____:____:____:____:____:	Unappealing

Indicate your **PREFERENCE** for this room setting by placing an **X** in the space on the scale that best describes your feeling of LIKE/ DISLIKE.

Like	____:____:____:____:____:____:____:	Dislike

PART I: SLIDE # 4

Look at the living room setting shown on the viewing screen. Please indicate your PERCEPTION of this setting by placing an X on the scale at the point that best describes your feelings for the room:

EXAMPLE:

Inviting ____:____:__X__:____:____:____:____: Uninviting

****

Active ____:____:____:____:____:____:____: Passive

Lively ____:____:____:____:____:____:____: Calm

Organized ____:____:____:____:____:____:____: Unorganized

Commonplace ____:____:____:____:____:____:____: Unique

Simple ____:____:____:____:____:____:____: Complex

Clear ____:____:____:____:____:____:____: Vague

Interesting ____:____:____:____:____:____:____: Uninteresting

Harmonious ____:____:____:____:____:____:____: Unharmonious

Designed ____:____:____:____:____:____:____: Undesigned

Ornate ____:____:____:____:____:____:____: Plain

Crowded ____:____:____:____:____:____:____: Uncrowded

Comfortable ____:____:____:____:____:____:____: Uncomfortable

Boring ____:____:____:____:____:____:____: Stimulating

Soothing ____:____:____:____:____:____:____: Distracting

Coordinated ____:____:____:____:____:____:____: Uncoordinated

Cluttered ____:____:____:____:____:____:____: Uncluttered

Pleasant ____:____:____:____:____:____:____: Unpleasant

Ugly ____:____:____:____:____:____:____: Beautiful

Understanding ____:____:____:____:____:____:____: Confusing

Appealing ____:____:____:____:____:____:____: Unappealing

Unattractive ____:____:____:____:____:____:____: Attractive

Stressful ____:____:____:____:____:____:____: Relaxing

Indicate your **PREFERENCE** for this room setting by placing an **X** in the space on the scale that best describes your feeling of Like/ Dislike.

Like ____:____:____:____:____:____:____: Dislike

PART I: SLIDE # 5

Look at the living room setting shown on the viewing screen. Please indicate your **PERCEPTION** of this setting by placing an **X** on the scale at the point that best describes your feelings for the room.

EXAMPLE:

Inviting ____:____:__X__:____:____:____:____: Uninviting

****

Interesting ____:____:____:____:____:____:____: Uninteresting

Stressful ____:____:____:____:____:____:____: Relaxing

Clear ____:____:____:____:____:____:____: Vague

Harmonious ____:____:____:____:____:____:____: Unharmonious

Unattractive ____:____:____:____:____:____:____: Attractive

Organized ____:____:____:____:____:____:____: Unorganized

Commonplace ____:____:____:____:____:____:____: Unique

Understandable ____:____:____:____:____:____:____: Confusing

Cluttered ____:____:____:____:____:____:____: Uncluttered

Lively ____:____:____:____:____:____:____: Calm

Crowded ____:____:____:____:____:____:____: Uncrowded

Ornate ____:____:____:____:____:____:____: Plain

Pleasant ____:____:____:____:____:____:____: Unpleasant

Active ____:____:____:____:____:____:____: Passive

Boring ____:____:____:____:____:____:____: Stimulating

Ugly ____:____:____:____:____:____:____: Beautiful

Comfortable ____:____:____:____:____:____:____: Uncomfortable

Coordinated ____:____:____:____:____:____:____: Uncoordinated

Designed ____:____:____:____:____:____:____: Undesigned

Soothing ____:____:____:____:____:____:____: Distracting

Simple ____:____:____:____:____:____:____: Complex

Appealing ____:____:____:____:____:____:____: Unappealing

Indicate your **PREFERENCE** for this room setting by placing an **X** in the space on the scale that best describes your feeling of Like/Dislike.

Like ____:____:____:____:____:____:____: Dislike

PART I: SLIDE # 6

Look at the living room setting shown on the viewing screen. Please indicate your **PERCEPTION** of this setting by placing an **X** on the scale at the point that best describes your feelings for the room.

EXAMPLE:

Inviting ____:____:__X__:____:____:____:____: Uninviting

****

Understandable ____:____:____:____:____:____:____: Confusing

Active ____:____:____:____:____:____:____: Passive

Pleasant ____:____:____:____:____:____:____: Unpleasant

Stressful ____:____:____:____:____:____:____: Relaxing

Clear ____:____:____:____:____:____:____: Vague

Harmonious ____:____:____:____:____:____:____: Unharmonious

Appealing ____:____:____:____:____:____:____: Unappealing

Commonplace ____:____:____:____:____:____:____: Unique

Lively ____:____:____:____:____:____:____: Calm

Crowded ____:____:____:____:____:____:____: Uncrowded

Interesting ____:____:____:____:____:____:____: Uninteresting

Soothing ____:____:____:____:____:____:____: Distracting

Ornate ____:____:____:____:____:____:____: Plain

Simple ____:____:____:____:____:____:____: Complex

Comfortable ____:____:____:____:____:____:____: Uncomfortable

Organized ____:____:____:____:____:____:____: Unorganized

Ugly ____:____:____:____:____:____:____: Beautiful

Designed ____:____:____:____:____:____:____: Undesigned

Boring ____:____:____:____:____:____:____: Stimulating

Cluttered ____:____:____:____:____:____:____: Uncluttered

Unattractive ____:____:____:____:____:____:____: Attractive

Coordinated ____:____:____:____:____:____:____: Uncoordinated

Indicate your **PREFERENCE** for this room setting by placing an **X** in the space on the scale that best describes your feeling of Like/Dislike.

Like ____:____:____:____:____:____:____: Dislike

PART I: SLIDE # 7

Look at the living room setting shown on the viewing screen. Please indicate your **PERCEPTION** of this setting by placing an **X** on the scale at the point that best describes your feelings for the room.

EXAMPLE:

Inviting ____:____:__X__:____:____:____:____: Uninviting

****

Crowded ____:____:____:____:____:____:____: Uncrowded

Unattractive ____:____:____:____:____:____:____: Attractive

Interesting ____:____:____:____:____:____:____: Uninteresting

Ugly ____:____:____:____:____:____:____: Beautiful

Comfortable ____:____:____:____:____:____:____: Uncomfortable

Understandable ____:____:____:____:____:____:____: Confusing

Pleasant ____:____:____:____:____:____:____: Unpleasant

Cluttered ____:____:____:____:____:____:____: Uncluttered

Designed ____:____:____:____:____:____:____: Undesigned

Stressful ____:____:____:____:____:____:____: Relaxing

Coordinated ____:____:____:____:____:____:____: Uncoordinated

Appealing ____:____:____:____:____:____:____: Unappealing

Lively ____:____:____:____:____:____:____: Calm

Organized ____:____:____:____:____:____:____: Unorganized

Boring ____:____:____:____:____:____:____: Stimulating

Ornate ____:____:____:____:____:____:____: Plain

Commonplace ____:____:____:____:____:____:____: Unique

Simple ____:____:____:____:____:____:____: Complex

Soothing ____:____:____:____:____:____:____: Distracting

Harmonious ____:____:____:____:____:____:____: Unharmonious

Active ____:____:____:____:____:____:____: Passive

Clear ____:____:____:____:____:____:____: Vague

Indicate your **PREFERENCE** for this room setting by placing an **X** in the space on the scale that best describes your feeling of Like/Dislike.

Like ____:____:____:____:____:____:____: Dislike

As you view the slides, please indicate your choice from each pair by placing an **X** in either the right or left column.

	Left	Right
Pair # 1	_____	_____
Pair # 2	_____	_____
Pair # 3	_____	_____
Pair # 4	_____	_____
Pair # 5	_____	_____
Pair # 6	_____	_____
Pair # 7	_____	_____
Pair # 8	_____	_____
Pair # 9	_____	_____
Pair # 10	_____	_____
Pair # 11	_____	_____
Pair # 12	_____	_____
Pair # 13	_____	_____
PAIR # 14	_____	_____
Pair # 15	_____	_____
Pair # 16	_____	_____
Pair # 17	_____	_____
Pair # 18	_____	_____
Pair # 19	_____	_____
Pair # 20	_____	_____
Pair # 21	_____	_____

PART II

INSTRUCTIONS: Circle the number of the appropriate category.

1. Age:
__1__ 20 - 29
__2__ 30 - 39
__3__ 40 - 49
__4__ 50 - 59
__5__ 60 - 69
__6__ 70 or above

2. Highest Educational Level Attained
__1__ Below High School (less than 12 years)
__2__ High School (12 years)
__3__ Vocational/Technical training (12-15 years)
__4__ Some college, but no degree (12 - 15 years)
__5__ Associate Degree (14 years)
__6__ BS or BA Degree (16-18 years)
__7__ Master's Degree (18-19 years)
__8__ Doctor's Degree (above 20 years)

3. Household Income Level
__1__ Below $10,000
__2__ $10,000-$19,999
__3__ $20,000-$29,999
__4__ $30,000-$39,999
__5__ $40,000-$49,999
__6__ $50,000-$59,999
__7__ $60,000 or above

4. Occupation
What is your occupation?_____

What is the occupation of your spouse (if applicable)?
_____

5. Stress Level
Rate what you feel is your general stress level. Place an X in the appropriate location on the scale:

Low stress____:____:____:____:____:____:____High stress

Travel Experience:
6.. Have you traveled INSIDE the United States, but OUTSIDE your state of residence for ONE week or more at a time during your life, since the age of 12 years?

__1__ Never (0 times)
__2__ Occasionally (1-4 times)
__3__ Moderately (5-8 times)
__4__ Often (over 8 times)

7. Have you traveled OUTSIDE the United States for periods of ONE week or more during your life, since the age of 12 years?

__1__ Never (0 times)
__2__ Occasionally (1-4 times)
__3__ Moderately (5-8 times)
__4__ Often (over 8 times)

8. Have you ever lived OUTSIDE the United States for periods of ONE month or more in your life, since the age of 12 years?

__1__ Yes
__2__ No

9. If Yes, for how long a time?_____Where?_____

10. What are your general CULTURAL activities when you travel? Circle all categories that apply.
__1__ Art Gallery Visiting
__2__ Art Museum Visiting
__3__ Other Museum Visiting
__4__ Concerts
__5__ Seminars/Lectures, Educational Studies
__6__ Tours of Architecture
__7__ Other (Please Specify)_____

11. **Art Museum Visiting**
How often do you go to ART MUSEUMS and/or ART GALLERIES?
__1__ Never
__2__ Every 4 years or more
__3__ Every 2-3 years
__4__ Once a year
__5__ Every 7-12 months
__6__ Every 1-6 months

12. Magazine Reading

Of the following magazines, which do you read on a regular basis? Circle all categories that apply.

__1__ Architectural Digest
__2__ Art & Antiques
__3__ Better Homes and Gardens
__4__ Connoisseur
__5__ Country Living
__6__ Consumer Reports
__7__ Good Housekeeping
__8__ Home
__9__ House & Garden
_10__ House Beautiful
_11__ Ladies Home Journal
_12__ Metropolitan Home
_13__ Modern Maturity
_14__ National Geographic Pub.
_15__ Newsweek
_16__ Reader's Digest
_17__ Smithsonian
_18__ Southern Living
_19__ Time
_20__ Town & Country
_21__ US News and World Report
_22__ Other (Please specify)_____

APPENDIX B

HANDOUT BOOKLET GIVEN TO SUBJECTS IN APPRECIATION FOR THEIR PARTICIPATION

Dear Participant,

As a doctoral candidate at Oklahoma State University, in Design, Housing, and Merchandising, I am researching the topic of differences of people's perceptions and preferences in using patterned materials in residential living room settings. The results of this research will benefit interior design educators and professional interior design practitioners as they work with students, clients, and manufacturers.

Your participation in this study is valuable and greatly appreciated. Thank you for taking the time to respond to this questionnarie and assist in an educational project.

Confidentiality is assured. In no way will individuals be identified in the written results. At the conclusio of the study the research findings will be available at Oklahoma State University.

In sincere gratitude,
Cherry Tredway
Allied Member, ASID
Assistant Professor, OCUSA

USING PATTERN SUCCESSFULLY IN INTERIORS

Introduction

Home environments comprise much of the built environment. They are the most intimate of environments and have high emotional significance. The human environment of home is comprised of many surfaces. These surfaces are physical elements that are either vertical, horizontal, or angular. They serve many purposes such as dividing and structuring space to meet human needs. The elements of a physical setting, their arrangement, and characteristics of the materials of which they are fabricated are what make a setting usable by groups of people or individuals for daily activities. Use of patterned textiles, wallcoverings, and floor coverings is a primary method to introduce into interiors physical elements that provide visual stimulation, variety, and interest. Surfaces provide forms with shapes, colors, and textures which assist humans in daily functions of life. They can also be the vehicle for aesthetic expression by decorating in unlimited ways to provide visual delight. When surfaces are decorated, the elements of design--color, texture, line, form, and shape--are employed. Repetition of these design elements in an infinite variety

of arrangements is termed pattern, which is a form of ornamentation.

The environment can be separated into many components for the purpose of studying its effects on people. One such component is ornamentation in the form of pattern. Pattern can be a property of many surfaces in homes, such as floors, walls, ceilings, window treatments, and furniture. Human senses and perceptions are stimulated by all of these surfaces, and surface decoration, through pattern, contributes to greater stimulation of our visual and emotional senses.

Information about the environment is processed through our perception of physical elements and our personal human needs. This information processing forms a link between perception and understanding (cognition) and guides our emotional responses as well, such as like or dislike.

Individuals differ in their perceptions and meanings of the environment and attitudes toward it. The attitudinal differences among people are theorized to be the result of such things as cultural and social background, personality, physiological traits and environment. Researchers in the behavioral and environmental sciences continue to conduct studies in an attempt to better understand the attitudinal and perceptual differences in people. There has been very little systematic study of attitude, perception, and personality in relation to patterned surfaces in home interiors.

Therefore, the following questions are relevant:

* Does use of pattern or lack of pattern affect human satisfaction with home environment?
* In what combinations are patterns on surfaces in homes perceived most favorably?
* Is visual complexity of interior surfaces preferred over visual simplicity?
* Does one's exposure to other factors, such as travel or education make a difference in how pattern is perceived and attitude toward it?
* Do personality traits correlate in any way with an individual's choice of the type and amount of patterning that is preferred on surfaces of their personal home spaces? If so, in what ways?

Decorative Pattern Design

Decorative design of objects relates to the ornamentation of the basic structure of the object. Ornamentation of the basic structure is created through conscious manipulation of line, shape, color, and texture. For example, the basic structure of a piece of fabric is made by weaving yarns together in a specific way. Ornamentation of the fabric's basic structure gives it a decorative dimension, which is called pattern. Pattern can take innumerable forms.

Pattern

Pattern results from orderly repetition of an element or motif over the surface of an object or material. **For**

example, a floral figure, such as a tulip shape can be repeated over and over in a printing process to cover the surface of a piece of fabric, thus ornamenting the fabric. Pattern is also characterized by the motifs being large enough in scale and with enough color contrast from the background and each other to allow the eye to clearly distinguish them. Pattern creates texture but often this "texture" is only visual, being flat, with no dimension to make it tactile. It is this visual quality, whether flat or dimensional, that appeals to humans. If motifs in a pattern are so small, subtle, or blended as to be indistinguishable the design is transformed into texture rather than pattern. An object or surface always is inherently textural, whether smooth, rough or degrees in between. However, a texture may or may not have pattern.

Pattern can be developed in one of two ways,1) Applied, or 2) Structural. It can be directly applied such as printing a design on fabric or painting on wood or it can be created through structural properties, making it integral to the basic structure, as in a plaid design woven into fabric rather than being printed on (applied). Decorative design or pattern takes many forms and designers draw from a wide variety of subject matter sources. Pattern forms and sources can be classified.

Pattern Classifications

There are four basic classifications of decorative design or sources of motifs to create pattern. These classifications are (1) Naturalistic, (2) Non-naturalistic or Stylized, (3) Geometric, and 4) Abstract.

Naturalistic. A naturalistic pattern is made up of motifs which are natural and realistically represent nature in form and color (See Figures #1 and #2).

Non-naturalistic or Stylized. A non-natualistic pattern is made up of motifs which are inspired by naturalistic objects, but their forms and colors are altered so that realism is lost; instead, the object's form is simplified or reduced to its basic qualities. It loses realism, yet what the motif is portraying can be understood. Stylized patterns are derived from human imagination and creativity. (See Figures #3 and #4).

FIGURE #1

FIGURE #2

FIGURE #3

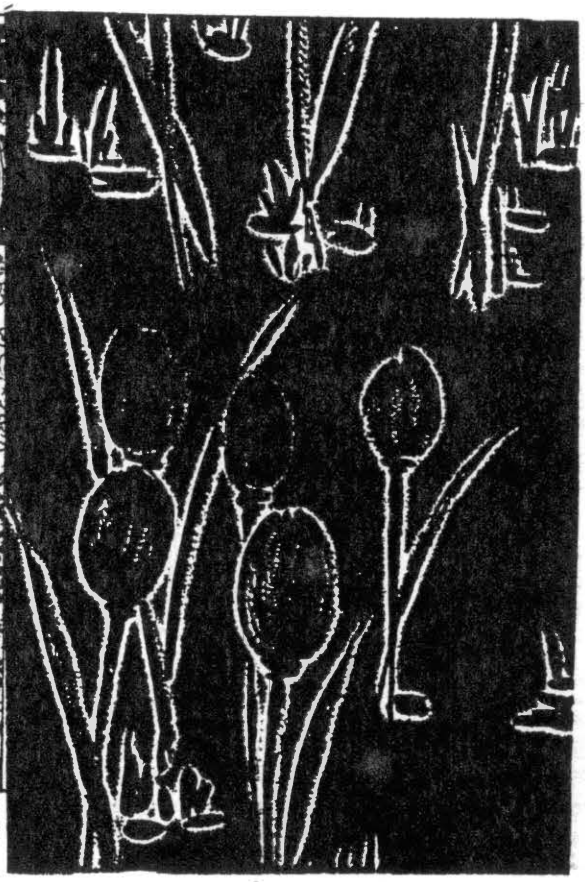

FIGURE #4

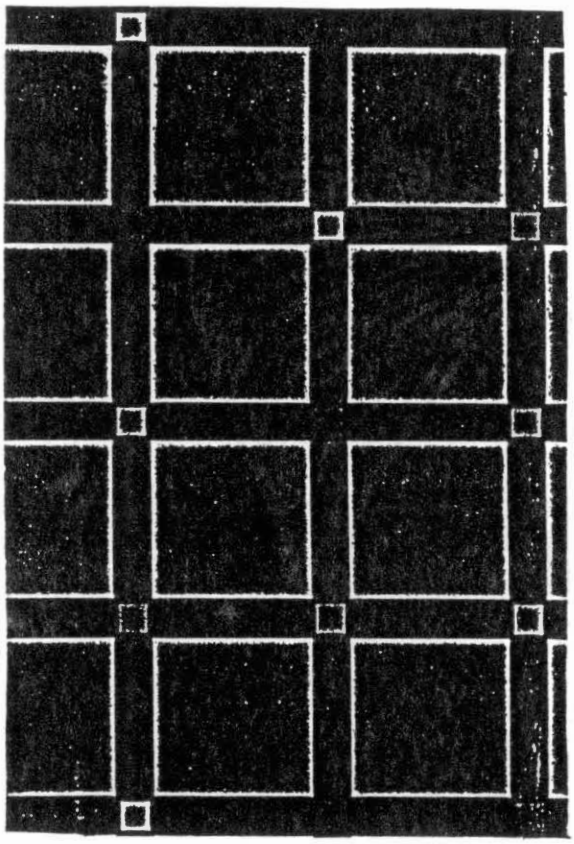

FIGURE #5

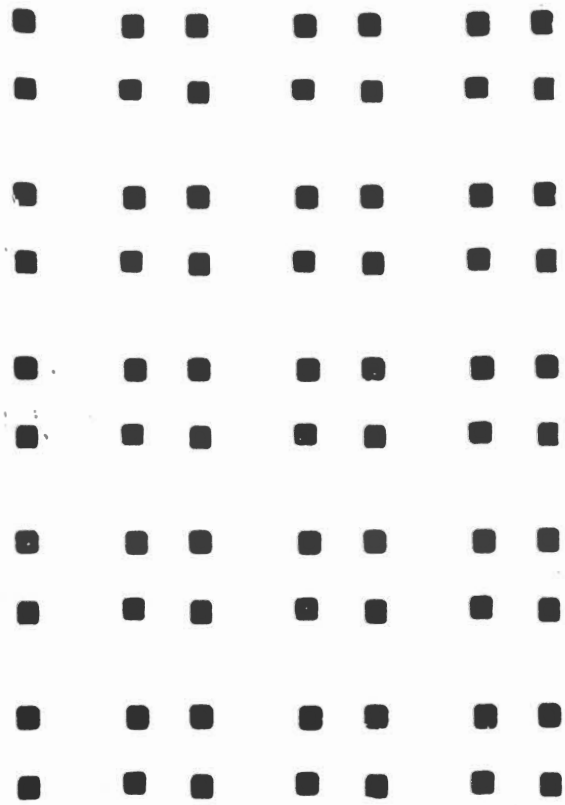

FIGURE #6

FIGURE #7

FIGURE #8

Geometric. A geometric pattern contains motifs that are basic geometric shapes and forms, such as plaids, stripes, polka dots, squares, cubes, triangles, rectangles, and circles (See Figures #5 and #6).

Abstract. An abstract pattern is made up of motifs that are non-representational, such as random brush strokes, blobs, irregular shapes, et cetera (See Figure #7). Combinations of one or more of these categories is also a mode of producing pattern; for example, combining a naturalistic or stylistic floral motif with a geometric motif to create the pattern. (See Figure #8) Figure #9 shows a combination of geometric/abstract motifs.

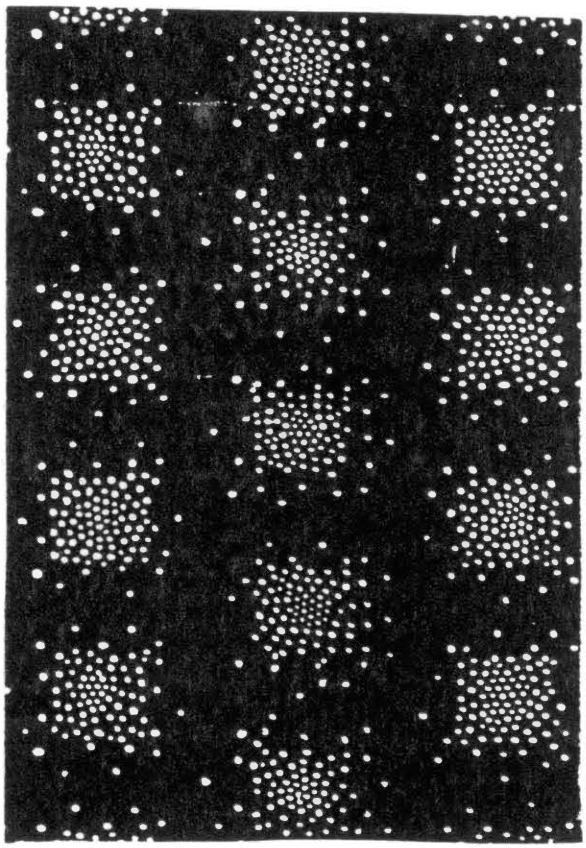

Figure #9

II. Perceptual Effects of Surface Decoration in Interiors

Patterned materials are commonly used in interior spaces, both residential and commercial. Wall coverings, floor coverings, window treatments, upholstery, bed and bath linens are all examples of interior surfacing materials that are prolifically marketed to consumers in patterned form. Pattern can also be derived through such means as special configurations of shapes and colors of ceramic tile, banding or bordering carpet in a color different from the carpet field, or laying wood flooring strips to achieve a parquet pattern; many more examples could be cited. Accessories also contribute to overall pattern and visual stimulation in interiors.

The consumer can easily become bewildered by the almost unlimited number of pattern choices available in interior surfacing materials. How can aesthetic choices be made? Can an aesthetic tasteful effect be achieved by combining two or more patterned materials in the same room? If one uses a patterned material on one or more surfaces, should the remaining surfaces be covered in non-patterned (solid color) materials? How interior surfaces are handled in respect to the materials and finishes used and whether they should be patterned or unpatterned (solid) is a subject of debate and a question of aesthetics. That humans desire pattern or decorative design on surfaces seems to be a logical assumption based on viewing photographs in popular

"home decorating" magazines as well as going into stores and seeing patterned materials on furniture, area rugs, wallpapers, et cetera.

Fear of patterned materials, ineffective use of them and avoidance are common practices by many consumers. Designers generally believe patterned surfacing materials can enhance an interior space and it takes knowledge and skill to combine two or more patterns effectively. Although no definite or mandatory rules govern the use of multiple patterns, general guidelines can be followed in achieving pleasing combinations of more than one pattern in a single room.

Interior spaces can and should be designed with conscious thought given to the visual effect that will result in relationship to the personalities of the people who inhabit and use the space. If one's personality is such that orderly, simple, and coherent elements are preferred, then no pattern or single pattern distributions need to be utilized. If one's personality is such that greater amounts of visual stimulation, complexity and variety is desired, then multiple pattern distributions need to be utilized.

A. Design Distribuytionss and Their Unifying Characteristics

Putting together all the elements of an interior space-floor and wall coverings, window treatments, furnishings, and accessories-with the end result being aesthetically

pleasing and harmonious is no small task! It is helpful to understand some basic concepts of ordering the design of all these elements. One of the basic concepts is DESIGN DISTRIBUTIONS. Design Distributions are simply categories of methods used to order disparate elements into a unified whole. They are:

No Pattern (Solid Color). A no-pattern distribution is simply what it says--using no patterned materials in a space. All walls, floors, ceiling, window treatments, and furnishings are in solid colors. Usually a color scheme is established and shades and tints of the chosen colors are used together, with one color being the most dominant. This distribution is easily achieved and will usually give a serene, uncluttered orderly sense.

Single Pattern. A single pattern distribution is incorporation of only one patterned material into an interior space; the single pattern can be used minimally or profusely, on one or many surfaces. A single pattern interior can be simple, coherent, and orderly, or complex and chaotic. It depends on the motif of the pattern, coloration, and number of surfaces covered. Most commonly, however, the single pattern distribution uses the patterned material rather sparingly such as upholstery on sofa and chairs or for a window treatment, with all other surfaces being solid-colored with colors derived from the pattern.

Multiple Pattern Distributions (MPD)

Mixing and matching of patterned materials in interior spaces is a common mode of decorating, but many people feel uncomfortable and incompetent to combine two or more patterns in the same room.

The key to harmonious results is the function of determinant unifying elements. There needs to be a factor to tie them together and create a harmony of relationship.

The third category uses TWO OR MORE PATTERNED MATERIALS TOGETHER IN THE SAME INTERIOR OR ROOM. There are three sub-categories of multiple pattern distributions, 1)Composite, 2) Recurrent, and 3) Transposal.

Composite. This is the use of two or more patterns on surfaces in an interior space, where one pattern gives the emphasis. It should be dominant in color, motif(s), scale or any combination of the three. Patterns of succeeding materials are derived directly from the dominant pattern or are totally different from it, yet complementing it through either color, motif, or scale. For example, a sofa upholstery fabric may have three different floral motifs in bold scale and it may contain five colors. This is the dominant pattern. Two chairs used in the grouping with it may be in one of the colors from the dominant pattern and contain a curvilinear abstract pattern that is complementary in shape to the floral motif; it may be small or medium in

scale or motif. *The unifying elements can be color, scale, or motif.* Choose one bold pattern and have the other patterned materials more or less subservient to it. The Composite Distribution is the most visually complex MPD.

Recurrent. This is the use of only one pattern motif, but having the pattern occur in two or more colorways within the same room setting. *The unifying element is motif.* For example, the same striped geometric pattern (motif) in off-white can be used in more than one background color. The striped background could be a dark value blue hue (navy) on a sofa, a medium-high value of orange (russet) on the chairs, and a high value of orange (peach) on a window treatment.

Transposal. This is the use of two or more differing patterns on surfaces or objects within the same room setting, but every pattern contains all of the same colors. *The unifying element is color.* For example, a sofa could be covered in an upholstery with a combination pattern of floral and stripes. The pattern contains three colors. The chairs are covered in a fabric with a different floral pattern, but complementary in scale and mood with the sofa pattern and the same three colors are again used. Window shades could be a small geometric pattern also containing the same three colors.

After analysis and evaluation, most interiors can be

categorized into one of the three multiple pattern distributions, as a single pattern distribution, or a no-pattern (solid color) distribution. It is also possible to have an interior composed of any two or all of the MPDs. The MPDs are manifest in interior photographs of numerous decorating type magazines on the market, available to the general public, as well as in professional interior design oriented publications. Composite is the most prevalent and the most visually complex MPD seen in them.

Simplicity Versus Ccomplexity

Interior designers frequently employ patterned materials in a variety of design solutions. However, too much pattern (complexity of visual stimuli) can make a room "busy" and overstimulating to the point of discomfort, and a room with too little pattern may appear stark and monotonous. Individuals vary in what they perceive and prefer as degrees of "busyness" (visual complexity) as opposed to "starkness" (visual simplicity). Psychological and environmental research to date indicate people prefer more complex visual stimuli, but studies have dealt almost exclusively with two-dimensional geometrical patterns rather than pattern seen in three-dimensional interior spaces. Although most pattern on upholstery, walls, or floors is two-dimensional, it is viewed in a three-dimensional setting on three-dimensional forms.

Many people do use multiple pattern combinations and delight in the effect they give. Others, however, deplore such combinations and would never use more than one pattern in a room, preferring all other surfaces to be solid-colored. In between are those who may be daring, but will not allow themselves to be too bold. Differences in opinion are expected and accepted, but what are factors that cause differences of opinion? The challenges of such a question leads to research studies such as this one.

Generally, solid-color, no pattern interiors and single pattern interiors are perceived as visually simple fields. However, a single-pattern interior can become complex depending on the complexity of the pattern itself and how much surface it covers.

With the addition of more patterns into a space or more surfaces covered by a patterned material perception of greater complexity usually results. Multiple pattern combinations create visual fields that are considered visually complex. Visual fields that are too simple or too chaotically complex are extremes that may evoke dissatisfaction in attitude. Through research perhaps some insight into how and why people perceive patterned interiors differently can be determined. This kind of knowledge would benefit designers as they work with clients to provide the best services to meet those clients' needs and desires.

APPENDIX C

INSTRUCTIONS GIVEN SUBJECTS FOR RESPONDING TO THE QUESTIONNAIRE

INSTRUCTIONS TO SUBJECTS FOR DATA COLLECTION

Introduction

A. Express appreciation to subjects for their willing participation.

B. Briefly explain the research study.

Instructions

A. Hand out to subjects the response packets and personality test booklets plus a # 2 pencil

B. Ask subjects to check their copy of the questionnaire to make sure all the pages are included in correct numerical order. Each should have:

   1. Personality test booklet (black binder).

   2. Response packet (white binder) This includes:

      a. Green answer sheet for recording responses to the personality test.

      b. Remaining questionnaire pages numbered in order from #1 to #11.

         If anyone has pages missing hold up your hand and I will give you another set.

   3. Please write in the upper right hand corner of

the response packet this notation: MF 7/13
Data collected at Mayfair on July 13.
Your CONFIDENTIALITY is assured. There are no identifying codes on any of the questionnaire packets other than what you just wrote in the upper right hand corner. Your name will not be associated in any way with your responses. Everyone is using a #2 lead pencil so all marks are the same color.

It is VERY IMPORTANT that every person answers every item as honestly and accurately as possible for the research results to be as valid as possible.

4. SECTION I is the personality test. It is a test for normal functioning adults. Please read each item in the green booklet and mark your answers in the response squares on the green answer sheet.
An X has been drawn through the name block at the top of the answer sheet page. DO NOT WRITE IN THIS AREA.
This portion of the questionnaire will take approximately 30 minutes. DO NOT BEGIN UNTIL TOLD. When you have completed SECTION I you will have to wait patiently for everyone else to finish. When everyone has finished SECTION I then everyone will begin SECTION II, PART I

together.

5. Complete the items on pages 1-3 of the questionnaire.
6. When everyone has completed these pages then seven slides will be shown one at a time. Page # 4 is for SLIDE #1. Read the instructions at the top of the page and respond to each of the scales for SLIDE # 1. Everyone will respond to it and then repeat the process on the succeeding pages for the remaining slides.
7. When everyone has responded to all seven slides, then the final part on page 11 will be to respond to pairs of slides and mark your preference of each pair.
8. As you leave, place the green booklet in a box by the door marked for it and place the response packet in the second box.

A booklet is available for each participant who wants to take a copy. The booklet gives some information about pattern and how multiple patterns can be combined tastefully and successfully in interiors.

APPENDIX D

PHOTOGRAPHS OF THE INTERIOR SETTINGS

Figure 3. Photograph of No-Pattern Distribution Setting

Figure 4. Photograph of Single Pattern A Distribution Setting

Figure 5. Photograph of Single Pattern B Distribution Setting

Figure 6. Photograph of Single Pattern C Distribution

Figure 7. Photograph of Transposal Multiple Pattern Distribution

Figure 8. Photograph of Composite Multiple Pattern Distribution

Figure 9. Photograph of Recurrent/Composite Combination Multiple Pattern Distribution

APPENDIX E

SUPPLEMENTARY TABLES

TABLE 42

MEAN SCORES FOR PERCEPTIONS OF PATTERN DISTRIBUTIONS IN LIVING ROOM SETTINGS

N = 248-250

VARIABLES	SLIDES						
SCALE = 1-7	#1	#2	#3	#4	#5	#6	#7
1. Boring/Stimulating	2.37	2.81	3.40	3.70	4.85	4.70	4.07
2. Stressful/Relaxed	4.60	4.40	4.85	4.66	5.44	1.96	4.74
3. Unharmonious/Harmonious	4.85	3.92	4.59	4.74	5.44	2.07	4.11
4. Passive/Active	1.80	2.55	3.30	3.59	4.37	6.03	3.22
5. Uninteresting/Interesting	2.00	3.14	3.00	3.77	5.22	3.70	3.89
6. Distracting/Soothing	3.92	3.74	3.63	3.81	4.66	1.55	3.96
7. Commonplace/Unique	1.55	2.18	3.03	3.48	5.14	5.18	3.96
8. Confusing/Understandable	5.22	4.70	4.89	4.70	4.89	5.03	5.00
9. Calm/Lively	1.96	2.52	2.96	3.77	4.26	6.07	3.07
10. Ugly/Beautiful	2.51	2.63	3.18	3.59	4.81	2.00	3.96
11. Uncoordinated/Coordinated	4.03	3.74	4.48	4.51	5.22	2.85	4.40
12. Clear/Vague	4.75	4.75	4.37	4.55	5.07	2.85	4.44
13. Unattractive/Attractive	2.59	2.29	3.33	3.77	5.00	1.85	3.89
14. Crowded/Uncrowded	4.33	5.07	4.66	4.33	4.40	1.92	4.66
15. Plain/Ornate	1.40	2.11	2.66	3.18	4.44	5.03	3.55
16. Simple/Complex	1.92	2.44	2.62	3.22	4.41	6.18	3.59
17. Unappealing/Appealing	2.62	2.30	3.15	3.48	4.81	1.81	3.89
18. Cluttered/Uncluttered	6.18	5.70	5.44	4.81	4.66	2.55	4.63
19. Uncomfortable/Comfortable	4.22	3.18	3.63	4.33	5.03	1.92	4.48
20. Disorganized/Organized	4.92	4.81	4.70	4.92	5.48	2.33	4.78
21. Undesigned/Designed	3.77	3.00	3.89	4.11	5.40	2.63	4.63

TABLE 43

FREQUENCY DISTRIBUTION: COMPARISON OF PREFERENCE OF SLIDES VIEWED IN PAIRS

N = 250

VARIABLES		n	%	n	%
SLIDE PAIRS					
1.	1 : 2	29	11.6	221	88.4
2.	1 : 3	33	13.2	217	86.8
3.	1 : 4	36	14.4	214	85.6
4.	1 : 5	57	22.8	193	77.2
5.	1 : 6	66	26.4	184	73.6
6.	1 : 7	153	61.2	97	38.8
7.	2 : 3	30	12.0	220	88.0
8.	2 : 4	43	17.2	207	82.8
9.	2 : 5	76	30.4	174	69.6
10.	2 : 6	78	31.2	172	68.8
11.	2 : 7	184	73.6	66	26.4
12.	3 : 4	63	25.2	187	74.8
13.	3 : 5	86	34.4	164	65.6
14.	3 : 6	108	43.2	142	56.8
15.	3 : 7	197	78.8	53	21.2
16.	4 : 5	96	38.4	154	61.6
17	4 : 6	108	43.2	142	56.8
18.	4 : 7	205	82.0	45	18.0
19.	5 : 6	153	61.2	97	38.8
20	5 : 7	222	88.8	28	11.2
21.	6 : 7	212	84.8	38	15.2

APPENDIX F

INSTITUTIONAL REVIEW BOARD FORM

OKLAHOMA STATE UNIVERSITY
INSTITUTIONAL REVIEW BOARD
FOR HUMAN SUBJECTS RESEARCH

Proposal Title: A Study of Relationships between Personality Types, Perception, & Preferences for Multiple-Patterned Surfaces in Residential Settings

Principal Investigator: Margaret Weber/Cherry Tredway

Date: July 5, 1991 IRB # HE-92-001

This application has been reviewed by the IRB and

Processed as: Exempt [X] Expedite [ ] Full Board Review [ ]

Renewal or Continuation [ ]

Approval Status Recommended by Reviewer(s):

Approved [X] Deferred for Revision [ ]

Approved with Provision [ ] Disapproved [ ]

Approval status subject to review by full Institutional Review Board at next meeting and and 4th Thursday of each month

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Comments, Modifications/Conditions for Approval or Reason for Deferral or Disapproval:

Signature: Marcia L. Dilley Date: July 5, 1991

Chair of Institutional Review Board

VITA

Cherry Pyron Tredway

Candidate for the Degree of

Doctor of Philosophy

Thesis: A STUDY OF PERCEPTIONS AND PREFERENCES FOR MULTIPLE-PATTERNED SURFACES USED IN RESIDENTIAL SETTINGS

Major Field: Home Economics

Biographical:

Personal Data: Born Clinton, Oklahoma, February 22, 1939, the daughter of Mr. and Mrs. Marvin Leon Pyron.

Education: Graduated Stigler High School, Stigler, Oklahoma, May 1957; received Bachelor of Science Degree in Vocational Home Economics Education, College of Home Economics, Oklahoma State University, May 1961; received Master of Education Degree in Community Junior College Education, Department of Education, University of Central Oklahoma, Edmond, Oklahoma, May 1978; received Master of Science Degree in Home Economics (Interior Design emphasis), Department of Home Economics, University of Central Oklahoma, Edmond, Oklahoma, May 1983; completed requirements for the Doctor of Philosophy Degree, College of Home Economics, Oklahoma State University, December, 1992.

Professional Experience: Director of Interior Design, Assistant Professor, Department of Art and Design, Oklahoma Christian University of Science and Arts, 1984 to present; Assistant Professor of Home Economics, Division of Behavioral and Social Sciences, Oklahoma Christian University of Science and Arts, 1976 to 1983. Allied Member, American Society of Interior Designers, membership in Interior Design Educators Council, American Home Economics Association; Certified Home Economist.