INTERIOR DESIGN CREATIVITY: THE DEVELOPMENT AND TESTING OF A METHODOLOGY FOR THE CONSENSUAL ASSESSMENT OF PROJECTS

by

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Dissertation submitted to the Faculty of the
Virginia Polytechnic Institute and State University
in partial fulfillment
of the requirements for the degree of

DOCTOR OF PHILOSOPHY

in

Housing, Interior Design and Resource Management

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August, 1992

Blacksburg, Virginia

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(ABSTRACT)

The purposes of this study were: (1) to adapt the Consensual Technique for Creativity Assessment (Amabile, 1982; 1983a) methodology for use in the domain of interior design; and (2) to provide evidence for reliability and construct validity of the methodology.

Participants were subjects who created the 18 projects used in the study, and judges, the 44 professional interior design experts who rated the projects. The sample of subjects was comprised of interior design students at a FIDER-accredited institution in the Mid-Atlantic region. The judges sample included two sub-categories: Educators (13) who were Corporate members of IDEC; and Designers (31) who were Professional members of ASID.

Projects were assessed by subjective ratings on the Dimensions of Judgment for Interior Design Creativity, the list of 12 rating criteria adapted from Amabile. Ratings were collected in judging sessions at three regional sites.

Interjudge reliabilities exceeded the established criterion level (.70 or greater) on all 12 dimensions, with

coefficients ranging from .84 to .96. Interjudge reliability for the Creativity dimension was .95, indicating a high level of agreement among judges on creativity, and providing essential evidence for construct validity.

Correlations among dimensions, linkage analysis, and principal components analysis were used to examine evidence for convergent and discriminant validity of the instrument. Convergence of creativity dimensions was confirmed, with sub-dimensions including Novelty, Originality, Complexity, and to a lesser extent, Appropriateness and Thematic Expression, found to be linked to Creativity. Functionality was linked to Technical Merit; Artistic Merit and Craftsmanship were linked to Aesthetic Appeal.

Evidence for discriminant validity was also confirmed, although not demonstrated as decisively as convergence. Cluster patterns revealed separation differences which varied systematically by sub-category of judges. Separation of creativity judgments from technical/functional aspects was demonstrated by educator judge ratings; separation of creativity judgments from aesthetic/artistic aspects was demonstrated by designer judge ratings. Ratings by all judges confirmed a small core cluster of dimensions tightly linked to each of the three global-dimension variables, but absolute independence of clusters was not established, due to observed dual associations of certain dimensions.

DEDICATION

For Jack, and Anne and Amy

ACKNOWLEDGMENTS

Several individuals have contributed to the culmination of this research and the preparation of the dissertation. Sincere appreciation is expressed to the members of my graduate committee: Dr. Jeanette Bowker and Dr. Savannah Day served as co-advisors of the committee and provided considerable guidance and encouragement throughout my doctoral program; Dr. Janet Sawyers, whose experience in creativity research was an invaluable resource, introduced me to the work of Amabile; Dr. James Impara, who provided essential expertise in the areas of test construction and statistical analysis, set high standards for the study and gave much painstaking effort in seeing it to completion; Dr. Joan McLain-Kark provided valuable insight as an interior design educator; and Dr. Rosemary Goss kept the overall picture in focus and gave numerous practical suggestions for implementing the research. In addition, special thanks goes to Dr. Robert Frary who, with characteristic kindness, on more than one occasion performed miraculous transformations on the data set.

A debt of gratitude is due to all who arranged for or participated in the various data collection sessions. For the project creation session, appreciation goes to Dr. Jeanette Bowker, Mr. Eric Wiedegreen and students in the interior design class at Virginia Tech. For the pilot

testing session, gratitude is expressed to the four interior design professional experts who served as judges: Dr. Carol Dagwell, Ms. Carol Brash, Ms. Lucinda Jennings, and Mr. Andrew Stowasser. Special appreciation is extended to Dr. Robert Meden of Marymount University and Mr. Paul Petrie of Virginia Commonwealth University, who so graciously provided classroom space for the judging sessions in Arlington and Richmond, and to the educators and designers in those areas who came on campus to judge. Likewise, sincere thanks goes to Dr. Douglas Strickland of the Roanoke Valley Graduate Center and the Roanoke designers who judged in that area.

Deepest thanks go to my family; to my parents whose remarkable innate abilities and tenacious work ethic shaped me; to my daughters, Anne and Amy, who encouraged me, distracted me, and filled me with pride as they literally grew into young women while I worked on this degree; and, most especially, to my beloved husband, Jack, who was there through it all.

Finally, the author wishes to pay respect to the research and writings of Dr. Teresa M. Amabile, of Brandeis University, whose theoretical models and assessment methods formed the basis for this study. Sincere gratitude and appreciation are expressed to Dr. Amabile for her enthusiastic support of this study and her willingness to give advice and assistance on numerous occasions.

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CHAPTER I

INTRODUCTION

Interior design is a young profession with origins in the early part of this century. Since that time it has evolved into a complex profession which now requires official assessment of competency and licensing in several states. This drive for professionalism has intensified rapidly during the past decade, due to recent emphasis upon recognition of interior designers in professional and legal terms (Friedmann, 1986).

The National Council for Interior Design Qualification (NCIDQ) and the Foundation for Interior Design Education Research (FIDER) have developed criteria and assessment procedures for evaluating competencies of interior designers and interior design programs, respectively. NCIDQ administers the examination which practicing designers must pass to attain professional status; FIDER implements the process of accreditation for interior design educational programs. In states with licensing statutes for interior designers, graduation from a FIDER accredited program and certification by NCIDQ are commonly cited as criteria for legal recognition. Criteria developed for NCIDQ and FIDER assessment procedures have become increasingly important to interior designers and interior design educational programs.

The definition of an interior designer included in the current FIDER Standards and Guidelines begins with the following statement:

> The professional interior designer is a person, qualified by education, experience, and recognized skills, who -- identifies, researches and creatively solves problems pertaining to the function and quality of the interior environment; -- ... (FIDER, 1988, p.1).

Also, the recently revised official international definition adopted by organizations of professional interior designers and educators includes a section on the scope of services provided by interior designers. It states that "research, analysis, and integration of information into the creative process results in an appropriate interior environment" (ASID, 1990, p. 2). Thus, official definitions of the profession of interior design emphasize creativity and creative problem solving.

FIDER, which has as its major role the strengthening of interior design education through a voluntary plan of accreditation for post-secondary programs in the United States and Canada (Rogers, Veitch, Brent, & Hill, 1983), lists "basic and creative arts" as one of eight categories necessary for accreditation. In addition, the FIDER Standards and Guidelines for accreditation states that the First Professional Degree Level Program should "develop

creative designers able to formulate, propose, and carry out design solutions relevant to the needs of people and the environment" and should "encourage innovative and creative approaches to design problem solving and show evidence of such approaches in the work and attitudes of the students" (FIDER, 1988, p. 2). Thus, creativity and creative problem solving are important competencies for interior designers and, as such, are valued in the review process for interior design educational programs (Dohr, 1982; Sawyers & Canestaro, 1989).

Professional designers and design educators have also identified creative competencies as important. Results of a survey undertaken to determine entry level competencies needed by the interior design apprentice (Myers, 1982) showed creativity and problem solving to be ranked among the top 30 competencies listed by the sample of American Society of Interior Designers (ASID) and Interior Design Educators Council (IDEC) professionals. Rey-Barreau and Whiteside (1983) labeled the development of disciplined thinkers and creative problem solvers as "most important" and claimed that the task of developing these creative abilities, together with the development of communication skills, is "the primary challenge in design education" (p. 14). In an article encouraging interior design educators to accept an influential role in producing students with potential for

successful careers, Whiteside, Rothgeb, and Congleton (1986) described competent graduates as "interior designers who are creative, knowledgeable, and disciplined individuals and who are also 'problem solvers'" (p. 4).

Rogers, Veitch, Brent and Hill (1983) expanded the point further with the assertion that the "education of creative designers is necessary in this society" (p. 32). Basing this assertion on the predictions of futurists such as Toffler (1981), they referred to the emergence of a new civilization, with new family styles, changed ways of working, loving, and living, a new economy, new political conflicts, and an altered state of consciousness. They cited Torrance's (1980) prediction that living with and adapting to these rapid changes in the world will require higher levels of creativity and ingenuity, and they called upon the design educational community to meet these changes with physical environments which show innovative adaption to changing human needs (Rogers, et al, 1983).

The recently published ASID interior design philosophy statement reinforced this need for adaptive innovation in interior designers, and extended the role of "advancing the quality of life through meaningful inhabitation" to "all populations," even though "factors such as culture, demographics, economics, populations, technologies, etc. make accommodation in habitats an increasingly complex

issue" (Brent, Kettler, Hewlett, & Lynford, 1988, p.1, p.5). Thus, interior designers must respond to human need in the global context of a widening number of populations and cultures, and must, through creative problem solving, help people realize those mental images that are supportive of their lifestyles and activities (Rapoport, 1980). Viewed in the overall climate of an ever-increasing demand for flexibility and innovation in design, creative competencies are indeed important for success in interior design and interior design education.

However, despite this overwhelming consensus among professionals, educators, and the accrediting organizations as to the importance of creativity and creative problem solving in the interior design profession, educational programs have had difficulty in providing evidence of these crucial competencies in student work. In reporting findings of a content analysis of FIDER Accreditation Reports to 91 First-Professional Degree Programs, Jackman and James (1985) identified strengths and weaknesses in student work as cited in final recommendations prepared by the visiting team. Of the 32 categories of comments ranked in the study, references to unsatisfactory achievements in creativity and innovation were among the two "recorded most frequently" (p. 15). In 38 percent of all final reports, recommendations for program improvement addressed the creativity and

innovation category; of the programs denied accreditation, 57 percent were cited for weakness in this category.

In addressing weaknesses in creative competencies, educational programs face several problems. Without established criteria for creativity in interior design, efforts to evaluate such competencies can be inconclusive due to the difficulty of separating creativity from other technical and aesthetic aspects of student work. In addition, judgments of creativity in "real world" interior design situations, such as interviews and portfolio reviews, are subjective in nature and, thus, are not based on an established standard of consensus within the field. Also, efforts to develop or improve creativity in student work through curriculum alterations and teaching environment innovations lack credibility because they are not based on empirical research grounded in a theoretical foundation.

Another serious problem is evident in the sources cited earlier in this chapter. The lack of consistency in the terminology used within the field to describe creative competencies (e.g. creativity, creative problem solving, creative process, innovation) presents a problem in defining and evaluating the construct. In fact, in the previously cited Myers (1982) study of entry-level competencies needed by the interior design apprentice, significant differences were reported between ASID and IDEC respondents in ranking

the terms creativity and problem solving as important to the beginning interior designer. Whereas the IDEC sample placed problem solving high on their list and creativity much lower, the ASID sample responded with a higher ranking for creativity. Thus, both groups of professionals valued these creative competencies, but designers favored the creativity term and educators gave preference to the problem solving term.

In official interior design materials, these same two terms appear frequently. However, Guilford (1967) wrote that problem solving and creative production "have so much in common that they are basically the same phenomenon. There is something creative about all genuine problem solving, and creative production is typically carried out as a means to the end of solving some problem" (p. 312). Guilford's (1967) Structure of Intellect Problem Solving (SIPS) model synthesized the two, integrating them into a single conceptual model very similar in stages to the design process models used by interior designers.

Unfortunately, the creativity literature provides little assistance for addressing weaknesses in creative competencies. Although there has been much interest in the identification and measurement of creative abilities since the 1950s, creativity has proven to be difficult to define, and its measurement has often been viewed with skepticism.

Most research has focused upon an investigation of the construct as a unitary personality variable or as a component of intelligence. Creativity measures have often been criticized because of their inability to discriminate creativity from other traits, their lack of correlation to real life creative behavior, and their failure to discriminate creativity in one area from creativity in another (Hocevar, 1981).

Further, recent reviews of the literature (Brown, 1989; Isaksen, 1987) indicate that many current theories view creativity as a multi-faceted phenomenon. Also, differences in creativity abilities and characteristics across fields have been demonstrated in a number of studies (Barron & Harrington, 1981; Hocevar, 1981). Several current lines of research and theory (Amabile, 1983a; Feldman, 1980; Hocevar, 1981; Sternberg, 1985) have converged on the conclusion that creativity is domain specific -- that is, creative abilities and characteristics vary from field to field, and individuals highly creative in one field may not necessarily be creative in another. Based on this view, efforts to assess creativity in a certain field should be specific to that field. Thus, in order to be useful, any investigation of interior design creativity should be domain-specific, and should be based upon a comprehensive theory which integrates creativity with the creative problem solving process.

One body of research which has focused upon creativity as domain-specific is Amabile's (1983a) research program conducted at Brandeis University over the past decade. Amabile's investigative interest has centered on the role of intrinsic motivation in creativity and its implications for the field of social psychology. Her three-component model of creativity and her schematic framework representing interactions among the components in actual creative production have formed the theoretical basis for an impressive line of research. In the Amabile studies, creativity of subjects' products has been evaluated by a consensual assessment technique, using groups of informed judges. Among the domains she and her students have investigated are artistic creativity (collages) and verbal creativity (poems and stories); subjects have included adults as well as children. "Her research has led to a number of confirmed predictions and can synthesize a variety of previous research. As such, it represents a particularly progressive research program" (Brown, 1989, p. 28).

Statement of the Problem

Both by definition and professional consensus, creativity is an essential competency for the interior designer. The need for interior design educational programs to provide evidence of this competency in student work during the review process for FIDER accreditation is evidenced in the criteria outlined by the official documents. Yet, a number of programs have had difficulty in providing evidence of this important competency. At the present time there are no published instruments which attempt to assess creativity or identify its characteristics in the domain of interior design. A valid, domain-specific methodology for the reliable assessment of creativity in the field of interior design is needed for the evaluation of such creativity and the identification of its associated characteristics.

Purpose of the Study

The purposes of this study were: (1) to adapt the Consensual Technique for Creativity Assessment (Amabile, 1982, 1983a) methodology for use in the domain of interior design; and (2) to provide evidence for reliability and construct validity of the methodology.

Conceptual Model

A total of twelve variables -- three global-dimension variables and nine sub-dimension variables -- comprise the Dimensions of Judgment for Interior Design Projects developed for this study. The three global-dimension variables, adapted from Amabile (1982, 1983a), are Creativity, Technical Merit, and Aesthetic Appeal. The nine sub-dimension variables formulated for the study -- Originality, Novelty, Thematic Expression, Complexity, Craftsmanship, Functionality, Appropriateness, Liking, and Artistic Merit -- are based upon results of the Amabile studies in other domains, creativity theory, interior design job task analysis, and other relevant research cited in Chapter Two. Each of the sub-dimension variables is hypothesized to be associated with one of the three global dimension variables and independent from the other two global-dimension variables. Hypothesized associations among the nine sub-dimension variables and the three global-dimension variables in the Dimensions of Judgment for Interior Design Projects are shown in the conceptual model (Figure 1).

In testing this model, creativity is assessed through subjective ratings of interior design project merit by expert judges familiar with the domain. Projects are rated, not only on the global-dimension, Creativity, and the

sub-dimensions hypothesized to be associated with it, but also on the other two global-dimensions, Technical Merit and Aesthetic Appeal, and aspects hypothesized to be related to them. It is theorized that, through an examination of relationships among ratings on various aspects of project merit, it may be possible to demonstrate separation between aspects and show evidence that judges' ratings on creativity are based upon something other than the fact that a project is aesthetically appealing or technically well done. Thus, evidence for the model is provided through an examination of interassociations among the twelve variables of the Dimensions of Judgment for Interior Design Projects.

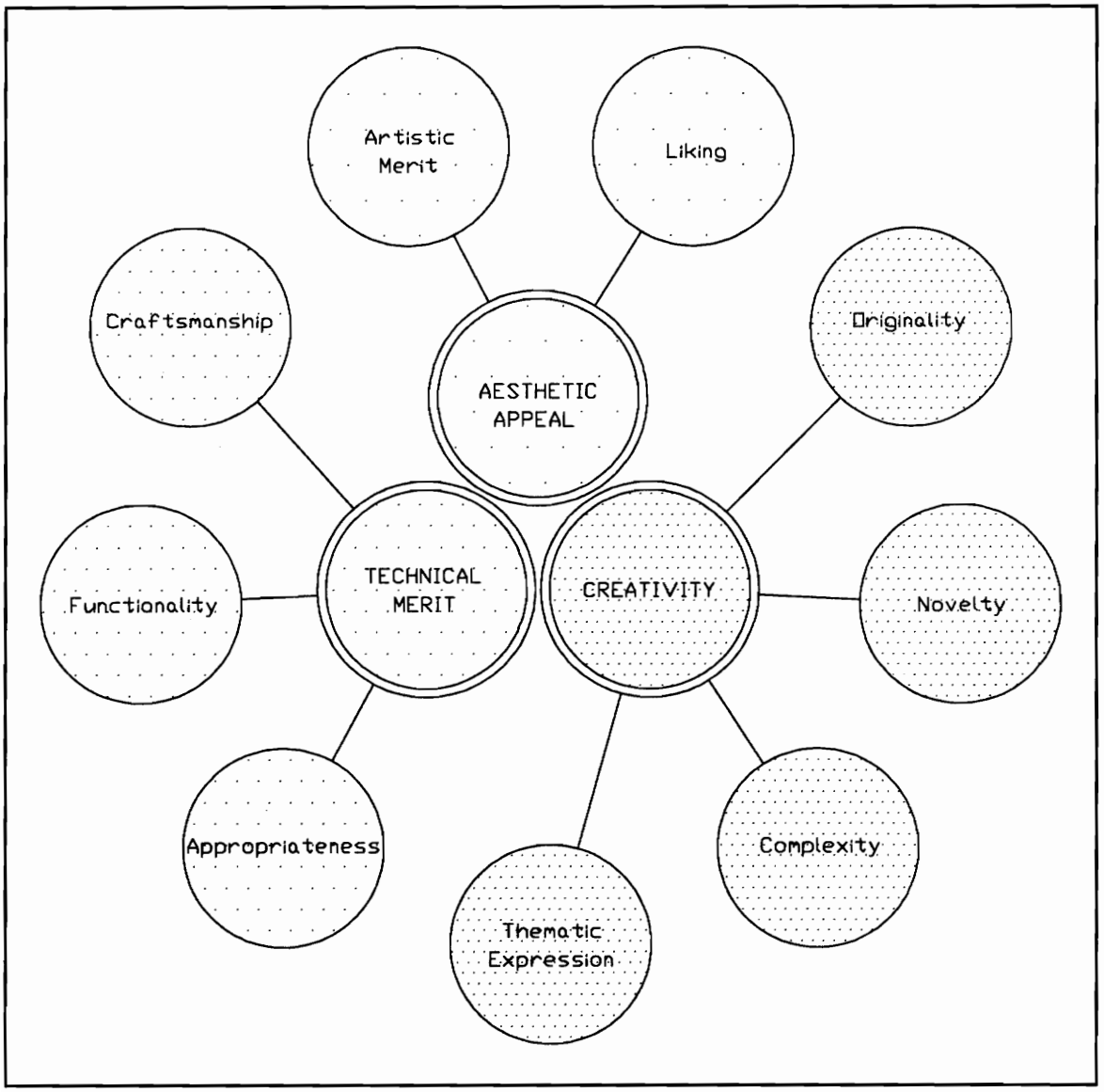

Figure 1. Conceptual model showing hypothesized associations among global- and sub-dimension variables in the Dimensions of Judgment for Interior Design Projects.

Research Questions

Is the Consensual Assessment of Interior Design Creativity, adapted from Amabile (1982; 1983a), a reliable and valid methodology for assessing creativity in interior design projects?

I. To what extent do interior design expert judges agree on ratings of project merit assessed by the Dimensions of Judgment for Interior Design Projects?

   1) To what extent is there agreement among judges on each of the three global-dimension variables -- Creativity, Technical Merit, and Aesthetic Appeal?

   2) To what extent is there agreement among judges on each of the nine sub-dimension variables -- Originality, Novelty, Thematic Expression, Complexity, Craftsmanship, Functionality, Appropriateness, Liking, and Artistic Merit?

At the outset of the study, two alternative research options were posed for Question II, with the ultimate choice between options to be dependent on outcomes from Question I. If the agreement level of judges reached the criterion used by Amabile (1982, 1983a), (interjudge reliability of .70 or greater), then Alternative A would be pursued. If not, research would proceed to Alternative B. Both alternatives for Question II are given below, even though the criterion was reached and Alternative A was pursued.

II. [Alternative A: Employed in the study, because results of Research Question I met the criterion level: interjudge reliability of .70 or greater on the Creativity variable] To what extent do interassociations among ratings of project merit assessed by the Dimensions of Judgment for Interior Design Projects provide evidence for convergent and discriminant validity of the Creativity variable?

1) To what extent do ratings on each of the global- and sub-dimension variables show association with or independence from each other?
2) Which sub-dimension variables are primarily associated with each of the three global-dimension variables?
3) Which sub-dimension variables show evidence of independence from each of the three global-dimension variables?
4) What evidence is provided for separation of the Creativity variable from the other two global-dimension variables -- Technical Merit and Aesthetic Appeal?

II. [Alternative B: Would have been employed in the study if results of Research Question I had not met the agreement criterion: reliability below .70 on the Creativity variable]

Can the lack of agreement among judges on the Creativity variable be attributed to factors related to judge characteristics or the judging process?

1) Do ratings differ according to sub-categories of judges -- educators vs. practicing designers? contract vs. residential designers?
2) Do ratings differ according to demographic characteristics of judges such as gender? educational background? experience?
3) Do judges report difficulties encountered during the judging session relative to the instructions? the dimension variables? the physical environment? fatigue? other?

Definition of Terms

For purposes of this study the following definitions of terms were used:

Creativity, a conceptual definition: "A product or response will be judged as creative to the extent that (a) it is both a novel and appropriate, useful, correct or valuable response to the task at hand, and (b) the task is heuristic rather than algorithmic" (Amabile, 1983a, p. 33).

Creativity, a consensual definition: "A product or response is creative to the extent that appropriate observers independently agree it is creative. Appropriate observers are those familiar with the domain in which the product was created or the response articulated. Thus, creativity can be regarded as the quality of products or responses judged to be creative by appropriate observers and it can also be regarded as the process by which something so judged is produced" (Amabile, 1983a, p. 31).

Dimensions of Judgment for Interior Design Projects: A list of 12 rating criteria with accompanying definitions for the subjective assessment of interior design projects on aspects of project merit:

Aesthetic Appeal: The degree to which the project, overall, is aesthetically pleasing.

Appropriateness: The degree to which the design is an appropriate solution to the problem.

Artistic Merit: The degree to which the presentation is good artistically.

Complexity: The level of complexity displayed in the design solution.

Craftsmanship: The level of craftsmanship skills displayed in the presentation.

Creativity: The degree to which the design is creative, using your own subjective definition of creativity.

Functionality: The degree to which the designed space is functional.

Liking: The degree to which you like the design, based upon your own subjective reaction to it.

Novelty: The degree to which the use of materials and/or design elements is novel.

Originality: The degree to which the design solution is original or unique.

Technical Merit: The degree to which the project, overall, is good technically.

Thematic expression: The degree to which the design conveys the theme identified in the statement.

Preliminary Assumptions

For purposes of this study, the nature of creativity was considered according to the following assumptions (adapted from Amabile, 1983a, pp. 38, 66-67):

1) It is assumed that creativity is not a discrete entity, but a continuous one, and that there is a continuum from the low levels of creativity observed in everyday life to historically significant creativity; thus, it is possible for any one with normal cognitive abilities to produce work that is creative to some degree in some domain of endeavor.

2) It is assumed that there can be degrees of creativity within a particular individual's work; any given individual is not creative at all times or in all domains.

3) It is assumed that, although different individuals may differ widely in their potential for creative performance in any given domain, it is possible to increase creativity to some extent.

4) It is assumed that the ages at which peak creativity is achieved in different domains varies widely.

5) It is assumed that there is a special "match" between individuals and domains; therefore an individual who is especially creative in one domain may not necessarily be especially creative in another.

6) It is assumed that, although innate abilities ("talents") in a given domain are important for high levels

of creativity, formal education is essential in most outstanding creative achievements.

7) It is assumed that talents, education, and cognitive skills are not by themselves sufficient for high levels of creativity.

8) It is assumed that, although particular clusters of personality traits are found fairly consistently among individuals exhibiting high levels of creativity, they are not sufficient in and of themselves for creativity.

9) It is assumed that, even when using their own subjective definitions, experts in a domain share creativity criteria to a reasonable degree (interjudge reliability of .70 or greater).

CHAPTER II

REVIEW OF LITERATURE

The purpose of this chapter is to establish a rationale for the use of a product-centered, domain-specific methodology for the subjective assessment of interior design creativity, based upon Amabile's conceptual framework and utilizing the consensual assessment technique. The first section provides a review of creativity research, including historical background, theories, approaches, measurement techniques, assessment problems, and recent trends in this broad field of inquiry. The second section presents the theoretical basis for the study, Amabile's Componential Framework of Creativity. The final section provides a review of research studies utilizing Amabile's Consensual Assessment Technique.

Creativity Research

Creativity is "a many splendored thing," a fact pointed out repeatedly by the well-known pioneer in creativity research, J. P. Guilford (Taylor, 1988). As a construct it has proven difficult to define and measure. Lack of consistency of terminology within the creativity/problem-solving movement has made the task of summarizing and

synthesizing creativity research findings more difficult. This lack of common understanding within the field has often been attributed to the wide diversity of the disciplines in which concern for creativity exists (Tryk, 1968). From psychology to history and philosophy, to art and aesthetics, to education and government, to business and industry, a wide variety of groups with varying orientations and interests have examined creativity, each group having its own unique motivation and agenda.

This section provides a broad overview of creativity research since 1950. Beginning with a brief review of the historical background, the discussion is organized according to the following topics: Theories of Creativity; Approaches to Creativity Research; Creativity Measurement Techniques; and Creativity Assessment Problems. The section concludes with a discussion of important recent trends in creativity research.

Historical Background

The investigation of creativity may be divided historically into three overlapping periods: "genius," "giftedness," and "creativity" (Getzels, 1975). In retrospect, it is apparent that each period was ushered in by an important event which signaled a paradigmatic shift (Taylor, 1975). The publication of Galton's Hereditary

Genius: An Inquiry into Its Laws and Consequences (1869) marked the beginning of the first period in which "genius" was defined by recognized achievement. The second period, with its shift of emphasis to "giftedness" as determined by intelligence tests, began in the 1920s with the publication of Terman's longitudinal studies of highly intelligent children (Terman, 1925). A single event, J. P. Guilford's presidential address to the American Psychological Association (Guilford, 1950), is frequently cited as signaling the beginning of the third and current era, with its shift in emphasis from giftedness to "creativity." In his speech, Guilford reformulated the problems of creativity and offered new methods for its study that sparked a virtual explosion of work in the field.

Over the next three decades numerous attempts were made to test and/or measure creativity (e.g. Guilford, 1959a; Mednick, 1962; Torrance, 1966) and to describe its characteristics in people (e.g. Getzels & Jackson, 1962; MacKinnon, 1962; Wallach & Kogan, 1965). In due time, efforts were made to enhance or improve creativity through the manipulation of conditional variables (e.g. Torrance, 1962). Numerous programs and methods for the systematic development of creativity in individuals and organizations (e.g. Gordon, 1961; Osborn, 1953; Parnes, 1962) also began to appear on the scene.

Reviews of the creativity research literature published during the late 1970s and early 1980s (Barron & Harrington, 1981; Getzels, 1975; Guilford, 1975; Hocevar, 1981; Kogan, 1983; Taylor, 1975) revealed that, although considerable effort had been expended in investigating creativity, much controversy remained regarding theoretical and definitional issues and the reliability and validity of creativity assessment techniques. Despite the controversy, Ripple (1977) concluded that agreement existed on four points: creativity is an identifiable conceptual phenomenon, it can be assessed, it has distinctive characteristics and correlates, and its development and expression can be facilitated. Getzels (1975) noted that, despite significant problems, progress had been made from various perspectives and "creative thinking is a subject of study of almost unparalleled significance for human welfare" (p. 341).

Theories of Creativity

Throughout the 20th century many psychologists and philosophers have formulated and advanced theories of creativity. Although these theories vary widely and none has provided a persuasive comprehensive theoretical explanation of creativity (Treffinger, Isaksen, and Firestien, 1983), an examination of such theories is helpful in understanding the literature.

Creativity theories have been categorized in several reviews (Arieti, 1976; Brown, 1989; Bloomberg, 1973; Kneller, 1965; Mackler & Shontz, 1965; Rowe, 1985; Taylor, 1975; Treffinger, Isaksen, & Firestien, 1983), with remarkable consistency among the classifications. Although any system of classification can be misleading due to overlapping concepts, for purposes of this theoretical background discussion, creativity theories are grouped according to the following categories: Psychoanalytic; Humanistic; Holistic; Associationistic; Trait-factorial; and Logical-rational.

Psychoanalytic. The psychoanalytic view of creativity stems from the work and influence of Freud (1925), who was the first to suggest clearly a dynamic theory of the creative act (Taylor, 1975). For Freud, "the individual's creativity originates in conflict arising from the tension of the conscious, reality-bound processes with unsatisfied, unconscious biological drives" (Treffinger, Isaksen, & Firestien, 1983, p. 11). Creativity is defined in terms of certain interactional strengths of the id, ego and superego (Repucci, 1960). In this view, there is little difference between the creative process and neurosis. Freud's work generated subsequent efforts in the investigation of creativity; later variations on his theory were formulated by Kris (1952), Kubie (1958), and Jung (1928).

Humanistic. Humanistic theories stress human potential for self-realization, personal growth and fulfillment. In this approach, self-actualization is considered to be the motivating drive for creativity. Definitions in this category can be characterized as "aesthetic" or "expressive" with the emphasis on self-expression (Repucci, 1960). The basic idea is that human beings have a need to express themselves, each in his/her own unique manner; any such expression is deemed to be creative. Humanists maintain that creativity occurs in the well-adjusted, not the neurotic or mentally-ill. Maslow (1954), Rogers (1959), Fromm (1959), and May (1959) were among the leading proponents of creativity theory in the humanistic tradition.

Holistic. Holistic or Gestalt theories view creativity as an action that produces a new idea or "insight" fully-formed; it comes to the individual as a flash (Mackler & Shontz, 1965). In this view, creativity is defined as the "restructuring of a Gestalt" (Repucci, 1960), and novelty arises from the imagination, not from reason and logic. Wertheimer (1945), Arnheim (1954), and Schachtel (1959), were among those who advanced holistic theory.

Associationistic. Associationistic theory deals with the ability to think productively, utilizing a variety of associations accessible to an individual. Creativity is defined as an "unusual recombination of these bonds"

resulting in a "new idea" or "new form" (Repucci, 1960). Ribot (1900), Mednick (1962), and Koestler (1964) were proponents of the associationistic viewpoint.

Trait-factorial. Trait theory views creativity as a function of many separate intellective "factors." Creativity is defined in terms of a theoretical model outlining a large number of these various factors (Repucci, 1960). Tests are constructed to measure these factors; factor analysis is then used to identify traits and isolate separate intellective factors. The most notable proponent of the trait-factorial approach to creativity was Guilford (1959b), who described the primary traits related to creativity as found by factor analysis, and demonstrated how creativity fit into his three-dimensional theoretical model of intelligence called the Structure of Intellect (SI).

Logical-rational. Traditional logic views creative thinking as a process of assertions and propositions, with certain combinations making possible new propositions, and reason establishing the correctness of a "creative" conclusion. In this type of theoretical formulation, definitions of creativity can be of the "solution thinking" type, emphasizing the thinking process itself rather than the actual solution of the problem, or can be of the "end product" or "innovation" type, focusing upon the bringing into being of a new idea, new object, or a new form or

arrangement of old elements (Repucci, 1960). Dewey's (1910) work in formulating the "logically distinct" steps in the "art of thought" was subsequently applied to the concept of creative thinking, giving new emphasis to the central role of logic in creativity. Proponents of this logical-rational view of the creative process, Wallas (1926), Rossman (1931), Osborn (1953), Guilford (1967), and Stein (1974), advanced theories outlining the various stages of the process involved in creative problem solving.

Given the variety of conflicting explanations as to the nature of creativity provided by these six categories of creativity theories, Psychoanalytic, Humanistic, Holistic, Associationistic, Trait-factorial, and Logical-rational, the resulting diversity in research studies, the confusion in terminology, and the difficulty in synthesizing results was predictible. Although theoretical formulations of the construct of creativity have been numerous and varied, none so far has gained unanimous consensus.

Approaches to Creativity Research

In addition to the wide variety of theoretical explanations of creativity, approaches to the subject also vary. According to Mooney (1963), there are "four significantly different approaches to the problem of creativity, depending on which of four aspects of the

problem a person uses to gain his initial hold" (p. 331). The researcher selects a vantage point from which to view the phenomenon, adopts a definition, either explicitly or implicitly, and designs projects and/or programs of research to investigate creativity according to that approach. The four approaches described by Mooney are: the Person of the creator, the Process of creating, the Environment in which creation comes about, and the Product created. This classification scheme has been used quite extensively in the creativity literature (Dellas & Gaier, 1970; Isaksen, 1987; Kneller, 1965; Morgan, 1953; Rhodes, 1961; Tardif & Sternberg, 1988), and is useful in providing a frame of reference for the discussion of creativity research efforts.

Person. Research in the creative person approach focuses on the nature of the individual, upon the person as a human being. Information related to personality, intellect, habits, and attitudes is the principal interest, and the research purpose is to identify the pattern of traits or characteristics which differentiate creative persons from less creative persons. This approach became dominant during the 1950s and is favored by personality psychologists who study individual-difference variables, whether cognitive or motivational (Barron & Harrington, 1981). Although not always stated explicitly, the person approach to creativity definition so characteristic of most

early empirical research on creativity (Nicholls, 1972), implicitly underlies most later investigations of the construct as well (Amabile, 1983a).

In his landmark address, Guilford (1950) defined creativity in terms of the person:

> In its narrow sense, creativity refers to the abilities that are most characteristic of creative people.... In other words, the psychologist's problem is that of creative personality....I have often defined an individual's personality as his unique pattern of traits. A trait is any relatively enduring way in which persons differ from one another. The psychologist is particularly interested in those traits that are manifested in performance; in other words, in behavior traits. Behavior traits come under the broad categories of aptitudes, interests, attitudes, and temperamantal qualities....Creative personality is then a matter of those patterns of traits that are characteristic of creative persons (p. 444).

In the person approach, the ultimate criterion is "the pattern of extrinsic signs which marks the creative person" (Mooney, 1963, p. 331). Researchers have employed a wide variety of biographical methodologies, both descriptive and empirical, in the study of known "creators" for the purpose of distilling these attributes. After four decades, "we now

have a cornucopia of personality measures that purport to identify creative individuals" (Simonton, 1988, p. 386), and we have list after list of characteristics and traits that are reported to be associated with creativity (e.g. Barron & Harrington, 1981; Dacey, 1989; Stein, 1968, 1974; Tardif & Sternberg, 1988).

In their often-cited review, Barron and Harrington (1981) listed a "fairly stable set of core characteristics" which have emerged as correlates of creative achievement: "high valuation of esthetic qualities in experience, broad interests, attraction to complexity, high energy, independence of judgment, autonomy, intuition, self-confidence, ability to resolve antinomies or to accommodate apparently opposite or conflicting traits in one's self-concept, and, finally, a firm sense of self as 'creative'" (p. 453).

In a recent review, Tardif and Sternberg (1988) provided an exhaustive consensual summary of current thinking about creativity, highlighting areas on which there is agreement among findings, and describing conflicting opinions on issues over which there is controversy. They reported a general consensus that people are creative within particular domains of endeavor, even though people who are creative in different domains may share common traits; also, they described a prevalent

characteristic of creative persons, an almost "aesthetic" ability to recognize "good" problems in their field. According to their synthesis, descriptions of the creative person typically fall into three general categories: cognitive characteristics; personality and motivational qualities; and special events or experiences during development.

The list of cognitive characteristics shared by creative people, regardless of domain, was grouped by Tardif and Sternberg (1988) into three sets: traits, abilities, and processing styles. Traits included relatively high intelligence, originality, articulateness and verbal fluency, and a good imagination. Abilities included metaphorical thinking, flexibility and skill in making decisions, independence of judgment, coping well with novelty, logical thinking skills, internal visualization, escaping perceptual sets, and finding order in chaos. Processing styles included the use of wide categories, a preference for nonverbal communication, building new structures rather than using existing structures, being alert to novelty and gaps in knowledge, and using existing knowledge as a base for new ideas.

As for personality and motivational qualities, Tardif and Sternberg (1988) reported that "creative personalities are composed of a constellation of many characteristics,

some of which may be present in one creative individual, but not in another" (p. 435). Most commonly mentioned characteristics were willingness to confront hostility and take intellectual risks, perseverance, a proclivity toward curiosity and inquisitiveness, being open to new experiences and growth, a driving absorption, discipline and commitment to one's work, high intrinsic motivation, being task-focused, a high degree of self-organization, tolerance for ambiguity, a broad range of interests, a tendency to play with ideas, unconventionality in behavior, and intuitiveness.

In considering characteristics related to the developmental histories of creative persons, Tardif and Sternberg (1988) reported that being a firstborn, surviving the loss of one's parent(s), being reared in a diversified, enriching, and stimulating home environment, and being exposed to a wide range of ideas were common experiences. Having definite role models and mentors was also mentioned as an important factor.

Although research in the creative person approach has produced a vast body of informative data regarding the personality correlates of creativity, lists can never provide a comprehensive picture of the creative personality. One well-known researcher emphasized this point when he wrote:

> ...there are many paths along which persons travel toward the full development and expression of their creative potential, and there is no single mold into which all who are creative will fit. The full and complete picturing of the creative person will require many images (MacKinnon, cited in Isaksen, 1987, p. 10).

Process. Research in the creative process approach focuses on the mental processes that are operative in creating ideas. Information related to the actual expression of creative acts is the principal interest, and the research purpose is to discern the patterns of thought or information-processing habits that underlie creativity. This approach is favored equally by gestalt psychologists intrigued with "insight" and cognitive psychologists fascinated with "problem-solving" (Simonton, 1988).

Many definitions of creativity have focused on the creative process. Watson (1928) described it as "how the new comes into being;" Koestler (1964) introduced the term, "biosociative process," the deliberate connecting of two previously unrelated "matrices of thought" to produce a new insight or invention. Newell, Shaw and Simon (1962) stated that "creative activity appears simply to be a special class of problem-solving activity characterized by novelty, unconventionality, persistence, and difficulty in problem formulation" (p. 66). Guilford (1967) wrote that problem

solving and creative production "have so much in common that they are basically the same phenomenon. There is something creative about all genuine problem solving, and creative production is typically carried out as a means to the end of solving some problem" (p. 312).

The influence of the early problem-solving models can be seen in definitions of the creative process. In the problem-solving view the process is seen as a linear set of discrete steps similar to those of Wallas's (1926) four steps in creative production: preparation, incubation, illumination, and verification, or Rossman's (1931) seven steps in invention: need observed, problem defined, information surveyed, possible solutions formulated, solutions evaluated, new ideas formulated, and, finally, solution accepted. Although less famous than his Structure of Intellect (SI) model, Guilford's (1967) Structure of Intellect Problem-Solving (SIPS) model synthesized the steps outlined by Wallas and Rossman, the feedback-based TOTE (test-operate-test-exit) model of Miller, Galanter, and Pribram (1960), and the basic elements of SI into an information-processing model involving evaluation at each step (Brown, 1989; Dacey, 1989; Michael, 1977).

In the process approach the ultimate criterion is "the psychological frame of mind which best serves the creator in handling himself productively during the process of

creation" (Mooney, 1963, p. 332). Researchers have relied upon retrospective reports, observation of performance on a time-limited creative task, factor analysis of the components of creative thinking, experimental manipulation and study of variables presumably relevant to creative thinking, and simulation of creative processes on computers in investigating the creative process (Isaksen, 1987).

Tardif and Sternberg's (1988) consensual summary of current thinking relative to the process approach reported agreement on the following: the creative process takes time and is not generally considered to be something that occurs in an instant with a single flash of insight; flashes of insight that may occur are a small but necessary component of creativity; the processes involved in creation require tension; creative processes often emanate from a previous failure to find explanations for phenomena or to incorporate new ideas into existing knowledge; and although some tentative evidence for universals in creativity across domains has been reported, creativity is generally considered to be domain-specific. Regarding differences in creative processing, there is agreement that, both within a domain and within the same individual at different points in time, different levels of creative expression may occur.

Environment. Research in the creative environment approach focuses on relationships between individuals and

their environments. Information related to the influence of environmental factors and ecological press on the person's mental processes is the principal interest, and the research purpose is to identify environmental patterns that tend to initiate and foster creativity. This approach is favored by those who are responsible either for the continuing care and cultivation of personnel, or for the explanation of changes taking place in persons because of cultural or physical surroundings. Much creativity research in educational and organizational fields has utilized the environment approach; recently the business and industrial community has given much attention to investigations of the climate conducive to creativity and innovation (Isaksen, 1987).

Rhodes (1961) defined creativity from the environmental perspective:

> Creative production is the outcome of certain kinds of forces playing upon certain kinds of individuals as they grow up and as they function....Each person perceives his environment in a unique way....Studies of press attempt to measure congruence and dissonance in a person's ecology (p. 308).

In the environmental approach, the ultimate criterion is "the pattern of circumstances necessary for releasing creative production" (Mooney, 1963, p. 332). Researchers have used case study, interview, and survey techniques; they

have investigated social climates that are conducive or inhibitive to creativity, differences in perception and sensory inputs created by varying environments, and various reactions to certain types of situations. Numerous lists of suggestions for creating an environment conducive to creativity (e.g. Isaksen, 1984) have been published.

Isaksen (1987) summarized current thinking concerning creative environment in groups and identified the following factors as conducive to creativity: group involvement and a high level of ownership regarding activities and decisions; a "facilitator" style of leadership; individual awareness of blocks to creative thinking; and intrinsic motivation rather than extrinsic motivation.

Tardif and Sternberg's (1988) discussion of creative "places" (environments) emphasized three important ways the climate within a particular profession can affect creativity: through the general contributions and resources available to individuals within the field; through the special effects demanded of the profession and the nature of the creative expressions that result; and through specific characteristics of the administrative climate that either promote or inhibit creativity. Specifically, they reported that environments support creativity by linking colleagues who stimulate, evaluate, confirm, sustain, and protect creativity within a domain, and, thus, foster motivation.

Product. Research in the creative product approach pertains to original ideas, expressed either in the form of language, as in a poem or theory, or in the form of craft, as in a painting or invention. A degree of newness is implied by the term original idea; when a new idea is embodied into tangible form it becomes a concrete entity, called a product. In the product approach, then, the product itself is the principal interest, and the research purpose is to assess the nature and quality of that product. MacKinnon (1978) emphasized the centrality and importance of studying the creative product:

> In a very real sense...the study of creative products is the basis upon which all research on creativity rests and, until this foundation is more solidly built than it is at present, all creativity research will leave something to be desired (p. 187).

Most explicit definitions of creativity have used the creative product as the distinguishing sign. Even among those who study creativity from the person or process approach, product definitions are generally considered as "ultimately the most useful for creativity research" (Amabile, 1983a, p. 20). Jackson and Messick (1965) listed a distinct set of aesthetic responses that creative products elicit from observers: surprise, satisfaction, stimulation, and savoring. Bruner (1962) also mentioned "effective

surprise" as the observer's response to a creative product, together with "a shock of recognition" that the product, while novel, is entirely appropriate. Most product definitions of creativity have in common the inclusion of these two characteristics -- novelty and appropriateness. Barron (1955) used the terms "certain stated uncommonness" and "adaptive to reality" to describe the two characteristics. Later, Stein (1974) integrated these two characteristics in his often-quoted product approach definition of creativity:

> Various approaches agree that the resultant of the creative process is something novel. The novelty that is produced is of some significance, but novelty in some insignificant detail, while no doubt of worth, does not merit being called creative. The novel result is also useful, tenable, or satisfying....For the result to be called creative, it needs also to represent a "leap"...away from that which has existed...(p. 15).

Simonton (1988) stated it more concisely: "...a product demonstrates creativity if it is simultaneously 'original' and 'adaptive'" (p. 386).

In the product approach, the ultimate criterion is the product itself. Curiously enough, despite the fact that creative product definitions abound, and some researchers

have attempted an analysis of creative products (Besemer & Treffinger, 1981), there appears to be a "paucity" of empirical evidence associated with the product approach (Isaksen, 1987). Among the creative product analyses that have been conducted (Amabile, 1983a; Besemer & O'Quin, 1986; Simonton, 1980; Taylor & Sandler, 1972), whether subjective or objective, most of the work has been done with creative products in specific contexts; very little has been done to gain a more general picture of the characteristics of creative products across domains.

Tardif and Sternberg (1988) listed some generalizations concerning creative product research on which there is consensus. Creative products are novel, not imitations or mass-produced; they are valuable or useful to the society, or at least to the restricted domain in which they were formed; they are powerful and generalizable; and they exhibit parsimony. According to these authors, "what we sorely need are some solid data on the differences between products in various domains and the qualities they must display in order to be deemed creative" (p. 438).

Research within each of the four approaches, Person, Process, Environment, and Product, has produced a partial view of the phenomenon of creativity, each from its own unique perspective. However, results from each of the approaches have often been difficult to assimilate into an

integrated systems view of the whole phenomenon, due to the lack of a common theoretical framework, the lack of common terminology, and the presence of inconsistencies in results from one study to another.

Creativity Measurement Techniques

When considering the wealth of research on creativity since 1950, including studies in each of the four approaches, based on a wide variety of theoretical conceptions, it is no surprise that the most salient characteristic of creativity measurements is their diversity (Hocevar, 1981). As Ripple (1989) has pointed out, a veritable "festival" of measurement options, each purported to assess some aspect of creativity, has been developed. Surveys of creativity measurement instruments have been reported by Kaltsounis (1971: Part I, 48 commercially available instruments), Davis (1971: Part II, 23 non-commercially available instruments), Kaltsounis (1972: Part III, 38 additional non-commercially available instruments), and Kaltsounis and Honeywell (1980: Part IV, 77 additional non-commercially available instruments).

Recently, Hocevar and Bachelor (1989) provided an excellent and comprehensive taxonomy of measurements used in the study of creativity, classifying more than 100 examples of assessment criteria into eight categories. This typology

includes the following categories: Tests of Divergent Thinking; Attitude and Interest Inventories; Personality Inventories; Biographical Inventories; Ratings by Teachers, Peers, and Supervisors; Judgments of Products; Eminence; and Self-reported Creative Activities and Achievements. In addition, Hocevar and Bachelor identified other measures of creativity deemed useful, but resistant to categorization because they were constructed exclusively for use in specific situations. Descriptions of measurement strategies utilized in each of the eight categories are provided in more detail below.

Tests of Divergent Thinking. Divergent-thinking tests have been the most widely used approach for studying creativity. Most of these pencil-and-paper assessments were modeled after Guilford's tests designed to tap the divergent thinking component in his Structure of Intellect theory (Guilford, 1956). A wide variety of divergent-thinking test batteries were developed by various proponents of this theory. These researchers believed that creative individuals possess more of the abilities outlined in the divergent-thinking component -- originality, flexibility, redefinition, and elaboration. Two of the most widely used divergent-thinking test batteries are the Torrance Tests of Creative Thinking (Torrance, 1966, 1974) and the Wallach-Kogan creativity tests (Wallach & Kogan, 1965). Items on

divergent-thinking tests differ from items on traditional intelligence tests in that they require a multitude of responses rather than a single correct answer. For example, in the Alternate Uses test (Wallach & Kogan, 1965), subjects are asked to think of alternate uses for a variety of common objects, such as a newspaper, a shoe or a button. Recently a number of researchers (e.g. Hocevar, 1979a; Milgram, 1983; Runco, 1986) have made suggestions for revising divergent-thinking tests to overcome certain criticisms and make them more suitable for practitioners and researchers.

Attitude and Interest Inventories. Some investigators, basing their approach on the assumption that a creative person will express attitudes and interests favoring creative activities, have suggested that creativity can be identified by attitude and interest inventories. Several pencil-and-paper format tests have been developed for the purpose of assessing such characteristics. The Group Inventory for Finding Creative Talent (Rimm & Davis, 1976, 1980) assesses an individual's interests in a wide variety of activities; the Pre-conscious Activity Scale (Holland and Baird, 1968) rates individuals on originality according to their attitudes; the "How Do You Think?" test (Davis and Subkoviak, 1975) assesses patterns of thinking; the Khatena-Torrance Creative Perception Inventory (Khatena & Torrance, 1976) has two subscales, "Something about Myself," and "What

Kind of Person Are You?" that are designed to identify the extent to which a respondent has interests, thought patterns, and personality characteristics presumed to be creative.

Personality Inventories. Still other investigators have perceived creativity as a set of personality factors, not as a combination of cognitive traits. "Creativity scales" have been derived for several of the well-known personality inventories, including the California Psychological Inventory (Helson, 1965), the Sixteen Personality Factor Questionnaire (Cattell & Butcher, 1968), the Adjective Check List (Gough, 1979), the Omnibus Personality Inventory (Heist & Yonge, 1968), and the Minnesota Multiphasic Personality Inventory (Barron, 1969).

Biographical Inventories. Some researchers, operating on the basis that an individual's present behavior is best predicted by past experiences, have suggested that a biographical inventory is an effective method for assessing creative talent. Most inventories of this type were originally devised on an intuitive basis and refined through testing samples of individuals rated high, average, or low in creativity. There are two published biographical inventories. The Alpha Biographical Inventory (Institute for Behavioral Research in Creativity, 1968), a 300 item questionnaire, was developed through intensive testing of

NASA scientists and engineers (Taylor and Ellison, 1964), and is limited to measuring scientific creativity. The Biographical Inventory: Creativity (Schaefer, 1970) has 165 questions in five sections: physical characteristics, family history, educational history, leisure-time activities, and miscellaneous. This latter instrument is broader in its applicability and has been used in several validation studies (e.g. Anastasi & Schaefer, 1969; Schaefer, 1969).

Ratings by Teachers, Peers, and Supervisors. Some investigators have chosen to assess the creativity of individuals through ratings by significant others such as teachers, peers, or supervisors. Teacher ratings are most often used in educational settings as the criterion measure in studies of students' creativity (e.g. Rimm & Davis, 1980). Although researchers have recognized the inherent limitations in using peer nominations as the criterion of creativity, some have used these ratings in their studies, particularly with children in classroom settings (e.g. Runco, 1984; Torrance, 1974; Yamamoto, 1963). Supervisor ratings have most often been used in industrial settings for establishing criteria useful in identifying creative employees (e.g. Buel, 1965).

Judgments of Products. Based upon the self-evident assumption that creative people produce creative products, and the fact that the creative product is the ultimate

tangible evidence of creativity, it is no surprise that investigators have employed product judgments in identifying creativity. Although Ghiselin (1963) suggested that it should be possible to analyze objectively the "intrinsic" quality" of products to determine whether they are creative, efforts for such objective analysis have been infrequent. However, Simonton (1980), in his study of the relationship between a melody's fame and its originality, developed a reliable and objective method for quantifying originality, although this technique failed to distinguish the creative from the merely bizarre. Most studies employing judgments of products have utilized subjective assessments (e.g. Sobel & Rothenberg, 1980; Getzels & Csikszentmihalyi, 1976). Examples of research incorporating creative products are available in areas as diverse as art (e. g. Bull & Davis, 1982), literature (e.g. Davis & Rimm, 1982), and science (e.g. Taylor, Smith & Ghiselin, 1963). Judges in product studies have ranged from experts to nonexperts; judging criteria have varied from diverse definitions of creativity, to no definition at all; judgments have also been based on social recognition criteria, such as awards or publications. Amabile's (1982, 1983a) work, reviewed in depth later in this chapter, has been "both important and illustrative of the creative product approach to measuring creativity" (Hocevar & Bachelor, 1989, p. 57).

Eminence. Some investigators have approached the study of creativity through studying eminent people. Although this method has a long history (e.g. Galton 1869; Castle, 1913), over the years it has been employed infrequently, probably because of the impractical nature of such study. Among the most noteworthy research of this type is the work done by MacKinnon (1962, 1975) and his colleagues at the Institute for Personality Assessment and Research (IPAR). More recently, researchers Albert (1983) and Simonton (1978, 1987) have followed the historiometric approach in their studies of creative genius.

Self-Reported Creative Activities and Achievments. Some creativity researchers have suggested that creative talent can best be identified through self-reports of activities and achievements. Holland and Nichols (1964) described lists applicable to the fields of science, art, literature and music that have been used to identify talent for the National Merit Scholarship Corporation. Of more recent interest, checklists of creative activities and accomplishments have been developed by Hocevar (1976, 1979b) and Runco (1986). In general, the total creativity score on these checklists is simply the number of activities checked. There are no commercially available checklists.

Other Creativity Assessment Procedures. According to Hocevar and Bachelor (1989), there are several often-used

measures of creativity that were tailor-made for specific situations and do not fit neatly into their eight-category typology. Among those are: Remote Associates Test (Mednick & Mednick, 1967); Starkweather Creativity Tests (Starkweather, 1967); Mosaic Construction Test (Hall, 1972); Barron-Welsh Art Scale (Barron & Welsh, 1952; Lundsteen Test of Creative Problem Solving (Rickborn & Lundsteen, 1968); Sternberg's (1985) indices of people's implicit theories of creativity; and the Lifetime Creativity Scales (Richards, Kinney, Benet, & Merzel, 1988).

Creativity Assessment Problems

Several reviews and critiques of creativity measurement techniques have been published over the past 25 years (e.g. Barron & Harrington, 1981; Crockenberg, 1972; Dellas & Gaier, 1970; Hocevar, 1981; Kogan, 1983; Treffinger, 1987; Treffinger & Poggio, 1972; Tryk, 1968). These authors identified problems associated with creativity assessment.

In one of the earliest critical evaluations of standard methods used to assess creativity, Tryk (1968) cited the difficulty in isolating and quantifying meaningful criteria -- the so-called "criterion problem" -- as the most difficult and important problem in creativity assessment. He criticized the fact that so much research had gone on in the absence of a sufficiently general theoretical framework.

He deplored the practice of comparing creativity measures with other similar measures of creativity, and pointed out that the average correlation between tests of creativity was only slightly above .30, hardly a definitive statistic. He called attention to problems with scoring, deficiencies in the testing situation (Wallach & Kogan, 1965), and failure to consider the importance of motivational variables as crucial determinants in creativity.

Dellas and Gaier (1970) identified the absence of replicative studies as a "glaring deficit", and criticized the lack of precision in reporting results in creativity studies. Echoing the concern that the criterion problem was far from solved, but of primary importance, they stated that, in the future, such a criterion must "come to terms with four dimensions: (a) relevance to the actual product or culture, (b) comprehensiveness, (c) reliability and discrimination, and (d) freedom from bias" (p. 70).

Crockenberg (1972), in her review of results from two widely-used divergent-thinking tests, found that neither test provided conclusive validity evidence. She concluded that it is conceptually unjustifiable to call these tests "tests of creativity," due, in part, to the fact that they use the production of many unusual ideas as the criterion, overlooking the essential aspect of "quality."

In a much-quoted review of creativity research spanning a 15-year period from 1965 to 1980, Barron and Harrington (1981) stated that: "some divergent thinking tests, administered under some conditions and scored by some sets of criteria, do measure abilities related to creative achievement and behavior in some domains" (p. 447). However, they noted that:

> divergent- thinking test scores have often failed to correlate significantly positively with plausible indices of creative achievement and behavior. While there are probably many reasons for this, one factor undoubtedly involves the field-specific relevance of many DT abilities and the primitive state of knowledge regarding the abilities underlying creative behavior in any given field. Because the DT abilities presumably underlying creative achievement probably vary from field to field, there is little reason to expect any randomly selected DT test to correlate with creative achievement in any randomly selected domain. Until greater attention is paid to the matching of DT tests to relevant domains, attempts to validate DT tests will proceed in an essentially shot-gun fashion (p. 448).

And, they concluded, "The 1980s will surely see a tendency to develop increasingly field-specific pictures of the creative person" (p. 456).

In her review and summary of problems associated with the use of creativity tests, Amabile (1983a) grouped all creativity paper-and-pencil tests together -- personality, biographical, attitude and interest, and behavioral (divergent-thinking). In addition to citing serious problems related to the validity of such tests, she pointed out that various social and environmental factors can influence their results. Also, she asserted that, despite the seeming objectivity of these creativity tests, the scoring procedures are basically subjective. She concluded that although many creativity tests do measure abilities and dispositions that are probably important for creative performance, it is inappropriate to label results of these tests as direct indicators of some general construct called creativity. As for product judgments, in addition to serious problems with reliability, she criticized their inability to distinguish the creative from the merely bizarre, and their failure to differentiate between the creativity of the product and other constructs such as the technical correctness or the aesthetic appeal of the product. In her opinion, because of the need for creative product judgments to include the aspect of appropriateness as well as novelty, "Ultimately...some type of subjective assessment is required" (p. 27).

Recently, Brown (1989) identified the following seven factors as problems related to the creativity literature: the use of introspective and retrospective data; the use of inappropriate comparison groups; the practice of inferring causality from correlations; the prevalence of inconsistent and contradictory findings; the failure of researchers to adhere to principles of statistical inference; the failure of researchers to describe methodology in detail; and the prevalence of abstruse and cryptic writing. He reiterated the illusive "criterion problem" and pointed out that, as early as 1971, there were doubts about the extent to which tests of divergent thinking or ideational fluency predict real-world creativity (Wallach 1971). In Brown's view:

> A problem common to virtually all trait-test approaches to creativity is that the hypothetical creativity constructs were not clearly anchored to observable real-world creativity....creativity test results became identical with creative production itself....the obvious difficulty is that creativity tests have construct validity, but not criterion validity (p. 18).

He concluded that divergent thinking tests should not be called tests of creativity, and that, in general, divergent thinking and cognitive trait models have failed to account for creative productivity. "Ultimately," he continued, "concepts of the creative process must be linked to creative

products", and, during the process of judging creative products, "appropriateness is a crucial conjoint criterion to unusualness" (p. 11).

Validity. In the final analysis, the single most important consideration in evaluating any of these creativity measurements is the question of validity -- whether or not the measure "really" taps creativity (Treffinger, 1987). Brown (1983) referred to validity as "the most important characteristic of a test" and defined it as "the extent to which a test measures what it is designed to measure, and nothing else" (p. 19). Three basic types of validity -- content, criterion-related, and construct -- can be considered.

In order to demonstrate content validity, it is necessary to present evidence that an instrument provides a representative sample of creativity in the selected domain (Treffinger, 1987). Regarding the content validity of creativity measurements there has been an "almost total neglect of the dimensionality of the attribute" (Hocevar, 1981, p. 457). The term creativity itself suggests that there is only a single universe which must be sampled, and much of the research has treated it as a unitary psychological construct. However, current thinking views creativity as a multidimensional construct, a fact which has presented a major problem in deciding upon the universe(s)

from which sampling should be done. The absence of a simple, generally accepted theory of creativity to define the universe and unify assessment efforts has also presented problems in determining appropriate evidence of content validity. For this reason, most creativity tests have been inadequate as indicators of creativity in a general sense, because they assess such narrow ranges of abilities, and their results are influenced by abilities such as verbal skills, which are not necessarily the same as creativity.

Evidence in support of criterion-related validity can be obtained by selecting known external indicators of creative behavior and correlating scores from such external indicators to the measure in question. If data collection for the measure and the criterion are simultaneous or separated only by a minimal time lapse, evidence for concurrent validity is obtained; if there is a time lapse of weeks, months, or even years between the measure and the criterion data, evidence for predictive validity is obtained (Michael & Wright, 1989; Treffinger, 1987).

Regarding the criterion-related validity associated with various creativity measures, probably the most difficult problem has been that of identifying a truly satisfactory criterion measure. In the absence of valid general criteria for creativity across age levels and content domains, and with a multi-dimensional and ill-

defined construct such as creativity, evidence for criterion-related validity has proven difficult to obtain. In the case of predictive validity, so many factors beyond an individual's creative ability as measured in childhood, for example, could reasonably be expected to intervene and have significant impact on creative development and accomplishments in adulthood. As for concurrent validity, it has already been noted that creativity tests have often failed to correlate significantly with plausible real-world indices of creative achievement and behavior (Barron & Harrington, 1981). Amabile (1983a) has raised serious questions about the concurrent and predictive validity of many creativity tests.

Evidence for construct validity is provided, not by the results of any single study, but rather by an accumulation of supporting data in small increments as a result of many specific experiments. One procedure often followed in providing evidence for construct validity is to determine a theoretical framework for the construct (and by inference the instrument or measure), describe hypotheses which might be derived from the theory, and then determine the extent to which experimental evidence supports those hypotheses. Results from this type of inquiry accumulate to provide a body of evidence for construct validity -- the total pattern of research evidence that supports an instrument. Two

major requirements exist for establishing construct validity: convergence and divergence with related and unrelated constructs. Convergent validation is the demonstration that a selected measure of a given behavior is related to other measures linked theoretically to the same construct. Discriminant validation is the demonstration that the selected measure is not linked to other measures and variables which theoretically support distinctly different constructs (Michael & Wright, 1989).

The strongest criticisms of the validity of creativity measures have been related to construct validity. Hocevar (1981) identified the lack of convergent validity as the "most condemning problem associated with the measurement of creativity" (p. 457). If each of the various measurement techniques is purported to be measuring creativity, then a positive (moderate to high) correlation between them is needed in order to satisfy a minimum condition of convergent validity. In the literature, however, although scores based on the same type of method have tended to be correlated, scores obtained from different methods have not. As noted above, correlations of divergent thinking with other measures of creativity often indicated no relationship, and even in studies where significant correlations were reported, the correlation was seldom higher than .30. Thus, as Amabile (1983a) noted, the convergent validity problem

"is especially troublesome since many of the creativity tests are validated against one another" (p. 25).

Regarding discriminant validity, Hocevar and Bachelor (1989) described two ways a test for this type of validity is typically applied in the creativity literature. In one application, the question is, "Is the creativity construct different from other constructs?" (p. 60). Their review of several appropriate studies indicated that measures of creativity have proven difficult to distinguish from measures of other constructs, such as intelligence, achievement, or competence. In fact, high correlations between creativity scores and scores on other presumably unrelated constructs, such as speaking skills, writing skills, dependability, adaptiveness, need to know, independence, and productivity, have been found. In product judgments, also, rating procedures employed by various methodologies have failed to differentiate between the creativity of a product and other aspects of product merit.

The second typical application of a test of discriminant validity in creativity studies, according to Hocevar and Bachelor (1989), involves the question, "Are the purported dimensions of creativity different from each other?" (p. 60). Their review of the literature revealed that, in studies involving multiple aspects such as fluency, flexibility, and originality, correlations between such

dimensions were generally about .80, thus demonstrating questionable discriminant validity even among the various dimensions of divergent-thinking tests. Even though modifications in scoring techniques (Milgram, 1983) and instructions (Runco, 1986) appear to have improved separation between dimensions, Hocevar and Bachelor concluded that, "Researchers cannot assume that the creativity construct has discriminant validity, particularly when subjective judgments are involved" (p. 61).

Reliability. The other important consideration in evaluating creativity instruments, and a requirement in establishing validity, is reliability -- "the stability or consistency of scores on a given measure" (Michael & Wright, 1989, p. 44). Hocevar and Bachelor (1989) have noted that reliability is a particular concern for creativity studies because, due to the very nature of the construct, there is a certain inherent variability in subjects' performance on such tests which can threaten the reliability of the results. The variability of creativity within the population is extremely great, and there are substantial variations within an individual across brief time periods. Also, creativity may be particularly susceptible to "intrusive" effects of measurement, such as motivational influences or factors involving the testing situation or context.

Traditionally, the estimation of test reliability has generally involved one of three broad approaches: the test-retest approach, which indicates stability of test scores over time; the equivalent or alternate forms approach, which indicates the stability of scores for various forms of an instrument; or the internal-consistency approach, which indicates the homogeniety of the various items or components of a single test form (Michael & Wright, 1989; Treffinger, 1987). Interjudge agreement, a special type of internal consistency measure, has often been applied for estimating reliability in creativity studies utilizing ratings assigned by judges.

Based upon their exhaustive review of creativity measurement techniques, Hocevar and Bachelor (1989) identified internal consistency and interjudge agreement as the two methods of reliability estimation most useful for creativity research. They noted that internal consistency is of special importance whenever a group of items on a test or questionnaire are summed to obtain a composite index, and concluded that the internal consistency indices found in the creativity literature were satisfactory in that most exceeded .70.

They were less positive, however, about the situation with interjudge reliability. They cited the subjectivity of the researcher in choosing who the judges should be and what

the judges should be looking for as a reliability concern. Also, they noted problems related to the instructions given to judges regarding criteria, definitions, and training for the task. They concluded that Amabile's (1982, 1983a) methodology, "represents the best work in the area of interjudge reliability" (p. 60).

After classifying creativity measurement techniques into a taxonomy of eight categories and examining the literature relative to validity and reliability criteria related to this wide variety of creativity studies, Hocevar and Bachelor (1989) concluded that, in general, both internal consistency reliabilities and interjudge reliabilites have been satisfactory for research purposes, although some concerns about interjudge reliability remain. Convergent validity remains as a serious problem in that measures that presumably relate to creativity frequently have not correlated with each other; discriminant validity also continues to be a problem, both in terms of demonstrating that scores on creativity measures differ from scores on other constructs, and in terms of demonstrating that the dimensions of creativity differ from each other.

In considering the best approach to follow in measuring creativity, based upon their exhaustive survey of techniques used in the past, Hocevar and Bachelor (1989) recommended focusing on criteria which have face validity -- eminent

individuals, creative products, or creative accomplishments and achievements. They cited the inadequacy of ratings by teachers, peers, and supervisors, due to the raters' inability to discriminate creativity from other traits. They warned that divergent-thinking, attitudes and interests, and personality characteristics can only be said to be correlates of real-life creative behavior, and should not be taken as direct measures of creativity. And, finally, they concluded, "Research that has the most bearing on what society recognizes as actual creativity can best be accomplished by studying eminent women and men, analyzing creative products, and administering inventories of creative activities and accomplishments" (p. 70).

Recent Trends

According to Sternberg (1988), by the end of the 1970s it had become clear that the initial thrust for creativity research had slowed, and that only a few researchers were continuing to study the field in a way that could make a difference. From the perspective of some (e.g. Glover, Ronning, & Reynolds, 1989), the field of creativity had declined, becoming a large-scale example of what Brown (1989) labeled a "degenerating research program". In general, divergent thinking and cognitive trait models had failed to account for creative productivity; several

theoretical approaches, including the psychoanalytical, were considered to have questionable value. Fewer studies were being published each year, and leadership for shaping a scientifically sound framework for development of research programs in creativity was lacking.

By the middle 1980s, however, evidence of new efforts and new themes began to appear in the literature (Runco & Albert, 1990). Important work on creativity was being done from a number of different perspectives, not only by some of the important early investigators, but also by new researchers in the field -- Amabile (1983a), Milgram (1983), Runco (1984), Sternberg (1985) and others. Toward the end of the decade, several new books were published on the subject (Isaksen, 1987; Sternberg, 1988; Glover, Ronning and Reynolds, 1989; Runco and Albert, 1990), each of them a collection of articles by various researchers, old and new. These books documented new insights and new approaches for the examination of creativity, and signaled the presence of a new wave of interest in creativity research.

This so-called "reawakening" brought new theoretical and methodological perspectives. Researchers (Sternberg, 1985; Runco & Bahleda, 1986) explored implicit theories of creativity -- those "constructions by people that reside in the minds of these individuals" and which "need to be discovered rather than invented because they already exist,

in some form, in people's heads" (Sternberg, 1985, p. 608). They also explored the use of "social validation" (Wolf, 1978) methodology in the study of creativity.

Amabile (1983a, 1983b) proposed a comprehensive theory of creativity, a componential systems framework in which creativity and creative process were integrated into a single conceptual model and the concept of intrinsic motivation was identified as an important factor in determining creativity. Her conceptual framework and her methodology, based upon consensual assessment of product creativity, was representative of the new and "genuinely penetrating insights into the study of creativity (Sternberg, 1988), and, as such, provided a new agenda for a "particularly progressive research program" (Brown, 1989).

Amabile's Componential Framework of Creativity

Amabile (1983b) argued that "creativity is best conceptualized not as a personality trait or a general ability but as a behavior resulting from particular constellations of personal characteristics, cognitive abilities, and social environments" (p. 358). Thus, in her view, creativity can be completely explained only through a model that encompasses all three sets of factors: dispositional, cognitive, and social. The resulting conceptual model, rooted in the diverse data on creativity phenomena accumulated over several decades, provides a set of three components as necessary and sufficient for creative production in any domain, and a five-stage schematic framework representing interactions among the components in actual creative production. This section will provide a summary of Amabile's theoretical framework according to the following: Definitions; Assumptions; Creativity Framework; and Creative Process Framework.

Definitions

Amabile's work has been grounded in two complementary definitions of creativity: an operational definition readily applicable to empirical research, and an underlying conceptual definition for use in building a theoretical formulation of the creative process.

A Consensual Definition of Creativity. The consensual definition, an explicitly operational definition that implicitly underlies most subjective assessment methodologies, is based on the creative product, rather than the creative process or person:

> A product or response is creative to the extent that appropriate observers independently agree that it is creative. Appropriate observers are those familiar with the domain in which the product was created or the response articulated. Thus, creativity can be regarded as the quality of products or responses judged to be creative by appropriate observers, and it can also be regarded as the process by which something so judged is produced (Amabile 1983a, p. 31).

A Conceptual Definition of Creativity. The conceptual definition, developed for the purpose of laying the foundation for a theoretical model of creativity, includes novelty and appropriateness, the two hallmark characteristics of creativity associated with most product definitions:

> A product or response will be judged as creative to the extent that (a) it is both a novel and appropriate, useful, correct or valuable response to the task at hand, and (b) the task is heuristic rather than algorithmic (Amabile, 1983a, p. 33).

Algorithmic tasks are those for which the path to the solution is clear and straightforward; heuristic tasks are those not having a clear and readily identifiable path to solution.

Assumptions

The Amabile conceptual framework relies on a number of assumptions about the nature of creativity, creative production, and creativity judgment (Amabile, 1983a, 1983b).

Creativity. Amabile assumes that (a) there is a continuum from the lower levels of creativity seen in everyday life to historically significant creativity, (b) there can be degrees of creativity within a particular individual's work, (c) the ages at which peak creativity is achieved in different domains varies widely, and (d) it is possible to increase individuals' creativity to some extent.

Creative Production. Amabile assumes that, for high levels of creativity, (a) there often seems to be a "match" between individuals and domains, (b) education and training in cognitive skills, though essential, are not sufficient by themselves, (c) clusters of personality traits, though correlated with creativity, are not sufficient in and of themselves, (d) innate talents in a given domain are important, but education is also essential, and (e) though eagerness to work diligently is essential, intellectual

playfulness and freedom from external constraints are also needed.

Creativity Judgments. Amabile assumes that (a) products or observable responses must ultimately be the distinguishing sign of creativity, (b) creativity is something that people can recognize and often agree on, even when they are not given a guiding definition, (c) there is one basic form of creativity, whether working in science or the arts, and (d) there are degrees of creativity.

Based upon these assumptions, Amabile's componential framework of creativity is an attempt to account for all well-established aspects of creativity phenomena. In the model, "talents, education, cogitive skills, innate interests, and personality dispositions all function interactively to influence creative behavior," together with the "apparently contradictory importance of both 'work' and 'play' in the motivation for creative behavior" (Amabile, 1983b, p. 362).

Creativity Framework

Amabile proposed the Components of Creative Performance (Figure 2) as a working framework showing the components essential for creativity. As shown in the model, there are three major components which interact, each component resulting from an interplay of several internal and external

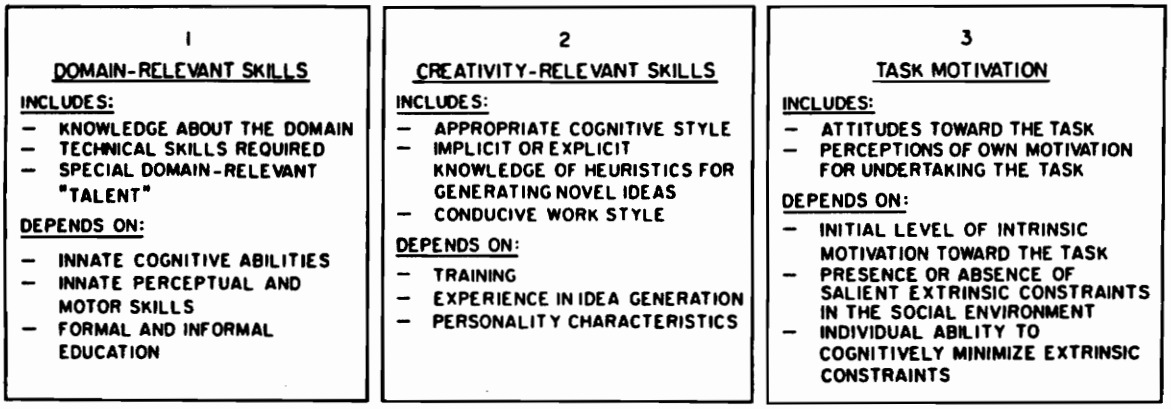

Figure 2. Components of Creative Performance.

Source: Amabile (1983b, p. 362). Copyright 1983 by the American Psychological Association. Reprinted by permission of the author (see Appendix A).

factors. The subprocesses traditionally viewed as being involved in the creative process appear in both the Domain-Relevant and Creativity-Relevant components; motivational factors which determine whether the creative process will begin and whether it will continue, appear in the Task Motivation component. Conceptually, the model is a multiplicative one: "Each of the components is necessary for some level of creativity to be produced; the higher the level of each of the three components, the higher the overall level of creativity should be" (Amabile, 1990, p. 79).

Domain-Relevant Skills. Domain-relevant skills operate at the most basic level; they are the foundation from which any performance must proceed. A person cannot be truly creative without a great deal of factual knowledge about a particular domain, the necessary technical proficiency to produce in that domain, and special talent for the domain in question. This component can be viewed as the individual's complete set of cognitive pathways, or, more poetically, the "network of possible wanderings" (Newell & Simon, 1972, p. 82) to be followed in solving a given problem or doing a given task.

Creativity-Relevant Skills. Creativity-relevant skills operate at the most general level; they are those cognitive and personality characteristics that have traditionally been

viewed as underlying the generation of potentially creative responses. Included in this component are a cognitive style favorable to taking new perspectives on problems, an application of heuristics for generating novel responses, and a working style conducive to persistent, energetic pursuit of one's work. These skills depend to some extent on "personality characteristics related to independence, self-discipline, orientation toward risk taking, tolerance for ambiguity, perseverance in the face of frustration, and a relative unconcern for social approval" (Amabile, 1990, p. 78). Creativity-relevant skills provide that special quality inherent in creative performance. Without them, assuming there is adequate incentive to perform an activity, the performance will be technically good if the necessary domain-relevant skills are present. However, even with extraordinarily high domain-relevant skills and high task motivation levels, an individual will not produce creative work if creativity-relevant skills are lacking.

Task Motivation. Task motivation is the most narrowly specific component and can vary drastically from one task in a domain to another. The difference between what a person can do and what a person will do is determined by task motivation: domain-relevant and creativity-relevant skills determine what the individual can do, but what the individual will do is determined by these skills together

with the level of intrinsic motivation. Amabile's own research focus has centered on this component, specifically on the role of intrinsic motivation in creative performance. Results of her studies have supported her hypothesis that certain extrinsic factors, such as evaluation, surveillance, reward, competition, and restricted choice can have a negative effect on creativity (Amabile, 1990).

Creative Process Framework

The Componential Framework of Creativity (Amabile, 1983a, 1983b) is a schematic representation of the roles played by each of the three components of creativity -- domain-relevant skills, creativity-relevant skills, and task motivation -- during the stages of the creative process (Figure 3).

This model resembles previous theories of creativity which outline the various stages in problem solving (Guilford, 1967; Rossman, 1931; Stein, 1974). It also is similar to models traditionally used to represent the design process used by interior designers (e.g., Lang, 1973; Spreckelmeyer, 1987) which typically include five phases: (a) gathering information, (b) generating alternative solutions to the problem and making a choice as to the best solution, (c) developing the design through working drawings and specifications, (d) implementing the design through

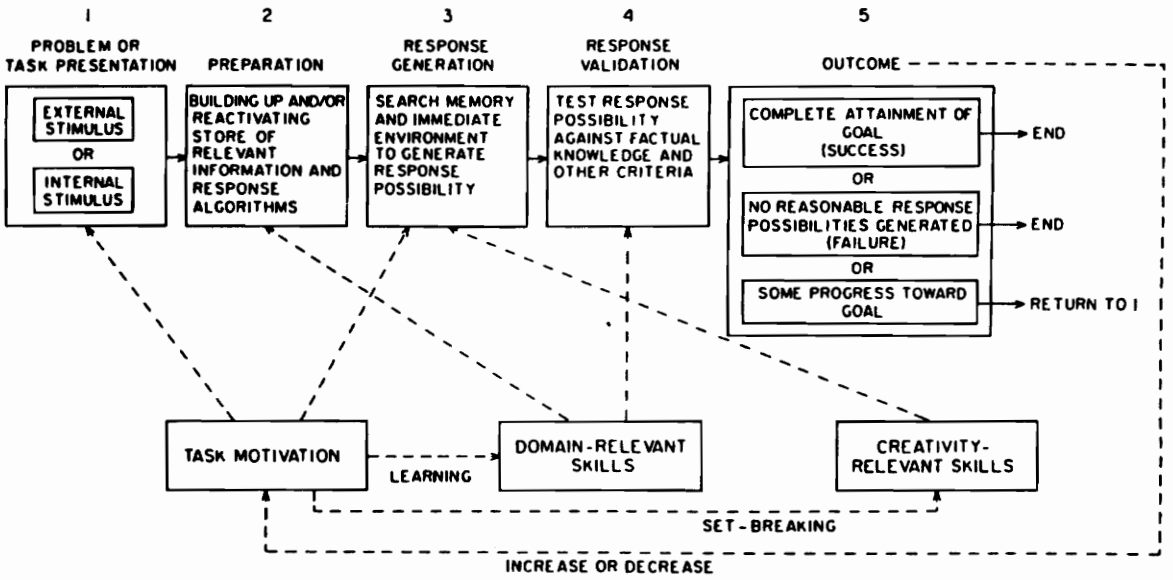

Figure 3. Componential Framework of Creativity.

Source: Amabile (1983b p. 367). Copyright 1983 by the American Psychological Association. Reprinted by permission of the author (see Appendix A).

construction and/or installation, and (e) post-occupancy evaluation of the space or environment. However, the Amabile framework is more detailed than previous models, and, by showing the impact of each of the three components of creativity at each stage in the process, it conceptually synthesizes creativity and the problem-solving process, integrating the two into a single model.

Stage One. The initial step in the sequence is the presentation of the task or the problem. Tasks/problems may emanate either from the individual's own intrinsic interest, or may be presented by someone else. Task motivation has an important influence at this stage; the individual will usually be more motivated to solve problems that arise intrinsically.

Stage Two. In the second stage, the individual acquires or reactivates information relevant to the task. This step may involve a considerable investment of time if domain-relevent skills are limited and new information must be gathered afresh, but can be almost instantaneous if there is a wealth of information already stored and ready to be reactivated.

Stage Three. In the third stage, novel potential solutions are generated through use of both cognitive problem-solving pathways and potentially useful features in the environment. It is in this crucial third stage that the

novelty of the product or response is determined. Both creativity-relevant skills and task motivation are important in this phase.

Stage Four. During the fourth stage, the individual tests a chosen potential solution for its usefulness and value. Domain-relevant techniques of analysis are employed to validate the solution response according to existing domain-relevant criteria. It is at this stage that the other essential characteristic for creativity, appropriateness, is determined.

Stage Five. Finally, in stage five, a decision is made which determines whether or not the process can be terminated or must return to the first stage for another trial run. If another trial is attempted, information added to the existing repertoire of domain-relevant skills during the last run can be used to pose the problem in a different form for the next trial.

The Feedback Cycle. The outcome of a given run through the process, whether success, failure, or partial success, can effect the individual's motivation for future involvement with the problem or task. Thus, the task motivation component plays an important role in this feedback cycle in determining whether the individual will try again or give up.

To summarize, in Amabile's Componential Framework of Creativity, "task motivation is responsible for initiating and sustaining the process;...domain-relevant skills are the raw materials that feed the process;...and creativity-relevant skills act as an executive controller, influencing the search for possibilities" (Amabile, 1990, p. 80).

Amabile's Consensual Assessment Technique

Amabile's methodology for judging creativity in her studies has been praised as "an elegant and yet simple alternative strategy for the study of creativity" (Ryan, 1984, p. 533) and as a "practical way of judging creativity for experimental purposes" (Kohn, 1987, p. 54). Basically, the method is a straightforward operationalization of the consensual definition: A product or idea is creative to the extent that expert observers agree it is creative (Amabile, 1982). The assessment procedure is implemented by asking subjects to complete some task in a specific domain (e.g., poetry), and then asking experts in that domain (e.g., poets) to rate independently the creativity of the products. The level of agreement among judges (interjudge reliability) is then assessed, and if it is acceptable (generally above .70), the mean across-judge creativity ratings are used as the dependent measures of creativity.

Task Requirements

In selecting an appropriate creativity task, three requirements must be met (Amabile 1982, 1983a):

(a) The task must lead to a product or clearly observable response that can be made available to judges for assessment.

(b) The task should be open-ended enough to allow for a wide range of flexibility and novelty in responses.

(c) The task should not depend upon certain special skills that candidates possess in markedly different amounts, such as verbal ability or drawing skills. For domains and tasks in which there is a heavy dependence on special skills, care should be exercised in selecting individuals with a relatively uniform level of baseline performance on such skills.

Assessment Procedure Requirements

In administering the assessment process, the Amabile technique outlines five requirements (Amabile 1982, 1983a):

(a) Judges should all have experience with the domain in question, although the experience levels need not be identical for all judges. Basically, each judge should be familiar enough with the domain to have developed, over time, some implicit criteria for creativity, technical goodness, and aesthetic appeal.

(b) Judges should make assessments independently. Also, they should not be trained by the experimenter or given specific criteria for assessing creativity. Judges should not be allowed an opportunity to confer while making their assessments.

(c) Judges should make assessments on other dimensions in addition to creativity. Minimally, they should make ratings of the technical aspects of the products, and, if possible, aesthetic appeal. These ratings are necessary for examining the degree of independence of the creativity judgments from other aspects supposedly unrelated to creativity.

(d) Judges should be instructed to rate the products relative to one another, not against some absolute standard they may hold for work in their domain. Based on the assumption that creativity is a continuous variable, and that, regardless of the level of creativity represented in the whole group, products can be rated along a continuum from highest to lowest, this requirement helps to standardize and, thus, improve reliability within the set of ratings.

(e) Each judge should view the products in a different random order, and each judge should consider the various dimensions of judgment in a different random order. These procedures are also designed to foster

reliable ratings by minimizing negative effects of judge fatigue and avoiding set responses by judges.

Data Analysis Procedures

Once judgments are obtained, numerical ratings on each of the various dimensions are analyzed for interjudge reliability. "As implied by the consensual definition of creativity, the most important criterion for this assessment procedure is that the rating be reliable. By definition, interjudge reliablity in this method is equivalent to construct validity. If appropriate judges independently agree that a given product is highly creative, then it can and must be accepted as such" (Hennessey & Amabile, 1988a, p. 16). Thus, Amabile's conceptualization of reliability, provided by a measure of interjudge agreement, is operational rather than mathematical.

Further, if ratings on creativity meet the criterion level (.70 or greater), dimensions are then factor-analyzed to determine the degree of independence between creativity and the other dimensions. If factor analysis results show dimensions hypothesized to be associated with creativity to cluster in a separate group from dimensions associated with technical goodness or aesthetic appeal, then evidence for construct validity is provided.

Results in Experimental Studies

In efforts to establish the utility of the consensual assessment technique, Amabile and her associates have carried out an exhaustive program of research over the past decade. In more than 30 separate investigations, judges were asked to assess the creativity of products produced by children or adults. Artistic creativity was investigated, using simple paper collages as the product to be assessed (Amabile, 1982, 1983a; Amabile, Hennessey & Grossman, 1986). Verbal creativity was also studied, using Haiku poems (Amabile 1982, 1983a, 1985) and short stories (Amabile, Hennessey & Grossman, 1986; Hennessey & Amabile, 1988b; Hennessey, Amabile & Martinage, 1989).

In various studies focusing on artistic creativity, subject groups ranged in size from 20 to 120; judges numbered from 6 to 21. Similarly, in studies on verbal creativity, subject groups ranged in number from 24 to 115; groups of judges ranged in size from 2 to 12. Whereas reliable assessments of verbal creativity using story-telling were achieved with as few as three judges, artistic creativity investigations using collages usually required at least 10 judges.

Interjudge Reliability. For earlier studies focusing on artistic creativity, interjudge reliabilities were calculated using a technique developed by Hoyt (1941) and

described by Winer (1971), which involves an analysis of between-design and within-design variance in ratings, and in which the result depends on the number of judges used. For later studies, Amabile used the Spearman-Brown calculation of reliabilities (Nunnally, 1967) which yields virtually identical results, but is somewhat simpler to calculate.

Throughout all the studies, interjudge reliabilities reported by Amabile consistently have been above .70. In the artistic domain (collage studies), interjudge reliabilities on the creativity variable ranged from .72 to .93. A summary of reliabilities obtained in studies of artistic creativity is provided in Table 1. Results in the verbal domain (poem and story studies) showed interjudge reliabilities on creativity ranging from .77 to .91. A summary of reliabilities obtained in studies of verbal creativity is provided in Table 2.

Based upon this accumulation of evidence across repeated studies, Amabile has asserted that creativity, though difficult to define or describe, is something that experts in a field can identify and assess reliably. In their exhaustive critique of creativity measurement techniques, Hocevar and Bachelor (1989) labeled Amabile's method the "best work in the area of interjudge reliability" (p. 60).

Table 1

Interjudge Reliability of Creativity Ratings: Summary of Amabile Study Results in the Artistic Domain.

Product	Subjects	Judges	Reliability*	
collage	22 girls	12 psychologists	.73	(.18)
		21 art teachers	.88	(.26)
		7 artists	.77	(.32)
collage	95 women	15 artists	.79	(.20)
collage	111 children	6 artists	.77	(.36)
collage	47 children	7 artists	.72	(.27)
		7 nonartists	.80	(.36)
collage	79 children	7 artists	.78	(.34)
collage	28 children	8 artists	.79	(.32)
collage	20 adults	14 nonartists	.93	(.49)
collage	40 women	10 artists	.93	(.57)
collage	50 women	10 artists	.92	(.53)
collage	60 women	14 artists	.75	(.18)
collage	120 women	12 artists	.80	(.25)
collage	52 men	15 artists	.79	(.20)
collage	48 adults	10 artists	.77	(.25)
collage	80 children	11 artists	.80	(.27)

From Amabile (1983a, pp. 40-50) and Amabile, Hennessey, & Grossman (1986). Studies conducted at Stanford and Brandeis over a ten year period by Amabile and students/colleagues: S. Berglas, M. Handel, M.L. Stubbs, J. Gitomer, S.C. Brackfield, P. Goldfarb, N. Goldberg, D. Capotosto, L.M. Berman, B. Auskern, B. Hennessey, and B.S. Grossman.

Note: The reliability coefficients reported by Amabile are estimates of the average reliability for all judges. Based upon these figures and Winer's (1971) procedures, the researcher also calculated **reliability estimates for a hypothetical single judge within the sample*** (shown in parentheses) for comparing studies with varying sample sizes.

Table 2

Interjudge Reliability of Creativity Ratings: Summary of Amabile Study Results in the Verbal Domain.

Product	Subjects	Judges		Reliability*	
Haiku poem	48 women	10 poets		.87	(.40)
	24 women	10 poets		.90	(.47)
Haiku poem	40 women	6 poets		.77	(.36)
Haiku poem	59 adults	12 poets		.82	(.28)
Haiku poem	48 adults	8 poets		.77	(.30)
Haiku poems	72 adults	12 poets	Poem 1	.82	(.28)
			Poem 2	.78	(.23)
story	47 children	2 teachers		.87	(.77)
story	115 children	3 teachers		.91	(.77)
story	80 children	3 teachers		.83	(.62)
story	113 children	3 teachers		.80	(.57)
cartoon captions	48 adults	10 people		.85	(.36)

From Amabile (1983a, pp. 50-56), Amabile, Hennessey, & Grossman (1986), and Hennessey, Amabile, & Martinage (1989). Studies cited conducted at Stanford and Brandeis over a ten year period by Amabile and students/colleagues: S.C. Brackfield, P. Goldfarb, L.M. Berman, R. Goldlust, R. Zingmond, B. Auskern, B. Hennessey, B.S. Grossman, M. Martinage, and E. Langer.

Note: The reliability coefficients reported by Amabile are estimates of the average reliability for all judges. Based upon these figures and Winer's (1971) procedures, the researcher also calculated **reliability estimates for a hypothetical single judge within the sample*** (shown in parentheses) for comparing studies with varying sample sizes.

Convergent and Discriminant Validity. Results of the factor-analytic methods applied in the Amabile studies have consistently separated dimensions into factor clusters that tend to reflect the independence of creativity judgments from judgments of technical goodness and aesthetic appeal. In the artistic creativity studies, results indicated two independent clusters of variables, that Amabile labeled "Creativity" and "Technical Goodness." Dimension variables such as "novel idea" or "novel use of materials" consistently clustered with the "Creativity" dimension variable; other dimensional variables such as "planning," "organization," and "neatness" clustered with the "Technical Goodness" variable.

In the early verbal creativity studies, there was also a separation between the creativity factor and other factors, though not as clear as with the artistic studies. Subsequent modifications in the dimension variable terminology for later studies on verbal creativity (Hennessey and Amabile, 1988b) produced factor analysis results in which three distinct and separate factors emerged: "Creativity," "Factual detail," and "Technical Goodness." Thus, evidence for convergent and discriminant validity of this technique has been provided in two separate domains, artistic and verbal. In the most recent edition of his basic behavioral research text, Kerlinger (1986), cited

Amabile's consensual assessment methodology as a research example of construct validation, and concluded that it "passed the construct validity test" (1986, p. 426).

Summary

Over the past four decades there has been a vast amount of research in the field of creativity. Researchers from a wide variety of disciplines have explored remarkably different theories, definitions, approaches, and measurement techniques for the examination of this evasive construct. Ushered in by a "reawakening" in the creativity movement during the 1980s, several new and promising lines of research have emerged, accompanied by expanded theoretical formulations and innovative measurement techniques.

Several researchers have concluded that creativity is multi-faceted, domain-specific, and, thus, most efficiently measured by the tangible evidence manifested in a creative product specific to the domain. Amabile's "elegant, but simple" creativity assessment technique, based upon her theoretical framework of creativity and the creative process, has provided a practical subjective method for assessing the creativity of a product in a given domain. She has applied the methodology in two domains -- artistic and verbal -- consistently demonstrating its reliability and validity in more than 30 studies over a ten-year span. If

adapted for and applied to the domain of interior design, this methodology may provide information valuable to interior design educators who, in the absence of a domain-specific instrument for the identification of creativity in the field, must provide evidence of this important competency in student work. The present study was designed to explore that possibility.

CHAPTER III

METHODOLOGY

The purpose of this study was to test the viability of adapting Amabile's consensual assessment technique for judging creativity in interior design. This chapter outlines the methodology employed in the study, and is organized into the following sections: Development of the Instrument; Participants in the Study; Data Collection; and Data Analysis.

Development of the Instrument

The instrument developed for this study, Consensual Assessment of Interior Design Creativity (CAIDC), is an adaptation of the Consensual Technique for Creativity Assessment (Amabile, 1982, 1983a). The CAIDC is based on Amabile's definitions of creativity and her componential framework of creativity and the creative process. Amabile's consensual assessment procedures for collecting and judging products were employed in the study, but the product task and rating dimensions were adapted by the researcher for application with interior design projects.

Although not a test in the familiar paper and pencil format, the instrument and techniques employed conform to

Brown's (1983) definition of a test as "a systematic procedure for measuring a sample of behavior" (p. 8). Therefore, established principles and guidelines for constructing and evaluating tests (APA, 1985; Brown, 1983) were applied in the development of the CAIDC.

The primary purpose of the instrument is to provide a reliable method for assessing the construct of creativity in interior design projects. Ratings on creativity serve as an index of the relative degree of presence of creativity in an individual's project, and are properly interpreted only in comparison to other projects in the sample, not according to some absolute standard for creativity in the domain.

The CAIDC consists of two parts, the Project Statment and the Dimensions of Judgment for Interior Design Projects. This section describes the systematic methodology employed in constructing each part, identifies sources and strategies applied in providing evidence for content validity of the task assignment and the rating criteria, and explains important features of the written materials used by participants in the study.

Project Statement

Consensual assessment technique (Amabile, 1982) requires that the product task must be open-ended enough to permit considerable flexibility and novelty in responses,

must lead to a product that can be made available to appropriate judges for assessment, and should not depend on skills that some individuals in the subject group have developed more fully than others. The task assignment developed for this study was designed to simulate activities performed when creating an actual project in interior design, and requires the creation of a product in which the design solution for an interior space is communicated in finished presentation format.

Content Validity of the Project Creation Task. Concern for content validity of the instrument dictated that the product creation task must reflect a representative sampling of tasks utilized in creating interior design projects in the "real world." Two documents associated with the recent revision of the test for interior design certification were used as resource material in identifying tasks which constitute the content domain for project creation in interior design.

The first document, the Report of the Job Analysis of Interior Design (NCIDQ, 1988) was written by the staff of Educational Testing Service (ETS) at the conclusion of the exhaustive job analysis conducted preparatory to the development of the latest version of the NCIDQ Examination. This report provided a list of tasks and knowledge areas that comprise the interior designer's job, together with

indications of linkages between them. The job analysis study was based on an exhaustive background survey of existing literature and research studies, interviews with incumbents, site visits, a broad-based mail survey, and input from a panel of experts, and, as such, constituted the basis for content validity of the new examination. For purposes of the present study, this linkage list was seen to comprise a valid representation of job-related tasks and knowledge content in the domain of interior design. Described in the report were tasks related to "space planning, traffic flow, aesthetics, design fundamentals, and appropriate use of furniture, fixtures, equipment, and finishes" (p. 61).

The second document, Examination Guide (NCIDQ, 1989), is the information guide for candidates preparing to sit for the NCIDQ Examination. It provided a description of design tasks and drawings required for the practicum section of the test, the purpose of which is to evaluate the candidate's ability to integrate a variety of technical and aesthetic considerations into a single product and communicate that integration through the medium of drawings. For the present study, then, appropriate "real world" tasks for the assignment were based upon materials from these two documents associated with the official certification process for interior designers.

These NCIDQ Examination documents, although useful for establishing task content, were inadequate for determining content domain for the creativity component of the task assignment. The NCIDQ Examination was designed to assess an interior designer's competent performance of occupational activities, and was also intended to be used for licensure in states and localities which adopt such legislation, but was not designed to assess the creativity of the interior designer. As Impara and Stoker (1985) have noted, a licensure examination focuses upon characteristics that are part of the required professional knowledge in a particular domain (in this case "life safety" concerns) but may not assess aspects not related to protection of the public that would contribute to "success' in a particular field.

So, in the absence of specific performance criteria for evaluating creativity, a third document, the FIDER Standards and Guidelines for the Accreditation of First Professional Degree Level Programs in Interior Design (FIDER, 1988) was used in the present study to identify content domain for specific task areas in which creativity is relevant. Specifically, STANDARD 1.2 and GUIDELINE 1.6, already cited in Chapter One, were identified as pertinent. In addition, among the eight categories upon which FIDER evaluates a program for accreditation (p. 4-8), three categories, "Basic and Creative Arts," "Theory," and

"Communication Skills," were found to contain creativity elements as criteria for evaluation.

Therefore, to provide evidence for content validity of the Project Statement developed for this study, a systematic methodology for combining criteria from the NCIDQ job analysis report and the FIDER accreditation documents was employed. First, the published table (NCIDQ, 1988) showing linkages between knowledge areas in the domain of interior design and tasks performed in the domain was examined. Then a methodical cross check between this NCIDQ task/knowledge table and the requirements of the three FIDER (1988) categories requiring evaluation of creativity was used to select a representative sample of appropriate tasks for the assignment which offer maximum opportunity for assessment of creativity.

Task Assignment. The task assignment, outlined completely in the Project Statement (see Appendix B), requires subjects to create a one-sheet finished presentation of a design solution for the space described in the statement. The goal is to produce a unique and innovative design solution which meets all the technical and functional requirements of the space. The design should employ the principles of good design and should exploit the elements of design -- line, shape/form, color, light, texture, and space -- in creating an imaginative

environment. Drawings required are a floor plan, an elevation or section, an axonometric, and a perspective vignette. The final presentation should communicate all aspects of the design solution, including materials used, within the format of a single well-composed sheet of good quality drawing paper.

Parameters of the proposed space to be designed, an enclosed entry space for a large exhibition hall, are defined only in terms of total cubic feet allocated, leaving the overall configuration of the space open-ended to allow for flexibility and novelty in spatial arrangement. Functional requirements are simple, primarily involving the provision of space for a prescribed number of persons to occupy and move through the space at once. Other activities or "experiences" to be accommodated in the space are also left open-ended to allow for novelty in responses. No handicapped access is required, thus removing technical considerations that might place constraints on creativity.

The theme for the project, "Childhood Imagination" was chosen for two reasons. First, it is a topic for which all subjects have equal familiarity and baseline experience. Second, its abstract content is open-ended, again allowing for flexibility and novelty in responses. Like the "silliness" theme chosen for Amabile's collage studies and the "joy" theme for the poem studies (Amabile, 1983a), this

theme focusing on childhood imagination was chosen to provide maximum opportunity for "creative" solutions.

Dimensions of Judgment for Interior Design Projects

The second part of the instrument, Dimensions of Judgment for Interior Design Projects, is the rating criteria to be used by experts in judging the merit of projects created by subjects. The list of dimensions for this study was adapted from Amabile (1983a) by the researcher. Consensual assessment technique requires that, in preliminary work on developing the methodology for a given task, judges be asked to make assessments on other dimensions in addition to creativity. Minimally, they should make ratings of the technical aspects of the work and, if appropriate, its aesthetic appeal. Through an examination of simultaneous ratings on various aspects of product merit, it is possible to determine whether subjective ratings on creativity are separate from or associated with subjective ratings on other traits.

For the initial study within each domain, Amabile generated a list of items for rating a variety of aspects of product merit, based upon informal conversations with colleagues in that specific field. Always included in the list were the three global dimensions -- creativity, technical goodness, and aesthetic appeal. Other dimensions

theorized to be associated with creativity or some other aspect of project merit were also included, but these dimensions varied from one domain to another, since they were adapted to fit characteristics of the particular product being assessed, whether a collage, a poem, or a story. Within each domain, results of the initial study were analyzed, and dimensions not found to be significant were eliminated. Thus, a logical, empirical process was employed in refining the rating dimensions used with each product.

Content Validity of the Rating Criteria. In developing the list of rating criteria dimensions for use in this study, dimension lists from each of the initial Amabile studies were examined. Through a systematic comparison of dimensions generated for assessing collages (Amabile, 1983a, p. 42), poems (Amabile, 1983a, p. 52), and stories (Hennessey & Amabile, 1988b, p. 239), common themes emerged, despite the varying terminology used to express concepts in each of the domains. Using these dimension lists, together with information from NCIDQ (1988; 1989) and FIDER (1988) as resource material for content in the domain of interior design, a preliminary working list of possible dimensions for rating interior design projects was generated. Dimensions for interior design were included or discarded based upon results obtained by Amabile in other domains.

Only those dimensions which corresponded in meaning to those found repeatedly by Amabile to be significant were retained. The list of dimensions used by Amabile with the three products she studied, together with the proposed list for interior design, subsequently used in the present study, are shown in Table 3.

This proposed list of dimensions, complete with accompanying descriptive definitions, was examined first by four interior design colleagues who critiqued content, terminology, and clarity of meaning within the domain. Editorial suggestions from these colleagues were incorporated into the dimension list and the project statement was refined. As a check for the creativity content of the rating criteria prior to pilot testing the instrument, letters (see Appendix C) were sent to a panel of six creativity researchers familiar with the Amabile studies and methodology, asking them to critique the proposed Dimensions of Judgment for Interior Design Projects. Corrected dimension lists were returned by all six creativity experts; the instrument was further refined according to their suggestions for modification. After pilot study judges completed the judging tasks described later in this chapter, they, too, were asked to critique the list of dimension rating criteria and their input was incorporated.

Table 3

Significant Dimensions of Judgment from Amabile's Studies in Other Domains with Dimensions of Judgment Proposed for the Domain of Interior Design.

COLLAGES*	HAIKU POEMS*	STORIES**	ID PROJECTS
Creativity	Creativity	Creativity	Creativity
Novel use of materials	Novelty of word choice	Novelty	Novelty
Novel idea	Originality of idea	Imagination	Originality
Complexity	Sophistication of expression	Detail	Complexity
Technical goodness	Grammar	Grammar	Technical merit
Planning	Use of the poetic form	Vocabulary	Functionality
Organization	Rhythm	Logic	
Neatness	Clarity	Straight-forwardness	Craftsmanship
Representa-tionalism	Richness of imagery		Artistic merit
Expression of meaning	Consistency of theme	Emotion	Thematic expression
	Appropriate-ness of word choice		Appropriate-ness of solution
Aesthetic appeal			Aesthetic appeal
Liking	Liking	Liking	Liking

* From Amabile (1983a) pp. 42-55.
** From Hennessey and Amabile (1988b) pp. 239-241.
Note. Each list has accompanying descriptive definitions.

Dimensions list. The resulting final list of judging criteria contains three global-dimension variables and nine sub-dimension variables. Each dimension is accompanied by a descriptive definition given to judges (e.g., "Creativity: The degree to which the design is creative, using your own subjective definition of creativity." The final dimension list with accompanying descriptions, the Dimensions of Judgment for Interior Design Projects, is provided in Appendix D.

A separate rating sheet is required for each of the 12 dimensions. Each sheet is labeled with the stated dimension, and its accompanying descriptive definition. A nine-point rating scale (1 = VERY LOW; 9 = VERY HIGH) is provided for rating each project on the stated dimension. A total of 12 rating sheets were provided for each judge in the study (see Appendix E).

Content Validity of the CAIDC

To summarize, in providing evidence for content validity of the two-part instrument developed for this study, a systematic methodology was employed in its adaption from Amabile. For the task assignment, empirical data from official certification/accreditation documents were combined to establish content domain for the Project Statement. For the rating criteria, dimensions were generated at the

outset, based on Amabile's results in other domains and her theoretical formulations. Evidence for content validity, then, was subsequently produced by a process of revision and refinement of the Dimensions of Judgment for Interior Design Projects, based on opinions of experts in the field. Repeated examination by colleagues in the interior design field, creativity researchers, and pilot study judges was applied to meet criteria described by Brown (1983) as Guion's (1977) five proposed conditions necessary for content validity. Input from these experts helped to ensure that behaviors described in the instrument have "generally accepted meanings," that the domain is described "unambiguously," that the domain is "relevant to the intended use of the study," and that "qualified experts agree that the domain has been adequately sampled" (Brown, 1983, p. 136). The degree to which the instrument meets Guion's fifth condition, "reliability of responses observed and evaluated," was examined as a part of the study.

Participants in the Study

Subjects

Subjects for the study were students enrolled in a senior-level contract design class at a large land-grant university during spring semester, 1992. This class is the final class in the sequence of interior design studio

classes in the FIDER accredited program. Students entering this class can be assumed to have essentially the same background and training in interior design, all having completed the same core courses. This factor is important in controlling against large individual differences in their baseline performance skills. All 28 students in the class participated in the project creation session as a requirement for the class. From this set of projects, a sample was selected for use in the study.

Although the use of as large a sample of projects as possible would have been desirable for statistical purposes, the overall time required to complete the judging process was also a serious concern in determining the optimum number of projects to be included in the final project sample. Amabile (1983a) had found judge fatigue during prolonged sessions to be a threat to reliability in some studies. Therefore, because all projects had to be assessed by all judges, and because avoiding judge fatigue was essential, the actual size of the final project sample was determined by results of a pilot test for the judging session described in more detail in the following section. Based on timing data and judge reaction to the judging tasks, the optimum final project sample size was set at 18.

Selection of the specific projects to be used in the final study was also accomplished during the pilot testing

process. A preliminary screening of all 28 subjects' projects by the panel of four interior design expert judges -- two educators and two designers -- was employed to select the final sample of 18 projects assessed in the study. Ratings on the creativity dimension, using the 9-point scale (1=VERY LOW, 9= VERY HIGH) were summed across the four judges for each project; projects were then ranked from highest to lowest according to these simple creativity scores. The 9 projects ranking highest and the 9 projects ranking lowest on this preliminary creativity screening comprised the final sample of 18 projects used in the study.

Judges

Expert-judges for the study included interior design professionals in two categories -- educators and practicing designers in the field. Consensual assessment technique requires only that judges should have experience in the field under investigation, and be familiar enough with the domain to have developed, over a period of time, some implicit criteria for creativity, technical goodness, and aesthetic appeal of a product specific to that field. Therefore, for this study, no attempt was made to ascertain an identical level of experience for all judges or to base the selection on any characteristic, such as "creative" or "noncreative," or any particular viewpoint relative to

creativity. The consensual assessment technique, by definition, is based upon the assumption that "experts in a domain do share creativity criteria to a reasonable degree" (Amabile, 1983a, p. 38).

Educators. The sample of educator expert-judges was comprised of Corporate members of the Interior Design Educators Council (IDEC) who are faculty members at four-year interior design programs in Virginia and the District of Columbia. IDEC Corporate membership is granted after two years of experience as an educator, and, as such, was used as the criterion for establishing the minimum experience level for judges in this category. Using the 1991-92 IDEC membership directory, a preliminary list of educators who met the established criteria was generated by the researcher. Chairpersons of each of the FIDER accredited interior design programs in Virginia and the District of Columbia were contacted by telephone to confirm and/or refine the list of faculty members at their institutions, and to solicit their support for the study.

Designers. The sample of designer expert-judges was comprised of professional members of the American Society of Interior Designers (ASID) whose practice is located in the Roanoke, Richmond, or Arlington/District of Columbia geographic areas. ASID Professional membership is based upon the completion of two years of work experience and

passing of the NCIDQ exam, and, as such, was used as the criterion for establishing the minimum experience level for judges in this category. Using the 1991-92 ASID memberhip and resource directories for the Virginia and Washington Metropolitan Chapters, a preliminary list of professional members who met the established criteria was generated. ASID leaders in the three geographic areas were contacted by telephone to confirm and/or refine the list of prospective designer judges in their areas, and to solicit their support for the study.

A letter explaining the requirements of the judging tasks and encouraging participation in the study (see Appendix F) was sent to 97 prospective judges (16 educators and 81 designers) in the three targeted geographic areas. This letter described the purpose of the study as focusing on subjective opinions of interior design projects, but avoided direct references to creativity as the construct under investigation. Each letter was followed one week later by a telephone call to ascertain willingness of letter recipients to be included in the judges sample.

Of the 97 prospective judges, 56 (15 educators and 41 designers) agreed by telephone to participate in the study and arranged a time on the scheduled day in their area to complete the judging process. A follow-up letter, outlining final details for the judging session in each geographic

area (see Appendix F) was sent to judges exactly one week prior to the three scheduled judging sessions.

Two judges cancelled their appointments prior to the scheduled judging session; six judges failed to keep their scheduled appointments. Thus, 48 expert-judges (13 educators and 35 designers) participated in the judging sessions at the three sites. Data from four of these judges were not included in the analysis: one designer judge did not meet the established professional criterion for that category; another designer judge submitted incomplete rating sheets because of insufficient time; and two judges' ratings were incompatible with the rest, due to a failure to follow instructions to "rate projects relative to one another, not according to some absolute standard for excellence." Therefore, 44 interior design professionals -- 13 educators and 31 designers -- comprised the final sample of expert-judges who participated in the study.

Data Collection

Project Creation Session

The project creation session was announced in the course syllabus as a scheduled activity for the class; all students enrolled in the class were required to participate. The session was held in a single-day format scheduled on a

Saturday early in the semester. Projects created during the session were graded by the instructor in addition to their use in the study.

Physical Setting. The task session was held in two adjacent drafting studios where students in the FIDER-accredited program had individually assigned standard drafting tables. Tables were arranged so as to provide a comfortable individual workspace for each student, and to discourage collaboration during the session.

Materials. Each student was provided one sheet of good quality drawing paper, 19" X 24", on which to create the final presentation. Students were asked to provide all other drafting/drawing/illustrating equipment and materials. A typed copy of the Project Statement detailing the requirements of the project (see Appendix B) was provided for each student, together with a copy of the Instructions for the Project Creation Session (see Appendix G). These two written sheets outlined all information necessary to complete the project and provided a list of the drawings to be submitted.

Procedures. One week in advance of the session, the instructor of the class announced the details of the project creation session and distributed a copy of the instructions to each student. The time schedule was announced and materials to be provided by the student were identified.

Students were told that the purpose of the session was to produce a one-sheet presentation of a design solution for a space which would be described on the day of the session. They were told that the completed project should demonstrate their ability to produce a unique and innovative design solution which meets all the technical and functional requirements of the proposed space. They were also told that their final presentation should communicate all aspects of the design solution, including materials, within the format of a single well-composed sheet. Specific references to "creativity" as a stated goal of the project were strictly avoided.

The task session was administered by the instructor of the class; an assistant (the researcher) was also present, due to the need to monitor two separate studio areas. At the beginning of the session, the instructor distributed the written assignment and instruction sheets, gave verbal instructions, and answered questions. During the session, individual questions about instructions or procedures were answered by the instructor; questions pertaining to the design solution were not entertained. Effort was made to alleviate anxiety and establish a friendly atmosphere in the studio to reduce any negative effects on performance caused by the stress of the situation.

Students worked independently without conversation for the duration of the project creation session. There was a short break for lunch; any other breaks were taken individually. A strict time limit was not imposed for ending the project creation session. When finished, each student submitted a final one-sheet presentation. A number, coding each project to an alphabetized list of students in the class, was affixed to each presentation as it was submitted.

After project grades had been assigned by the instructor and reported to the 28 subjects, details of the present study were discussed during a regular class meeting. At that time permission to use the projects in the study was requested and official consent forms (see Appendix H) were distributed.

Pilot Testing Session

A panel of four interior design experts, including two educators and two practicing designers who met established experience criteria, were recruited as judges for a pilot test of the rating materials and procedures. The pilot testing session was held two weeks after the project creation session. Established judging procedures, described in detail in the following section, were followed in arranging the space and providing materials and instructions

for the judges. Projects created by all 28 subjects were assessed by this preliminary panel of expert-judges.

The purposes of the pilot test were as follows: 1) to test the appropriateness of the judging materials; 2) to investigate the length of time required for the judging process; and 3) to rank the projects from highest to lowest on the Creativity variable. Results of this preliminary screening were used to revise the judging materials, to establish the optimum number of projects to be included in the sample, and to identify the projects to be assessed in the study.

In the pilot test the 28 projects were judged on the 12 dimensions as follows: All judges rated all 28 projects on the creativity dimension; For the remaining 11 dimensions, judges were asked to assess projects in any random order, but the total number of projects assessed by each of the four judges varied. One judge assessed 14 projects; the remaining three judges assessed 16, 18, and 20 projects respectively, each judge selecting which projects to assess in some random order.

Beginning and ending times for each judge were noted, together with the number of projects judged. The average time per rating for each judge was computed, and that data used in determining the optimal number of projects for the final sample.

After the four judges had completed the rating procedures, the panel met briefly for informal questioning and discussion with the researcher to identify any problems encountered during the judging process. Information gained during this exit interview was used for a final revision of the Dimensions of Judgment for Interior Design Projects and the accompanying Instructions for the Project Judging Session for use in the study.

Project Judging Sessions

Three separate one-day project judging sessions were held across the state, each on the campus of a FIDER accredited school in the three geographical areas targeted for the study -- Roanoke, Richmond, and the District of Columbia. Chairpersons of the interior design programs in these educational institutions arranged for permission to hold the judging sessions on site at these facilities. Expert-judges located in a particular area, including both educators and designers, were scheduled to come to the designated location at staggered times during the single-day session.

Physical Setting. The judging session at each site was held in a large drafting studio to ensure a well-lighted, ventilated environment, free of noise and distractions, and to standardize the physical setting as much as possible from

location to location. Drafting tables were arranged in a wide semi-circle to provide equal accessibility to each project, and to facilitate ease in moving from one project to another during the judging process, since more than one judge often worked at the same time. Near the entry to the judging area, a table with chairs was set up for each judge, upon arrival, to receive and examine information needed to perform the rating process.

Materials. A clipboard containing all the materials and instructions needed for performing the judging task was provided for each judge. Included on the clipboard were the Instructions for the Project Judging Session (see Appendix I), the Project Statement (see Appendix B), the Dimensions of Judgment for Interior Design Projects (see Appendix D), the individual Rating Sheets for each dimension (see Appendix E), randomly pre-arranged for each judge and labeled with that judge's identifying number, and a demographics sheet (see Appendix J).

Procedures. Each of the three project judging sessions was administered by the researcher in a single-day format. The expert-judges arrived at pre-arranged staggered times throughout the day. Upon arrival at the information table, judges were presented with prepared clipboards containing judging materials and instructions for the task. Any questions about the judging process were answered by the

researcher, who tried to ensure that all important aspects of the method outlined in the instructions were understood before the rating process was begun.

Judges were instructed to use rating sheets to assign ratings on each of the dimensions of project merit, and to consider all projects on one dimension before proceeding to the next dimension. They were instructed to consider projects in some random order other than in consecutive order through the display. They were instructed to rate projects relative to one another, not against some established standard for work in the field. And they were asked to make their assessments independently, without discussion or collaboration.

After completing the assessment process, judges were asked to make certain that all rating sheets were complete. Each judge completed a questionnaire to provide certain demographic information (see Appendix J) related to background, training, and experience.

When all judging sessions were completed, judges were sent a letter (see Appendix F), expressing appreciation for their help and revealing the purpose of the study in more detail.

Data Analysis

Ratings for each of the 18 projects on each of the 12 dimensions by each of the 46 expert-judges were coded and transferred to the computer. Demographic data from each judge's personal information sheet were also recorded in the computer file.

The SAS (Statistical Analysis System) was used to obtain descriptive analyses of the demographic data. Frequencies and percentages regarding various aspects of judges' background, training, and experience were generated.

To investigate the degree to which interior design professionals agree on ratings of interior design project merit, and to provide evidence essential for construct validity, interjudge reliability was estimated by a process first described by Hoyt (1941) and later by Winer (1971).

Using the reliability program contained in the Statistical Package for the Social Sciences (SPSS), 12 separate analysis of variance procedures were run, one for ratings on each of the dimensions of judgment. Reliability coefficients were calculated by hand from the ANOVA output, using the formula described by Winer (1971). These procedures provide for the calculation of a reliability coefficient for the mean ratings of all judges (the calculation Amabile used in reporting study results), and a reliability coefficient for the ratings of a hypothetical

single judge from the group of judges. Commenting on these methods of estimating reliability, Ebel (1967) noted that, because the reliability of all judges (the method used by Amabile) is impacted by the overall number of judges, it is difficult to compare this reliability estimate from one study to another unless sample sizes are identical. In the case of unequal sample sizes, he suggested that the reliability coefficient for the hypothetical single judge may be more useful for comparison. Thus, for this study, both all-judge and hypothetical single-judge reliability coefficients were calculated, reported, and analyzed. In addition, both types of reliability estimates were computed for each of the sub-categories of judges -- educators and designers.

To provide further evidence for construct validity of the methodology and to test the hypothesized relationships among global-dimension and sub-dimension variables in the conceptual model, intercorrelations among mean scores of projects on the 12 dimensions of judgment were examined for evidence of convergence and discriminance. A 12 by 12 matrix of Pearson correlation coefficients was examined to determine which of the dimensions were significantly correlated with each other and which showed evidence of independence. Using a linkage analysis method presented by McQuitty (1961) and described in Frary (1977),

interassociations within the correlation matrix were converted into clusters, providing further evidence of association and/or separation patterns within the global- and sub-dimension variables.

To provide further confirmation of clusters identified in the linkage analysis and to provide opportunity for comparison with the Amabile studies in other domains, principal components analysis (varimax rotation) was carried out on mean ratings for each project on each of the dimensions of judgment. Although factor analysis is a method which usually requires large numbers of subjects, and, certainly, a larger project sample would have ensured more stability in the analysis, as Kerlinger (1986) noted, Amabile's research, despite small sample sizes, has produced similar results in repeated studies. The principal components (varimax rotation) procedure was repeated for each of the sub-categories of judges -- educators and designers.

CHAPTER IV

RESULTS AND DISCUSSION

The purpose of this research was to test the utility of the Consensual Technique for Creativity Assessment methodology (Amabile 1982; 1983a) for investigating creativity in the domain of interior design. The goal for this initial investigation was to develop an instrument based upon results of Amabile's studies in other fields, to utilize it with a set of participants, and to examine the results for evidence of reliability and validity. This chapter outlines the results accumulated with the Consensual Assessment of Interior Design Creativity instrument, and is organized into the following sections: Description of Participants; Evidence for Construct Validity; and Discussion of Findings.

Description of Participants

Participants for the study were subjects who created interior design projects during the Project Creation Session, and judges who assessed the merit of those projects during the three Project Judging Sessions. Characteristics of these two groups of participants are described in the following section.

Subjects

Subjects were 28 female interior design students at a large land-grant university in the Mid-Atlantic region. All were senior interiors majors currently enrolled in their final semester before graduation from the four-year FIDER-accredited program. Subjects were approximately the same age, each fitting within the predicted "typical" age range for college graduation -- from 21 to 23 years. Thus, in addition to having essentially the same classroom background and training in the program, the group of subjects who participated in the project creation session was also homogeneous in aspects such as gender and age. From among the set of projects created by these 28 subjects, the 18 projects assessed in the study were selected in a preliminary screening process.

Judges

Judges were 44 professional experts in the field of interior design, including 13 educators and 31 practicing designers. Selected because of their proximity to the judging site cities, they represented three distinctly different geographic areas in the state: Roanoke, in rural southwestern Virginia (six judges); Richmond, in coastal eastern Virginia (17 judges); and Arlington, in metropolitan northern Virginia/Washington, DC (21 judges).

The majority of the judges were female (33 judges), with male judges comprising only 25 % of the total sample (11 judges). Various levels of experience in interior design were well represented in the sample, ranging from those who had been employed full-time in the field for at least two but less than five years, to those whose experience exceeded 31 years. In fact, if considered by decades of experience, the sample was almost equally divided into thirds: 14 judges (31.8%) reported ten years or less; 16 judges (36.4%) reported 11 to 20 years; and 14 judges (31.9%) reported 21 or more years. Of this latter group, five judges had 31 or more years of full-time employment in the field. In addition, four judges in the sample were "fellows," professionals whose expertise in the field had been specially recognized by their respective professional organizations, with two educators listed as FIDEC and two designers listed as FASID.

Based upon self-classification of their primary focus and expertise, almost two-thirds of the judges (63.6%) identified themselves as specialists in contract design. The remaining one-third were divided almost equally between those whose specialty is residential design exclusively and those whose focus and expertise is an equal combination of residential and contract design.

Judges' educational backgrounds varied widely, from those having attained only an associate degree (three judges; 6.8%) to those who held a doctorate (four judges; 9.1%). However, the overwhelming majority of the sample (63.6%) reported a baccalaureate degree as the highest attained, and, of this group, 17 judges held a Bachelor of Arts or Bachelor of Fine Arts degree and 11 judges held a Bachelor of Science degree. Nine judges (20.5%) held a master's degree, with four reporting Master of Science degrees and the remaining five reporting degrees granted from graduate programs in art, architecture, or fine arts.

Understandably enough, a sizable number of the judges (18) held baccalaureate degrees conferred by schools in the three immediate areas, from the FIDER-accredited Virginia schools where the judging sessions were held. However, the majority of the judges (60%) graduated from schools outside the state. Judges in the sample reported undergraduate training from a total of 25 different interior design educational programs in 16 states and two foreign countries. Thus, the judges represented programs located from California to Florida, from Massachusetts to Texas, and even from Canada to China. Master's degrees reported were from 12 different universities outside Virginia, and all four judges with doctoral degrees graduated from separate programs in other states.

When asked to identify the academic discipline in which their training in interior design had been administered, almost half of the judges classified their program area as "art" (19 judges); about one-fourth said their program area was in "home economics" (12 judges); four judges' training was in "architecture," two in "industrial design," and two in "environmental design." Academic program area information for the remaining five judges was not provided.

Educator Judges. The educator sub-category included representatives from only two of the regional areas: Richmond and Arlington. Educators located in the Roanoke area were not included because of their involvement in the preliminary stages of the study, as colleagues whose collaboration was needed for the development of the instrument and as judges for the pilot test.

Two demographic characteristics were notable in distinguishing the educator sub-category from the total group of all judges. Predictibly, the educational level of the educator sample was much higher, with 30% of this group holding the doctorate and the remainder holding a master's degree. Also, gender proportions were different, with the educator group divided almost equally between males (seven judges) and females (six judges). The distribution of the remaining demographic characteristics for this group, including primary focus and expertise, academic program

area, and years of experience in the field were similar to those reported for the whole group.

Designer Judges. Because the designer sub-category was larger than the educator group, and thus more influential on totals in the whole sample, demographic characteristics for the designer sub-category essentially duplicate those reported for the total group of judges. Designers were from all three areas, most were female (87%), most held the baccalaureate degree (87%), and most were contract designers (65%) whose academic training was in "art" (45%) or "home economics" (29%). Although all experience levels were represented in the group, the majority of these judges (58%) reported full-time employment of 10 years or less. Thus, on average, the designer group was somewhat younger, with more recent training but fewer years of experience than the educator group.

Evidence for Construct Validity

Ratings of projects on the 12 Dimensions of Judgment for Interior Design Projects were collected and analyzed to provide evidence for construct validity. Results of this analysis are presented in the following section, which is organized according to the four types of evidence examined: Interjudge Reliability; Intercorrelations among Dimensions; Linkage Analysis; and Principal Components Analysis.

Interjudge Reliability

Interjudge reliabilities (Winer, 1971) for mean scale ratings for the total group of all judges and for each of the judge sub-categories -- educators and designers -- are presented in Table 4. For all judges, reliabilities exceeded the acceptable level of .70 on all 12 dimensions of judgment, with estimates ranging from .84 to .96, and a median reliability of .935. Reliabilities calculated for each of the sub-categories of judges also showed acceptable agreement, except for ratings by educators on two of the sub-dimensions, Appropriateness (.46) and Functionality (.54).

Although, at first glance, a comparison of the reliability estimates for the two sub-category groups might suggest a higher level of agreement among designer judges than among educator judges, it should be noted that these estimates are influenced by the number of judges in the sample. Thus, with this measure of overall reliability, results from 13 judges will virtually always be lower than results from 31 judges. Therefore, calculations of interjudge reliabilities for a hypothetical single judge within each of the groups are presented in Table 5. These single-judge reliability estimates (Winer, 1971) provide a more accurate comparison between groups of unequal sample size (Ebel, 1967).

Table 4

Interjudge Reliabilities for Mean Scale Ratings on Dimensions of Judgment: Judges and Sub-Categories of Judges.

Dimension of Judgment	Educators n=13	Designers n=31	All Judges n=44
Aesthetic Appeal*	.80	.93	.94
Appropriateness	.46	.90	.89
Artistic Merit	.85	.94	.95
Complexity	.83	.96	.96
Craftsmanship	.88	.93	.95
Creativity*	.85	.93	.95
Functionality	.54	.77	.84
Liking	.73	.93	.93
Novelty	.79	.95	.95
Originality	.77	.92	.92
Technical Merit*	.84	.90	.93
Thematic Expression	.73	.92	.93

* Global-Dimension Variable

Note: These overall interjudge reliability estimates were calculated by procedures outlined by Winer (1971, pp. 286-287), and based upon mean squares within and between judges given by ANOVA tables.

Table 5

Interjudge Reliabilities for Scale Ratings of a Single Judge Within Each Group on Dimensions of Judgment: Judges and Sub-Categories of Judges.

Dimension of Judgment	Educators n=13	Designers n=31	All Judges n=44
Aesthetic Appeal*	.24	.31	.26
Appropriateness	.06	.22	.15
Artistic Merit	.31	.32	.30
Complexity	.27	.43	.37
Craftsmanship	.37	.29	.29
Creativity*	.30	.32	.31
Functionality	.08	.10	.10
Liking	.17	.32	.23
Novelty	.23	.36	.29
Originality	.20	.26	.22
Technical Merit*	.29	.23	.23
Thematic Expression	.17	.28	.24

* Global-Dimension Variable

Note: These hypothetical individual interjudge reliability estimates were calculated by procedures outlined by Winer (1971, pp. 286-287), and based upon mean squares within and between judges given by ANOVA tables.

Interjudge reliabilities for all groups were acceptable on the three global-dimension variables, given the criterion established by Amabile (1983a). Of primary interest for the study was the interjudge reliability of the creativity dimension, which, for all groups, was high. Reliabilities of mean ratings on Creativity by educators (.85), designers (.93), and all judges (.95) were far above the criterion level of .70 (see Table 4); reliability estimates for a hypothetical single judge within each of the respective groups (.30; .32; .31), were virtually identical (see Table 5), showing remarkable consistency within and between all groups of judges on this important variable.

Further corroboration of the level of agreement on the creativity variable was provided by an examination of creativity mean scores for each of the 18 projects, by judge groups. Project 9, rated highest on creativity during the pilot test, was rated highest on creativity by each category of judges, with an average creativity rating of 7.07 by all judges; 6.85 by educators; and 7.16 by designers. Likewise, Project 1, rated lowest on creativity during the pilot test, was also assessed lowest on creativity by each category of judges, with an average rating of 2.00 by all judges; 1.54 by educators; and 2.19 by designers.

Thus, overall, the levels of agreement among interior design expert judges on ratings of project merit assessed by

the Dimensions of Judgment met the established criterion of interjudge reliability of greater than .70, both on the three global-dimension variables and on the nine sub-dimension variables. Evidence for reliability of the dimension ratings as outlined in Research Question I provided the first, and essential, indication for construct validity of the methodology. With reliability of the creativity ratings well assured, Research Question II [Alternative A] was then considered, and the analysis focused on an examination of patterns of association and/or separation among dimension variables.

Intercorrelations among Dimensions

Pearson product-moment correlations among the 12 Dimensions of Judgment indicated, as expected, a high degree of association between variables (see Appendix K). Based upon results of ratings by educators, designers, and all judges, respectively, highest significant correlations between each of the sub-dimension variables and the three global-dimension variables are summarized in Tables 6, 7, and 8. As hypothesized, without regard for judge category, dimensions such as Originality, Novelty, Complexity, and Thematic Expression were significantly correlated ($p < .001$) with the Creativity dimension. In addition, for each of the judge groups, the Liking and Appropriateness dimensions

Table 6

Sub-Dimension Variables Significantly Correlated with Each of the Global-Dimension Variables: Educators.

Aesthetic Appeal*	Creativity*	Technical Merit*
	Appropriateness	Appropriateness
Artistic Merit	Artistic Merit	Artistic Merit
	Complexity	Complexity
Craftsmanship	Craftsmanship	Craftsmanship
		Functionality
Liking	Liking	Liking
Novelty	Novelty	Novelty
Originality	Originality	Originality
	Thematic Expression	Thematic Expression

* Global-Dimension Variable

Note. $p < .001$
$n = 13$

Table 7

Sub-Dimension Variables Significantly Correlated with Each of the Global-Dimension Variables: Designers.

Aesthetic Appeal*	Creativity*	Technical Merit*
	Appropriateness	Appropriateness
Artistic Merit		
	Complexity	Complexity
Craftsmanship		Craftsmanship
		Functionality
Liking	Liking	Liking
Novelty	Novelty	Novelty
Originality	Originality	Originality
	Thematic Expression	

* Global-Dimension Variable

Note. $p < .001$
$n = 31$

Table 8

Sub-Dimension Variables Significantly Correlated with Each of the Global-Dimension Variables: All Judges.

Aesthetic Appeal*	Creativity*	Technical Merit*
	Appropriateness	Appropriateness
Artistic Merit		
	Complexity	Complexity
Craftsmanship	Craftsmanship	Craftsmanship
		Functionality
Liking	Liking	Liking
Novelty	Novelty	Novelty
Originality	Originality	Originality
	Thematic Expression	

* Global-Dimension Variable

Note: $p < .001$
$n = 44$

were also correlated significantly with Creativity. Some of these same sub-dimensions were also correlated, although to a lesser degree, with the other two global-dimension variables, Aesthetic Appeal and Technical Merit.

Of more crucial importance, however, were the sub-dimensions significantly correlated with Aesthetic Appeal and Technical Merit, but not with Creativity: Functionality, Craftsmanship, and Artistic Merit. For the total group of all judges and for both sub-categories of judges -- educators and designers -- Functionality showed association with Technical Merit and separation from the other two global-dimension variables. For designers and all judges, Artistic Merit showed association with Aesthetic Appeal and separation from the other two globals. And, for designers, Craftsmanship was associated with Technical Merit and Aesthetic Appeal, but showed separation from Creativity.

Linkage Analysis

Linkage analysis of interassociations within the correlation matrix (McQuitty, 1961; Frary, 1977) produced the dimension cluster patterns for educators, designers, and all judges presented in Figures 4, 5, and 6, respectively. In these figures, global-dimension variables are depicted by double circles, and each dimension is shown connected by solid line to the other variable in the matrix with which it

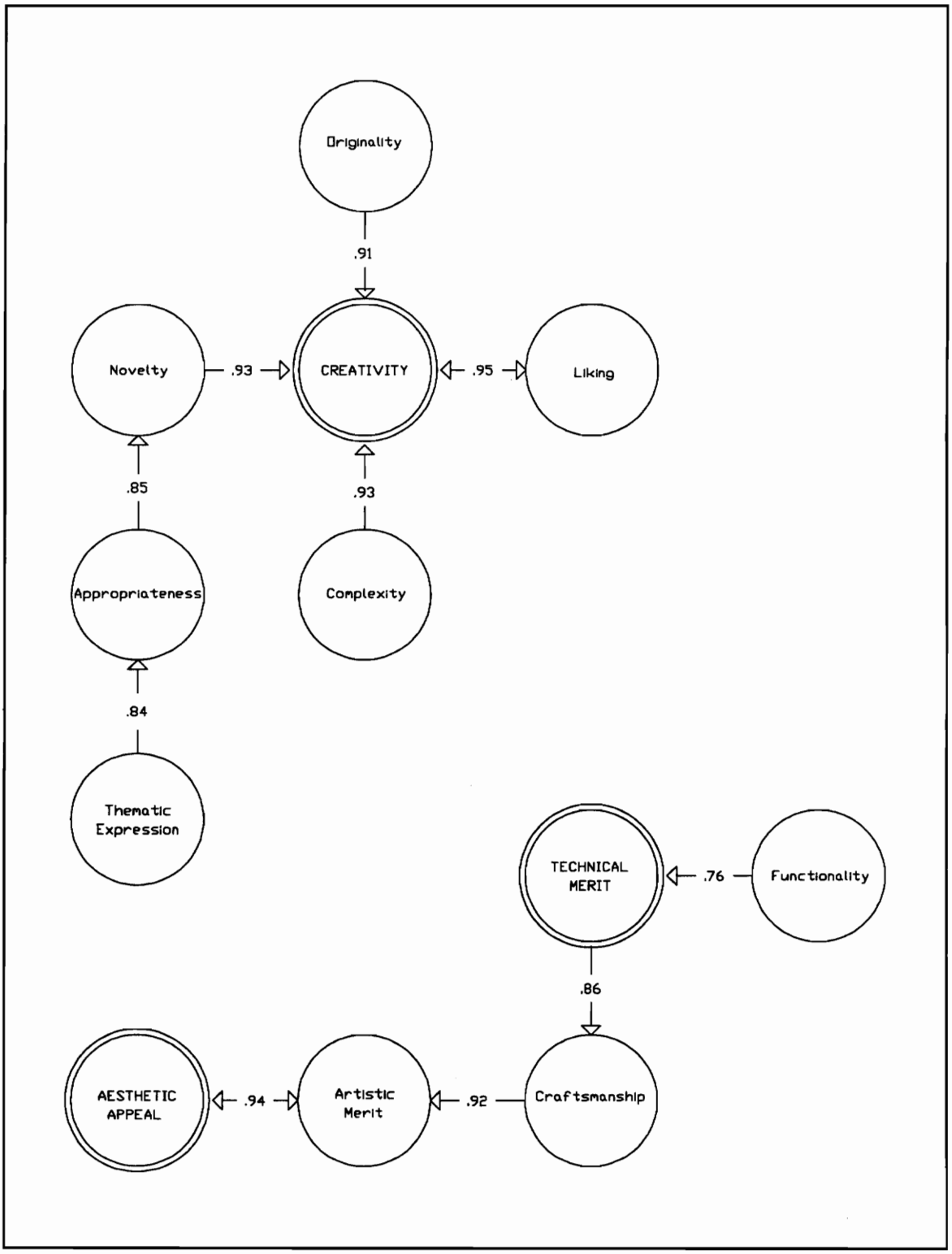

Figure 4. Linkages among Dimension Variables: Educators.

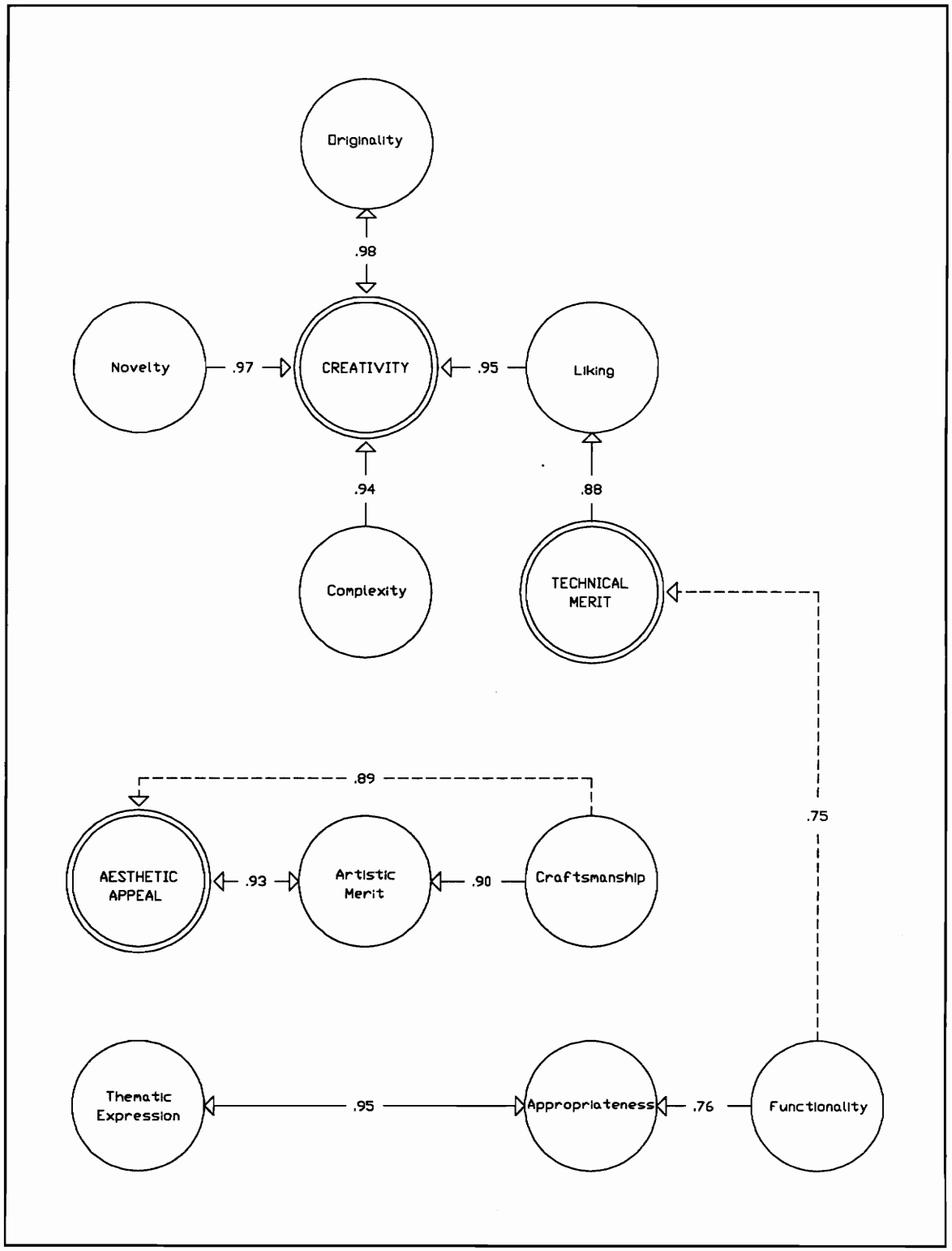

Figure 5. Linkages among Dimension Variables: Designers.

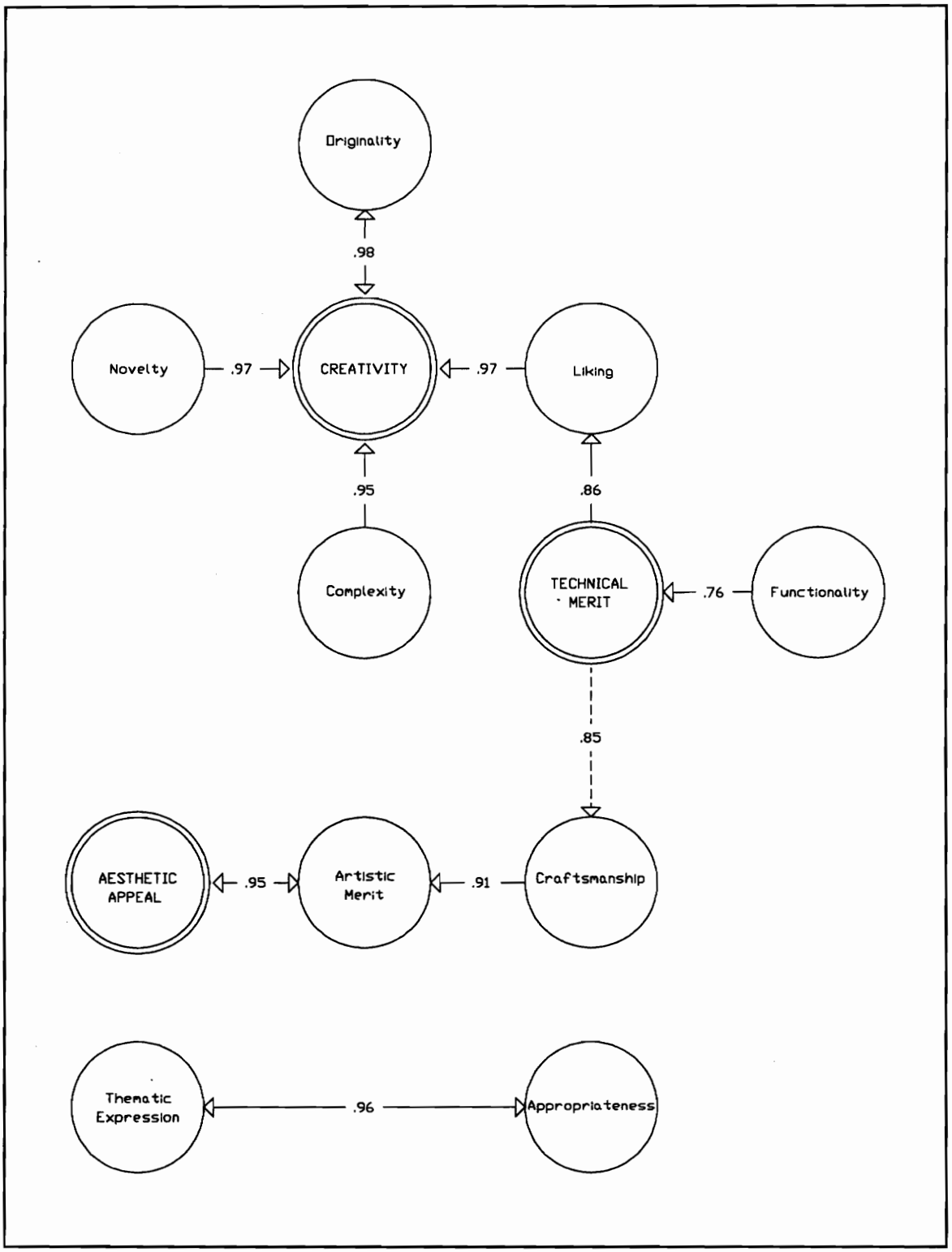

Figure 6. Linkages among Dimension Variables: All Judges.

has the highest correlation; in cases where two correlations were very close in value, the second highest association is also shown, but indicated by broken line. A double arrow indicates that each of the connected variables has its highest correlation with the other; a single arrow indicates the direction of the correlation in cases where only one of the variables has its highest association with the other. Correlation coefficients are indicated, showing, for each of the judge groups, the degree of association between the two dimensions.

Primary associations between certain variables were constant for all judge categories. For educators, designers, and all judges, highest correlations for Originality, Novelty, Complexity, and Liking were with the Creativity global-dimension variable. Also, Artistic Merit and Craftsmanship consistently correlated highest with the theoretically associated global-dimension variable: Aesthetic Appeal. Functionality was associated, either primarily or secondarily, with the Technical Merit global-dimension variable by judges in all categories, and a strong link between Thematic Expression and Appropriateness was common for all judge groups.

Slight variations in the dimension clusters shown in these three figures indicate areas in which educators and designers appeared to have subtle differences in perceptions

of project merit. For educators, two clusters emerged (see Figure 4), one group of linkages around the Creativity variable, the other incompassing both the Technical Merit and Aesthetic Appeal global-dimension variables. Liking had its strongest link with Creativity. Technical Merit had highest correlations with Craftsmanship and Functionality, with Craftsmanship bridging these technical aspects to Artistic merit and Aesthetic Appeal. Thus, for educators, primary linkages grouped the technical/functional and artistic/aesthetic aspects together, leaving other aspects related to the quality and complexity of the idea and solution linked primarily to creativity.

Two clusters also emerged for the designer group (see Figure 5). Because the highest correlation for Technical Merit was with Liking, the creativity cluster was bridged to dimensions related to technical and functional aspects. For designers, Thematic Expression and Appropriateness showed strongest links with Functionality, not with Novelty as was the case with educators. And the Aesthetic Appeal cluster, with its associated presentation skill sub-dimensions, Artistic Merit and Craftsmanship, was separate for this group. Based upon these primary associations, some evidence for the separation of the three global-dimension variables was shown by these designer judge results. Except for the fact that, when registering their "Liking" of a project,

judges' opinions were associated both with the creative and the technical aspects of that project, three independent clusters would have emerged.

In examining the linkages among dimension variables for all judges (see Figure 6), it is clear that the small clusters around the three global-dimension variables remained the same as observed in each of the judge sub-categories. Originality, Novelty, and Complexity consistently clustered with Creativity; Functionality was associated consistently with Technical Merit; and Artistic Merit was unanimously linked with Aesthetic Appeal. However, Liking showed primary associations with both the creative and the technical clusters; Craftsmanship , though primarily linked with the aesthetic cluster, also had a strong association with the technical cluster. Finally, based solely upon highest correlations, two sub-dimensions, Thematic Expression and Appropriateness, failed to cluster with other dimensions, due to the fact that each was most highly correlated with the other. Further examination of the correlation matrix showed that the second highest correlation for each of these sub-dimensions was Liking, and the third highest was Creativity, possibly linking these loosely to the creativity cluster. However, in view of the duality of associations noted for Liking, a degree of overlapping of clusters is evident.

Thus, linkages for the total group of all judges depicted a small core cluster of dimensions tightly linked to each of the three global-dimension variables. Beyond that, two "pivot" dimensions, Liking and Craftsmanship, due to their dual associations, formed loose connections between clusters. Strong evidence for stable associations between certain of the sub-dimension variables and the three global-dimension variables was provided by this analysis. Further examination of these associations and possible separation between dimensions was explored by principal components analysis.

Principal Components Analysis

For each group of judges, a separate principal components analysis was carried out on correlations among mean ratings for each project on all 12 Dimensions of Judgment. Results of these analyses using varimax rotation are presented, by judge category, in Tables 9, 10, and 11. For each of the judge groups two orthogonal factors were observed, though the dimensions comprising the factors for each group were not identical.

For educators (see Table 9), Factor 1 explained 76% of the variance in judges' ratings, and was labeled "Creative Presentation;" Factor 2 explained 10% of the variance in judges' ratings, and was labeled "Technical Aspects." Nine

Table 9

Principal Components Analysis* on 12 Dimensions of Judgment: Educators.

	Factor Loadings	
	Factor 1 "Creative Presentation"	Factor 2 "Technical Aspects"
Creativity	.94	.24
Originality	.93	.15
Liking	.89	.38
Novelty	.88	.36
Aesthetic Appeal	.87	.14
Complexity	.86	.29
Artistic Merit	.84	.33
Thematic Expression	.83	.18
Appropriateness	.77	.34
Craftsmanship	.72	.56
Functionality	.07	.97
Technical Merit	.58	.78

* Varimax Rotation

Table 10

Principal Components Analysis* on 12 Dimensions of Judgment: Designers.

	Factor Loadings	
	Factor 1 "Creative Solution"	Factor 2 "Aesthetic Appeal"
Appropriateness	.95	.21
Thematic Expression	.93	.02
Liking	.83	.52
Creativity	.82	.51
Novelty	.80	.49
Complexity	.79	.47
Originality	.79	.54
Functionality	.72	.30
Technical Merit	.70	.62
Artistic Merit	.13	.97
Craftsmanship	.32	.91
Aesthetic Appeal	.43	.86

* Varimax Rotation

Table 11

Principal Components Analysis* on 12 Dimensions of Judgment: All Judges.

	Factor Loadings	
	Factor 1 "Creative Solution"	Factor 2 "Aesthetic Appeal"
Thematic Expression	.94	.11
Appropriateness	.93	.26
Liking	.78	.59
Novelty	.78	.54
Complexity	.77	.52
Creativity	.76	.60
Originality	.70	.63
Technical Merit	.69	.60
Functionality	.68	.24
Artistic Merit	.17	.97
Craftsmanship	.32	.90
Aesthetic Appeal	.37	.87

* Varimax Rotation

dimensions loaded high on Factor 1 and low on Factor 2: Creativity; Originality; Liking; Novelty; Aesthetic Appeal; Complexity; Artistic Merit; Thematic Expression; and Appropriateness. One dimension loaded high on Factor 2 and low on Factor 1: Functionality. And two dimensions, Technical Merit and Craftsmanship, loaded moderately high on both factors (.58 and .78; .72 and .56, respectively).

For designers, the two factors which emerged were labeled "Creative Solution" (Factor 1, explaining 76% of the variance in judges' ratings) and "Aesthetic Appeal" (Factor 2, explaining 12% of the variance in judges' ratings). Dimensions loading high on Creativity and low on Aesthetic Appeal were: Appropriateness; Thematic Expression; Liking; Creativity; Novelty; Complexity; Originality; and Functionality. Dimensions loading high on Aesthetic Appeal and low on Creativity were: Artistic Merit; Craftsmanship; and Aesthetic Appeal. Loadings of one dimension, Technical Merit, were moderately high on both factors (.70; .62).

When ratings of all judges, including educators and designers, were combined for principal components analysis, once again, two orthogonal factors emerged and they were very similar to those observed for the designer group. Factor 1, explaining 77% of the variance in judges' ratings, was labeled "Creative Solution;" Factor 2, explaining 11% of the variance in judges' ratings, was labeled "Aesthetic

Appeal." Loading high on Factor 1 and low on Factor 2 were: Thematic Expression; Appropriateness; Liking; Novelty; Complexity; and Creativity. Loading high on Factor 2 and low on Factor 1 were: Artistic Merit; Craftsmanship; and Aesthetic Appeal. Dimensions loading moderately high on both factors were Originality (.70; .63) and Technical Merit (.69; .60).

These results illustrate the problems of instability in factor loadings often encountered with smaller sample sizes. Interpreted in isolation, these findings which suggest differences in dimension clusters for educators as opposed to designers are subject to question. However, taken in tandem with results of the correlation matrix and the linkage analysis, it cannot be denied that, in this study, and for this group of judges, there was a distinguishable difference between educators and designers in the set of dimension attributes associated with and/or separated from projects they deemed creative. These differences were first observed in the correlation matrix, confirmed by linkage analysis and further documented by the principal components analysis loadings of dimension variables on each of the two orthogonal factors.

Discussion of Findings

Results of this study provided strong evidence in support of the reliability of the consensual assessment methodology and the Dimensions of Judgment for Interior Design Creativity instrument. Ratings by interior design professionals -- educators and designers -- exceeded the criterion level for agreement on all 12 of the dimension variables. Of particular interest was the high level of agreement on the Creativity variable, with interjudge reliability at .95 for mean scale ratings by all judges (single-judge interjudge reliability at .31 for the same group). The consensual definition of creativity states that "A product or response is creative to the extent that appropriate observers independently agree it is creative...." (Amabile, 1983a, p.31). Based upon that definitional assumption, consistent judgments such as these, given independently by this sample of professionals in the field, must be taken as a valid measure of creativity for this set of interior design projects. In this study, highly reliable creativity judgments provided strong essential first evidence for construct validity of the instrument and the methodology.

High levels of agreement on creativity assessments in this study were similar to those obtained repeatedly by Amabile in numerous studies investigating artistic and

verbal creativity. Like results from her studies, these results support the assertion that the Consensual Technique for Creativity Assessment methodology has practical utility for providing reliable subjective assessments of creativity in a wide variety of domains. As was the case with Amabile's judges when assessing collages, Haiku poems or stories, judges who assessed these interior design projects, without prior training and in the absence of a stated definition of creativity, provided highly reliable ratings.

A strategy used in this study, but not a part of Amabile's methodology, was the reporting of a second set of reliability estimates for each judge category -- separate interjudge reliabilities for scale ratings of a hypothetical single judge within each of the stated groups. Because sample sizes in the present study differed dramatically, this additional statistic was most appropriate for comparing results across the various judge categories (Ebel, 1967). Additionally, to compare results of this study with Amabile's previously reported studies also having varying sample sizes, hypothetical single-judge reliabilities for her studies were calculated by the researcher, based upon overall interjudge reliabilities (see Tables 1 and 2). This statistic is increasingly important for comparisons across domains, because, with the present study, the methodology has now been applied with four different products.

Single-judge reliability estimates calculated for creativity assessments in the 17 artistic (collage) studies reported by Amabile (see Table 1) ranged from .18 to .57, for an average of .31 over the 17 studies. Single-judge reliability estimates calculated for creativity assessments in Amabile's 12 verbal (Haiku poem and story) studies (see Table 2) ranged from .23 to .77, for an average of .45 over the 12 studies. Thus, single-judge interjudge reliability estimates for creativity assessments found in the present interior design study (see Table 5), averaging .31 over the three groups, were very similar to Amabile's results in the artistic domain. As was noted in Chapter Two, alterations to the wording of the dimension variables over the course of the verbal investigations finally resulted in much higher reliabilities for the story-telling studies conducted later. Thus, whereas Amabile found it possible with the final story-telling assessments to obtain high levels of reliability with only three judges, for collage assessments, 10 or more judges were required. Based upon results of this initial study, reliable assessments in the domain of interior design require at least six judges to reach the minimum reliability criterion (.70). Due to the similarity of these results to those obtained in the artistic domain, the same requirement of 10 or more judges would assure reliable results in this domain.

Creativity ratings were found to correlate significantly with a number of the other Dimensions of Judgment, including Novelty, Originality, Complexity, Liking, and, to a lesser extent, Appropriateness and Thematic Expression. Descriptive definitions corresponding to each of these sub-dimensions, then, provided empirical evidence for additional characteristics also associated with projects assessed as creative. For all groups of judges, aspects related to the design solution -- its appropriateness, its complexity, its uniqueness and its originality -- were highly associated with creativity. A certain novel quality, achieved through the application of materials and/or design elements in an unpredictable manner, was also highly correlated with creativity. And effective expression of the "Childhood Imagination" theme was a characteristic associated with projects deemed creative. One other dimension, Liking, correlated significantly with the Creativity variable for all groups, providing no additional properties or features associated with creativity, but revealing the fact that positive subjective reactions toward an interior design project were strongly related to preceptions of its creativity. Linkage analysis and principal components analysis confirmed the associations between creativity and these dimensions for all judge

groups, providing support for convergent validity within the creativity cluster of the conceptual model.

Evidence for discriminant validity of the instrument was also provided by the study results, although not demonstrated as decisively as convergence. The dimension showing strongest evidence for separation from the creativity and aesthetic clusters was Functionality. Results of all analyses showed that, for all judge groups, Functionality was significantly correlated with Technical Merit, but not with Creativity or Aesthetic Appeal. Evidence for independence of this technical/functional cluster was provided by correlation analysis and confirmed, especially for the educator judge category, by linkage analysis and principal components analysis. Thus, at least for educators in this study, there was evidence that creativity judgments were independent from opinions on technical and functional aspects of the designed space.

Conversely, results of the same analyses for the designer judge sub-category indicated a separate cluster of dimensions for the aesthetic/artistic aspects of project merit. For the designer judge category, Artistic Merit and Craftsmanship were significantly correlated with Aesthetic Appeal and not with Creativity. Thus, at least for designers, there was evidence that opinions on the visual

and artistic communication skills displayed in a project were separate from opinions of the project's creativity.

Dimension cluster patterns for the total group of all judges were similar to those of the designer sub-category. Since designers outnumbered educators by more than two to one in the total sample, this weighted influence of the designer judges on results of linkages of the total group of all judges was as expected.

When evidence for convergence and divergence were considered simultaneously for each of the judge sub-categories and for the total group, support for the existence of three separate dimension clusters was encouraging but not conclusive. First of all, as the correlation matrices show (see Appendix K) there was a moderate degree of intercorrelation among all of the dimension variables, indicating the possibility that judges' assessments were based, to a certain degree, more on overall opinions than on separate aspects of project merit. As a result, some of the dimensions significantly correlated with creativity were also correlated, although to a lesser degree, with one or both of the other global-dimension clusters. Intercorrelations such as these weaken the evidence for discriminant validity, a situation encountered by Amabile during the initial study in the verbal domain. In that study, ratings on Haiku poems produced results in

which all 14 dimensions loaded positively on two main factors, and some loaded rather high on both. In subsequent studies, a clearer separation between clusters emerged. Although intercorrelations in the present study are not as problematic as in the study just cited, evidence for complete separation of the dimension clusters is threatened when ratings on these dimensions highly associated with creativity are not independent from ratings associated with technical and/or aesthetic aspects. This lack of separation could be due to the instrument itself, to problems associated with the task assignment, perhaps, or the rating criteria. In that case, further refinement of the instrument may result in clearer evidence for independence among dimension clusters.

However, differences in dimension cluster patterns in this study varied systematically by sub-categories of judges -- educators and designers. Taken at face value, these results indicate that, although the two groups agreed remarkably on which projects were more or less creative, there were subtle differences in the way these educators and these designers perceived other aspects of merit associated with and/or separated from creativity in the projects. Regarding creativity, educators viewed it as separate from technical and functional aspects but somewhat integrated with artistic and aesthetic features. Conversely, designers

appeared to separate creativity judgments from artistic and aesthetic aspects, but not completely from the technical and functional aspects of the design solution.

This finding recalls a phenomenon noted by Myers (1982), who reported significant differences between IDEC educators and ASID designers on responses regarding creativity competencies needed by entry level interior designers. As cited in Chapter One, when the two groups were asked to rank these creative skills, each preferred a different terminology, with educators choosing a higher ranking for "problem solving" while designers favored "creativity" as a needed competency. In summarizing the differences on rankings of compentencies by the two groups, Myers commented that the ASID group focused more on "practical, on-job competencies," while the IDEC rankings "represented more theory-oriented competencies" (p. 23).

Thus, one explanation for differences observed between dimension cluster patterns for educators and designers is that, due to the content of tasks required in their respective professional positions, they each approach it from a different perspective. Perhaps educators perceive the creative process as problem solving ideation and, thus, more theoretical in nature. Accustomed as they are to separating technical and functional aspects of the designed space from the aesthetic aspects when routinely grading projects,

the observed separation of the cluster of knowledge-based, technical and functional aspects from the more theoretical creativity cluster may be a logical division for that group.

Designers, on the other hand, because of the wide variety of real-world, practical tasks required in designing a space to meet the client's needs within prevailing codes and restrictions, may perceive the creative process as more holistic. Thus, they may view the functional and technical requirements of the space as integral to the design solution and, of necessity, conceived simultaneously. For them, perhaps it is more logical to separate the creative aspects of the actual design solution, of which technical and functional aspects are an inseparable component, from the aesthetic and artistic aspects of the client presentation.

In the final analysis, based on results with the total group of all judges, much evidence for reliability and construct validity of the Dimensions of Judgment for Interior Design Projects was provided by this study. The study revealed a high level of agreement among interior design professionals on creativity judgments. Convergence of creativity dimensions was confirmed, and descriptive characteristics associated with creativity in interior design were identified, based upon definitions corresponding to dimensions consistently associated with creative projects.

For the present, support for discriminant validity of the model is only tentative. Based on these results, it is unclear whether, as suggested above, the lack of clear evidence for separation between dimension clusters is an indication of important fundamental differences between educators and designers on perceptions of creativity, or whether, with further refinement of the instrument, these differences will disappear and separation will emerge.

However, despite questions that remain, this, the first application of the consensual assessment technique for investigating creativity in the domain of interior design, produced highly reliable results and accumulated valuable baseline evidence for creativity in interior design. Based upon results of this investigation, the conceptual model showing hypothesized associations among global- and sub-dimension variables in the Dimensions of Judgment for Interior Design Projects was revised to represent relationships observed and confirmed by the analyses herein outlined and discussed. The revised conceptual model is presented in Figure 7.

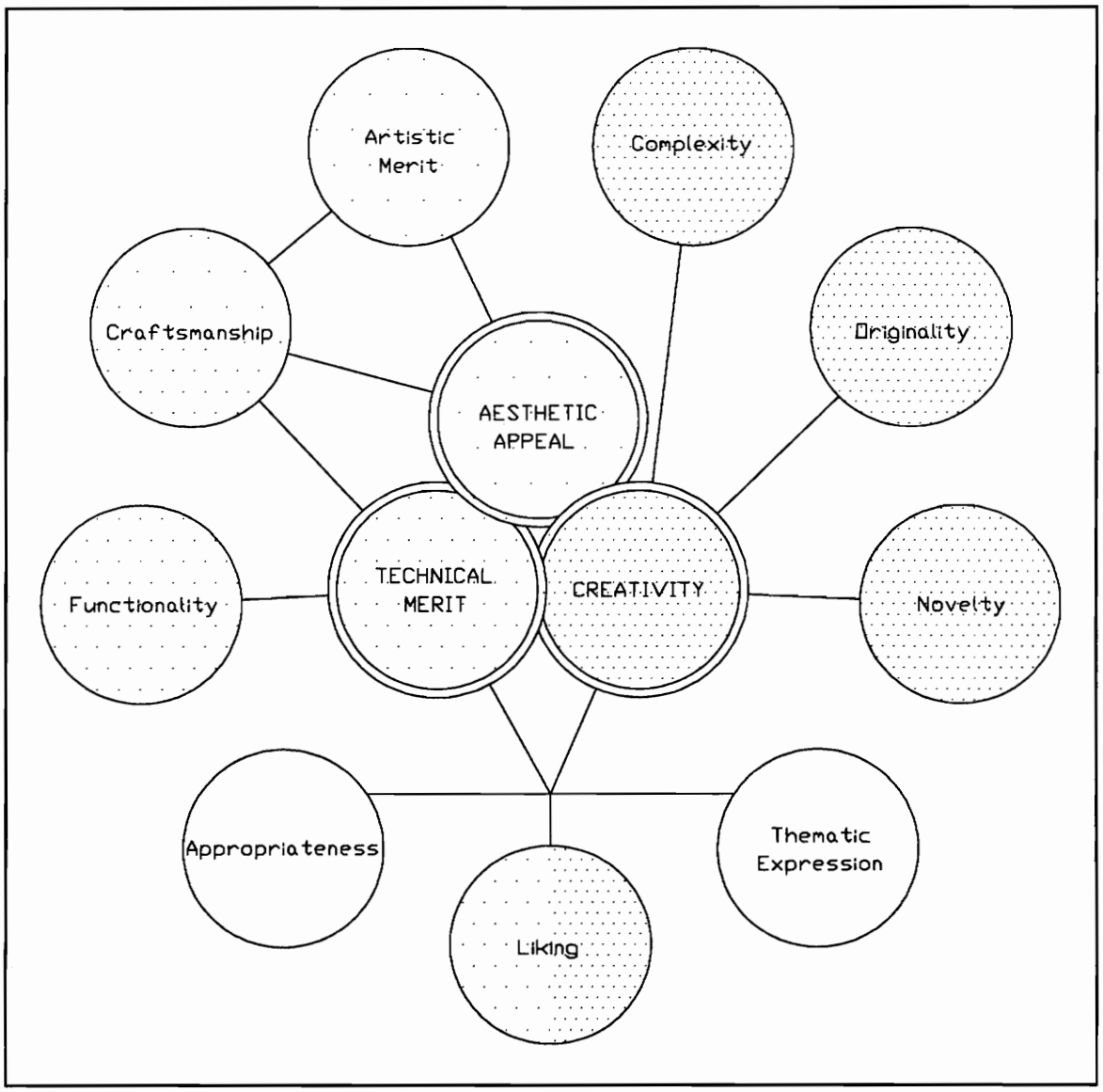

Figure 7. Revised conceptual model showing observed relationships among global- and sub-dimension variables in the Dimensions of Judgment for Interior Design Projects.

CHAPTER V

SUMMARY AND CONCLUSIONS

The purpose of this chapter is to summarize the study and its findings, and to suggest its potential for contribution to the field. The chapter begins with a summary which reviews the focus of the study, the methodology employed, and the results obtained. Conclusions are presented, implications are discussed, and the chapter concludes with recommendations.

Summary

Creativity is an essential competency in interior design, one which is valued by professionals in the field and evaluated during the review process for accreditation of interior design educational programs. A number of programs have had difficulty in providing evidence of this important competency in student work. However, there are no published instruments which attempt to assess creativity or identify its characteristics in the domain of interior design.

The purposes of this study were: (1) to adapt the Consensual Technique for Creativity Assessment (Amabile, 1982;1983a) methodology for use in the domain of interior design; and (2) to provide evidence for reliability and

construct validity of the methodology. The Consensual Assessment of Interior Design Creativity (CAIDC) instrument was developed and hypothesized relationships among global- and sub-dimension variables were established in a conceptual model. It was theorized that evidence for convergent and discriminant validity of the creativity variable would identify characteristics associated with creativity in interior design and demonstrate separation of the construct from other characteristics related to technical and aesthetic aspects.

Participants were subjects who created the 18 projects used in the study, and judges, the 44 professional interior design experts who rated the projects. The sample of subjects was comprised of 28 female interior design students at a FIDER-accredited institution in the Mid-Atlantic region; the 18 projects used in the study were selected in a preliminary screening process. The judges sample included two sub-categories: Educators (13), faculty members at four-year interior design programs in Virginia and the District of Columbia who were Corporate members of IDEC; and Designers (31) who were Professional members of ASID. The judges sample was drawn from current IDEC and ASID membership directories, and represented three distinctly different geographic regions in the state of Virginia.

Projects were assessed by subjective ratings on the Dimensions of Judgment for Interior Design Creativity, the list of 12 rating criteria adapted from Amabile for this study. These ratings were collected during on-site judging sessions at the three FIDER-accredited institutions in the state, one in each of the geographic regions.

Interjudge reliability of the ratings was estimated by a process described by Winer (1971), and based on analysis of variance (ANOVA) results. Interjudge reliabilities exceeded the established criterion level (.70 or greater) on all 12 dimensions included in the rating criteria, with coefficients ranging from .84 to .96, and a median reliability of .94. Of primary interest was the interjudge reliability of the creativity variable (.95), which indicated a high level of agreement on creativity judgments among these interior design professional experts, and provided essential evidence for construct validity of the instrument.

Correlations among dimensions, linkage analysis (McQuitty, 1961; Frary, 1977), and principal components analysis were used to examine evidence for convergent and discriminant validity of the instrument. Convergence of creativity dimensions was confirmed, with sub-dimensions including Novelty, Originality, Complexity, and to a lesser extent, Appropriateness and Thematic Expression, found to be

linked to the Creativity global-dimension variable. Convergence of one sub-dimension, Functionality, with the Technical Merit global-dimension was demonstrated, and two sub-dimensions showed evidence of convergence with the Aesthetic Appeal global-dimension variable: Artistic Merit and Craftsmanship.

Evidence for discriminant validity of the instrument was also provided, although not demonstrated as decisively as convergence. Examination of dimension cluster patterns revealed separation differences which were found to vary systematically by sub-category of judges. Separation of creativity judgments from technical/functional aspects was demonstrated by educator judge ratings; separation of creativity judgments from aesthetic/artistic aspects was demonstrated by designer judge ratings. When ratings of all judges were considered, discriminant validity evidence showed a small core cluster of dimensions tightly linked to each of the three global-dimension variables. However, absolute separation into the three clusters as hypothesized in the conceptual model -- creativity, technical merit, and aesthetic appeal -- was not confirmed, primarily due to dual associations for two "pivot" dimensions, Liking and Craftsmanship.

For the total group of all judges, principal components analysis produced two factors, one labeled "Creative Solution" which incompassed, not only the dimensions associated with creativity, but also those associated with the quality of the design solution, Appropriateness, Thematic Expression, and Functionality. The other factor, labeled "Aesthetic Appeal" included Aesthetic Appeal, Artistic Merit, and Craftsmanship, dimensions primarily associated with effective presentation skills.

Conclusions

Evidence for construct validity is provided, not by the results of any single study, but rather by an accumulation of supporting data in small increments as a result of many specific experiments. For this initial investigation of creativity in the domain of interior design, a theoretical framework for the construct of creativity in interior design was determined. Hypothesized associations among the global- and sub-dimension variables were shown in a conceptual model, and the present study was designed to test the extent to which experimental evidence supports this model.

Three types of evidence for construct validity of the conceptual model were examined : interjudge reliability, convergent validity, and discriminant validity. Results of the study provided evidence in support of the following

statements about the Consensual Assessment of Interior Design Creativity (CAIDC) methodology and the conceptual model:

I. Interior design expert judges agree to a remarkably high degree on their ratings of interior design project merit with this methodology. As confirmed in other domains, experts in this domain especially agree on creativity judgments. Evidence for reliability of the methodology and construct validity of the conceptual model is provided.

II. Interassociations among ratings on the various aspects of project merit show some variables to be strongly associated with creativity and other variables to be somewhat separated from creativity.

   A. Characteristics highly associated with creativity in interior design projects are identified with this methodology. Aspects related to the overall quality of the design solution --its originality or uniqueness, its novel use of materials or design elements, its complexity, its appropriateness, and its thematic expression -- are associated with creativity. Liking, based on a simple positive subjective reaction, is also highly associated with creativity. Evidence for utility of the methodology, convergence of the

creativity construct, and construct validity of the conceptual model is provided.

B. Characteristics not highly associated with creativity in interior design projects are identified with this instrument. Aspects related to effective presentation skills -- craftsmanship, artistic merit, and overall aesthetic appeal -- and aspects associated with practical aspects of the designed space -- functionality and technical merit -- are somewhat separate from creativity. Evidence for the utility of the methodology is provided; some evidence for discriminance of the creativity construct and construct validity of the conceptual model is provided.

C. Initial results indicate subtle differences between educators and designers in perceptions of characteristics associated with creativity. Educators' views of creativity appear to merge with artistic and aesthetic aspects; Designers' views of creativity appear to merge with functional and technical aspects. Evidence for uniform discriminance of the methodology by different categories of professionals across the field is not provided.

D. Fundamental associations and separations among global- and sub-dimensions in the conceptual model are supported. There appear to be three identifiable dimension clusters -- the creative, the technical, and the aesthetic. As hypothesized, Originality, Novelty, and Complexity are associated with Creativity; Functionality is associated with Technical Merit; and Artistic Merit is associated with Aesthetic Appeal. However, Craftsmanship, though associated with Technical Merit as hypothesized, is also highly associated with the Aesthetic Appeal cluster. Liking, hypothesized to be primarialy associated with Aesthetic Appeal, is most highly associated with Creativity, has very important associations with Technical Merit, and is not completely independent from Aesthetic Appeal. The two remaining sub-dimensions, Appropriateness and Thematic Expression, are not exclusively associated with the Technical Merit and Creativity global-dimensions, respectively, as hypothesized with global-dimensions, Technical Merit and Creativity, respectively. Instead, these two have highest associations with Liking and secondary associations with Creativity. Tentative evidence

for construct validity of the conceptual model, as revised, is provided.

Implications

From a theoretical standpoint, the most important implication derived from the research reported here is that results of this initial investigation of creativity in interior design coincide with results obtained by Amabile in other domains. The remarkably high reliabilities obtained in this study indicate the utility of the consensual assessment technique for this domain, and support the theoretical assumption that experts in a given field can recognize creativity and assess it reliably, even without explicit definitions or descriptors. Characteristics highly associated with or separated from creativity in interior design also coincide with Amabile's results in other domains. Even the lack of conclusive evidence for uniform separation between creativity aspects and technical and aesthetic aspects in this first study coincides with results of Amabile's initial investigations in other domains. Both the differences noted between perceptions of educators and designers, and the lack of complete separation for the technical/functional cluster, are similar to problems encountered by other creativity researchers in the past. They simply underscore the difficulties described by

Hocevar and Bachelor (1989) in their discussion of problems in distinguishing creativity from other constructs, especially when subjective assessments are involved.

This study was the initial investigation of its type in the domain of interior design, and, as such, represents an important extension of Amabile's theoretical framework and assessment methodology to a totally new field. Despite minor difficulties, the study adds another domain to the body of knowledge accumulated with the methodology, provides much evidence in support of the theoretical framework, and establishes baseline information useful for further refinement of the instrument in future research. As new studies are designed to explore the construct of creativity in interior design, the conceptual model developed for this study provides a simple framework to be tested and refined over time as new evidence is accumulated.

From a more practical standpoint, these results have implications for immediate consideration in interior design, both for education and the profession. They indicate that in interior design there is an entity called creativity that experts in the field can recognize and judge reliably. It appears that subjective opinions of the creativity of student project work, as routinely exercised in "real-world" situations such as portfolio reviews, interviews, and FIDER accreditation site visits, can be assumed to be reliable.

Also, results of this study provide empirical evidence indicating strong links between creativity and certain other characteristics of project merit. Educational programs seeking methods for improving creativity in project work can utilize this information in designing curriculum strategies to strengthen these characteristics. Such expanded instructional concepts could enhance creativity, both in the individual student and in the educational program as a whole.

And finally, based upon evidence for reliability of creativity ratings provided by this initial study, this instrument has utility for application in further studies. Such new research efforts could be designed to further explore specifics of the creative process or to test the effects of the environment, both physical and psychological, on creativity in interior design.

Thus, this study has implications, both theoretical and practical, for future application and research. Whether used alone or combined with other measures, its potential contribution for theory development and curriculum design extends not only to the educational arena, but also to psychological and organizational contexts.

Recommendations

This section contains recommendations for further research based on the Consensual Assessment of Interior Design Creativity methodology:

Further research is needed to provide evidence for separation of creativity in interior design projects from other aspects of project merit. Specifically, a revision of the task assignment to include more functional requirements is recommended. In developing the task assignment for this study, the functional requirements were kept to a minimum, to avoid constraints on creativity. Also, the theme was chosen for its uniform familiarity for all subjects. However, ratings on creativity were not independent from technical and functional ratings for all groups of judges. This suggests the possibility that there was not enough difference between projects on functional and technical aspects and, possibly, not enough difference on creativity as well. It would be useful to repeat the study with another task assignment, one in which the power of judges' discriminance on those dimensions would be increased. An alternative research strategy for improving discriminance would be to revise the rating criteria itself, thereby refining the terminology used for the dimension variables and their corresponding descriptive definitions.

Any such changes should focus in particular on dimension variables related to the technical/functional aspects in hopes of obtaining results with more conclusive separation between creativity and the technical cluster.

Further research is needed to determine whether the subtle differences between educators and designers on perceptions of characteristics associated with creativity can be confirmed by other studies. Specifically, this study needs to be repeated with a group of judges in which the sample size for educators and designers is identical, and controls for other demographic characteristics such as training, experience in the field, principal focus, age, and gender are in place. Further, ratings by other sub-categories of judges, separated according to a different demographic characteristic, could be analyzed to determine if differences in cluster patterns are exclusive to the educator/designer division or common across demographic variables. Such differences could be probed in more depth by varying the statistical analyses to include a cluster analysis of judges.

Further research could combine results obtained with this instrument with other types of creativity research methods to explore specifics of the creative process in interior design. Specifically, combining this adaptation of Amabile's (1982; 1983a) Consensual Technique for Assessment

of Creativity with techniques of Csikszentmihalyi's (1990) Experience Sampling Method adapted for the domain of interior design, could provide new information on thought processes and strategies as reported by subjects whose projects rate high or low on creativity.

Further research could combine results obtained with this instrument with other methods and measures to examine stimulants and obstacles to creativity in the classroom and/or work environment. Specifically, an investigation into the effects upon creativity of extrinsic factors such as grades, deadlines, surveillance by the instructor, or other factors, could provide valuable information for fostering creativity in the studio environment. Or, a paper-and-pencil instrument such as the Creative Environment Scales: Work Environment Inventory (Amabile & Gryskiewicz, 1989) could be combined with creativity in project work as assessed by this instrument, to evaluate or compare effects of the environment on creativity.

Further research could also utilize this instrument in comparing the effect of specific teaching methods on the creativity of student projects. Specifically, projects created with computer aided design (CAD) technology could be compared with projects created using traditional board drafting methods to determine the effect, if any, of CAD on creativity.

To facilitate maximum accuracy and completeness in comparisons between this study and all other studies based upon this instrument, it is recommended that the hypothetical single-judge reliability coefficients be reported along with the overall interjudge reliabilities. This one addition to Amabile's methodology, based upon Winer's calculations and Ebel's (1971) discussion, will ensure accuracy as the conceptual model is developed and tested within this domain.

Afterword

One final comment about the study remains, and it pertains to the nature of the interior design profession itself. Whereas products assessed in Amabile's studies -- collages, Haiku poems, and stories -- have all been examples of creative art, interior design is usually classified as an applied art. Interior designers are trained to design for the client's needs, not for self-expression. Is it possible that demonstrating separation of creativity from technical and aesthetic aspects is less likely in an applied art than in a creative art? First, because interior designs are spatial by nature, certain technical and functional aspects of the design are integral to the solution and, thus, virtually inseparable from creative elements during the design process. Second, as is the case with any visual

medium, effective presentation skills are an inherent part of the package which "sells" the design idea. Thus, in this interdisciplinary profession, the creative, the technical, and the aesthetic overlap in multiple, perhaps even unique ways. This study has sought to examine these overlapping interassociations for the purpose of promoting greater understanding of the construct of creativity and its identification in the domain of interior design. Future investigations can probe for answers to these new questions about creativity in this emerging, interdisciplinary, applied-art profession of interior design.

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APPENDIX A

Permission to Reprint Amabile's Conceptual Models

1017 Chesley Street
Radford, VA 24141
February 3, 1992

Teresa M. Amabile
Department of Psychology, P.O. Box 9110
Brandeis University
Waltham, MA 02254-9110

Dear Dr. Amabile:

As you are aware by now, my dissertation research project in the area of interior design creativity is well underway. Since I wish to use your creativity framework as the theoretical basis for my study, I am writing to ask your permission to reprint the conceptual models in the final draft of my dissertation. Specifically, I would like to copy pages 68 and 78 from the book The Social Psychology of Creativity (1983). Full bibliographic information for the book would appear in the REFERENCES section; citations for these two Figures would appear as follows:

> Components of Creative Performance.
> Source: Amabile (1983, p. 68). Copyright 1983 by the American Psychological Association. Reprinted by permission of the author.

> Componential Framework of Creativity.
> Source: Amabile (1983, p. 78). Copyright 1983 by the American Psychological Association. Reprinted by permission of the author.

When we talked about this by telephone late in December, you suggested that I should send you this request in writing, so that you could grant the official permission in written format. For this, and all the other help you have given me, I am indebted to you.

Sincerely,

Susan Barnard

Brandeis University

Psychology Department

P.O. Box 9110
Waltham, Massachusetts
02254-9110

617-736-3500

February 23, 1992

Ms. Susan Barnard
1017 Chesley Street
Radford, VA 24141

Dear Ms. Barnard:

I am happy to grant you permission to reprint the two figures that appear on pages 68 and 78 of my book, The Social Psychology of Creativity ("Components of Creative Performance" and "Componential Framework of Creativity"). Because the original copyright on these figures was held by the American Psychological Association, as you note, it might be better to cite the Journal of Personality and Social Psychology article where these figures first appeared (1983). Either citation is fine with me.

I wish you all the best in finishing your dissertation, and I look forward to receiving a copy of it.

Cordially,

T. M. C.

Teresa M. Amabile
Professor

APPENDIX B

Project Statement

Project Statement

"Childhood Imagination" is the title of a main exhibit scheduled to open in Squires Student Center at Virginia Tech during Fall Semester, 1992. The exhibit will feature a diverse collection of art work and photography focusing on children and their special ability to enter the secret world of their own imagination, a private world in which thoughts can run free, not bound by reality. Coinciding with the exhibit will be a series of other events -- an "Imaginative Concert" for children and parents, a classic film series, and a featured play -- all in celebration of the theme, "Childhood Imagination."

As an added feature for the exhibit, the planning committee desires to erect a free-standing, enclosed entry space through which persons will pass before viewing the exhibit. The purpose of the proposed entry space is to create an environment in which the "child in each of us" can experience once again what it is like to enter that secret, free and imaginative world of the child. Visitors, whether children or adults, will enter the space from the "adult" world outside, will move through and "experience" the imaginative environment created within the space, then will emerge to view the actual exhibit with a heightened sensitivity for "Childhood Imagination."

Your task is to design the entry environment described above. Since the exhibition hall itself is a large, open area with high ceilings, there are no pre-determined dimensions for the enclosed, free-standing entry space. The committee has allocated approximately 1500 cubic feet of space for the project; the actual shape and form of the space are to be determined by the designer. The structural system required for the proposed entry environment will be designed by others.

Only one basic functional requirement must be met: There must be room for six persons, adults or children, to occupy, experience, and move through the space at any one time. These persons will be able-bodied users; no provision for handicapped access is required. Other functional requirements may be dictated by the "imaginative experiences" chosen to be incorporated by the designer, and must be accommodated in the design.

You are to produce a unique and innovative design solution in which all technical and functional requirements are met. You are to exploit the elements of design -- line, shape/form, color, light, texture, and space -- in creating an interesting entry environment in which to experience "Childhood Imagination."

The final presentation must communicate all important aspects of the design solution, including materials used, within the format of a single well-composed sheet. Graphics to be included in the final presentation are: Floor plan, Interior Elevation or Section, Axonometric, (drawn at scales of your choice) and Perspective Vignette.

APPENDIX C

Letters to Creativity Researchers

Virginia Tech
VIRGINIA POLYTECHNIC INSTITUTE
AND STATE UNIVERSITY

Department of Housing, Interior Design and
Resource Management

College of Human Resources
Blacksburg, Virginia 24061-0431
Dept. (703) 231-6163 Office (703) 231-

January 6, 1992

Dear

Because of your expertise in the field of creativity research, I am writing to ask for your help in establishing content validity for a study currently in progress. I am a graduate student at Virginia Tech, presently working on my doctoral dissertation in the area of creativity in interior design. The research plan which I have outlined is adapted after methodology used by Teresa Amabile in her investigations of creativity in two domains -- artistic and verbal. My study will extend this methodology to the domain of interior design by utilizing the consensual assessment technique in investigating creativity in interior design projects.

Through collaboration with interior design colleagues, I have developed a list of rating criteria, the "Dimensions of Judgment for Interior Design Projects," which will be used to assess interior design projects created for the study. As in the Amabile studies, the rating criteria include not only aspects hypothesized to be related to creativity, but also aspects supposedly related to technical goodness and aesthetic appeal. These rating criteria will be used to investigate agreement on creativity judgments among experts in the field, and to try to separate judgments of creativity from judgments of other aspects of project merit.

Having read some of your articles, I am aware that you are familiar with the methodology used in Amabile's creativity studies. Would you be willing to read the list of rating criteria which I have developed for my study, consider their appropriateness for use in assessing the creativity of interior design projects, and provide feedback based upon your expertise?

Enclosed please find a copy of the "Dimensions of Judgment for Interior Design Projects", a single sheet showing the rating criteria listed in alphabetical order. Please indicate any editorial suggestions, corrections, or additions/deletions by writing directly on this sheet. For additional comments or recommendations, please feel free to write in the margins or use the reverse side. A self-addressed envelope has been enclosed for your convenience in returning the list to me.

If you have further questions, you may contact me by telephone at (703) 639-2060.

Thank you for your assistance.

Susan Barnard

Jeanette Bowker
Major Advisor and Department Head

A Land-Grant University—The Commonwealth is Our Campus
An Equal Opportunity / Affirmative Action Institution

APPENDIX D

Dimensions of Judgment for Interior Design Projects

Dimensions of Judgment for Interior Design Projects

Dimension	Descriptive Definition
Aesthetic appeal	The degree to which the project, overall, is aesthetically pleasing.
Appropriateness	The degree to which the design is an appropriate solution to the problem.
Artistic merit	The degree to which the presentation is good artistically.
Complexity	The level of complexity displayed in the design solution.
Craftsmanship	The level of craftsmanship skills displayed in the presentation.
Creativity	The degree to which the design is creative, using your own subjective definition of creativity.
Functionality	The degree to which the designed space is functional.
Liking	The degree to which you like the design, based upon your own subjective reaction to it.
Novelty	The degree to which the use of materials and/or design elements is novel.
Originality	The degree to which the design solution is original or unique.
Technical merit	The degree to which the project, overall, is good technically.
Thematic expression	The degree to which the design conveys the theme identified in the statement.

APPENDIX E

Rating Sheets

Judge No. _____

AESTHETIC APPEAL: The degree to which the project, overall, is aesthetically pleasing.

Please rate (✓) each project from **VERY LOW** to **VERY HIGH** on the aspect described above. Rate projects **RELATIVE TO ONE ANOTHER**, not according to some absolute standard for excellence. Consider projects in **ANY RANDOM ORDER**, and indicate the number of the project being rated [1 - 18] in the bracket provided on the left.

	VERY LOW								**VERY HIGH**
Project Number									
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__

The following list of consecutive numbers (1-18) has been provided for your convenience in crossing off projects during the rating process, if desired:

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

Judge No. _____

APPROPRIATENESS: The degree to which the design is an appropriate solution to the problem.

Please rate (✓) each project from **VERY LOW** to **VERY HIGH** on the aspect described above. Rate projects **RELATIVE TO ONE ANOTHER**, not according to some absolute standard for excellence. Consider projects in **ANY RANDOM ORDER**, and indicate the number of the project being rated [1 - 18] in the bracket provided on the left.

	VERY LOW								**VERY HIGH**
Project Number									
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__

The following list of consecutive numbers (1-18) has been provided for your convenience in crossing off projects during the rating process, if desired:

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

Judge No. _____

ARTISTIC MERIT: The degree to which the presentation is good artistically.

Please rate (✓) each project from **VERY LOW** to **VERY HIGH** on the aspect described above. Rate projects **RELATIVE TO ONE ANOTHER**, not according to some absolute standard for excellence. Consider projects in **ANY RANDOM ORDER**, and indicate the number of the project being rated [1 - 18] in the bracket provided on the left.

	VERY LOW								**VERY HIGH**
Project Number									
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__

The following list of consecutive numbers (1-18) has been provided for your convenience in crossing off projects during the rating process, if desired:

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

Judge No. _____

COMPLEXITY: The level of complexity displayed in the design solution.

Please rate (✓) each project from **VERY LOW** to **VERY HIGH** on the aspect described above. Rate projects **RELATIVE TO ONE ANOTHER**, not according to some absolute standard for excellence. Consider projects in **ANY RANDOM ORDER**, and indicate the number of the project being rated [1 - 18] in the bracket provided on the left.

	VERY LOW	**VERY HIGH**
Project Number		
[ ]	(1)__ (2)__ (3)__ (4)__ (5)__ (6)__ (7)__ (8)__ (9)__	
[ ]	(1)__ (2)__ (3)__ (4)__ (5)__ (6)__ (7)__ (8)__ (9)__	
[ ]	(1)__ (2)__ (3)__ (4)__ (5)__ (6)__ (7)__ (8)__ (9)__	
[ ]	(1)__ (2)__ (3)__ (4)__ (5)__ (6)__ (7)__ (8)__ (9)__	
[ ]	(1)__ (2)__ (3)__ (4)__ (5)__ (6)__ (7)__ (8)__ (9)__	
[ ]	(1)__ (2)__ (3)__ (4)__ (5)__ (6)__ (7)__ (8)__ (9)__	
[ ]	(1)__ (2)__ (3)__ (4)__ (5)__ (6)__ (7)__ (8)__ (9)__	
[ ]	(1)__ (2)__ (3)__ (4)__ (5)__ (6)__ (7)__ (8)__ (9)__	
[ ]	(1)__ (2)__ (3)__ (4)__ (5)__ (6)__ (7)__ (8)__ (9)__	
[ ]	(1)__ (2)__ (3)__ (4)__ (5)__ (6)__ (7)__ (8)__ (9)__	
[ ]	(1)__ (2)__ (3)__ (4)__ (5)__ (6)__ (7)__ (8)__ (9)__	
[ ]	(1)__ (2)__ (3)__ (4)__ (5)__ (6)__ (7)__ (8)__ (9)__	
[ ]	(1)__ (2)__ (3)__ (4)__ (5)__ (6)__ (7)__ (8)__ (9)__	
[ ]	(1)__ (2)__ (3)__ (4)__ (5)__ (6)__ (7)__ (8)__ (9)__	
[ ]	(1)__ (2)__ (3)__ (4)__ (5)__ (6)__ (7)__ (8)__ (9)__	
[ ]	(1)__ (2)__ (3)__ (4)__ (5)__ (6)__ (7)__ (8)__ (9)__	
[ ]	(1)__ (2)__ (3)__ (4)__ (5)__ (6)__ (7)__ (8)__ (9)__	
[ ]	(1)__ (2)__ (3)__ (4)__ (5)__ (6)__ (7)__ (8)__ (9)__	

The following list of consecutive numbers (1-18) has been provided for your convenience in crossing off projects during the rating process, if desired:

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

Judge No. _____

CRAFTSMANSHIP: The level of craftsmanship skills displayed in the presentation.

Please rate (✓) each project from **VERY LOW** to **VERY HIGH** on the aspect described above. Rate projects **RELATIVE TO ONE ANOTHER**, not according to some absolute standard for excellence. Consider projects in **ANY RANDOM ORDER**, and indicate the number of the project being rated [1 - 18] in the bracket provided on the left.

	VERY LOW								**VERY HIGH**
Project Number									
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__

The following list of consecutive numbers (1-18) has been provided for your convenience in crossing off projects during the rating process, if desired:

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

Judge No. _____

CREATIVITY: The degree to which the design is creative, using your own subjective definition of creativity.

Please rate (✓) each project from **VERY LOW** to **VERY HIGH** on the aspect described above. Rate projects **RELATIVE TO ONE ANOTHER**, not according to some absolute standard for excellence. Consider projects in **ANY RANDOM ORDER**, and indicate the number of the project being rated [1 - 18] in the bracket provided on the left.

	VERY LOW								**VERY HIGH**
Project Number									
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__

The following list of consecutive numbers (1-18) has been provided for your convenience in crossing off projects during the rating process, if desired:

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

Judge No. _____

FUNCTIONALITY: The degree to which the designed space is functional.

Please rate (✓) each project from **VERY LOW** to **VERY HIGH** on the aspect described above. Rate projects **RELATIVE TO ONE ANOTHER**, not according to some absolute standard for excellence. Consider projects in **ANY RANDOM ORDER**, and indicate the number of the project being rated [1 - 18] in the bracket provided on the left.

	VERY LOW								**VERY HIGH**
Project Number									
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__

The following list of consecutive numbers (1-18) has been provided for your convenience in crossing off projects during the rating process, if desired:

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

Judge No. _____

LIKING: The degree to which you like the design, based upon your own subjective reaction to it.

Please rate (✓) each project from **VERY LOW** to **VERY HIGH** on the aspect described above. Rate projects **RELATIVE TO ONE ANOTHER**, not according to some absolute standard for excellence. Consider projects in **ANY RANDOM ORDER**, and indicate the number of the project being rated [1 - 18] in the bracket provided on the left.

	VERY LOW	**VERY HIGH**
Project Number		
[ ]	(1)__ (2)__ (3)__ (4)__ (5)__ (6)__ (7)__ (8)__ (9)__	
[ ]	(1)__ (2)__ (3)__ (4)__ (5)__ (6)__ (7)__ (8)__ (9)__	
[ ]	(1)__ (2)__ (3)__ (4)__ (5)__ (6)__ (7)__ (8)__ (9)__	
[ ]	(1)__ (2)__ (3)__ (4)__ (5)__ (6)__ (7)__ (8)__ (9)__	
[ ]	(1)__ (2)__ (3)__ (4)__ (5)__ (6)__ (7)__ (8)__ (9)__	
[ ]	(1)__ (2)__ (3)__ (4)__ (5)__ (6)__ (7)__ (8)__ (9)__	
[ ]	(1)__ (2)__ (3)__ (4)__ (5)__ (6)__ (7)__ (8)__ (9)__	
[ ]	(1)__ (2)__ (3)__ (4)__ (5)__ (6)__ (7)__ (8)__ (9)__	
[ ]	(1)__ (2)__ (3)__ (4)__ (5)__ (6)__ (7)__ (8)__ (9)__	
[ ]	(1)__ (2)__ (3)__ (4)__ (5)__ (6)__ (7)__ (8)__ (9)__	
[ ]	(1)__ (2)__ (3)__ (4)__ (5)__ (6)__ (7)__ (8)__ (9)__	
[ ]	(1)__ (2)__ (3)__ (4)__ (5)__ (6)__ (7)__ (8)__ (9)__	
[ ]	(1)__ (2)__ (3)__ (4)__ (5)__ (6)__ (7)__ (8)__ (9)__	
[ ]	(1)__ (2)__ (3)__ (4)__ (5)__ (6)__ (7)__ (8)__ (9)__	
[ ]	(1)__ (2)__ (3)__ (4)__ (5)__ (6)__ (7)__ (8)__ (9)__	
[ ]	(1)__ (2)__ (3)__ (4)__ (5)__ (6)__ (7)__ (8)__ (9)__	
[ ]	(1)__ (2)__ (3)__ (4)__ (5)__ (6)__ (7)__ (8)__ (9)__	
[ ]	(1)__ (2)__ (3)__ (4)__ (5)__ (6)__ (7)__ (8)__ (9)__	

The following list of consecutive numbers (1-18) has been provided for your convenience in crossing off projects during the rating process, if desired:

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

Judge No. _____

NOVELTY: The degree to which the use of materials and/or design elements is novel.

Please rate (✓) each project from **VERY LOW** to **VERY HIGH** on the aspect described above. Rate projects **RELATIVE TO ONE ANOTHER**, not according to some absolute standard for excellence. Consider projects in **ANY RANDOM ORDER**, and indicate the number of the project being rated [1 - 18] in the bracket provided on the left.

	VERY LOW								**VERY HIGH**
Project Number									
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__

The following list of consecutive numbers (1-18) has been provided for your convenience in crossing off projects during the rating process, if desired:

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

Judge No. _____

ORIGINALITY: The degree to which the design solution is original or unique.

Please rate (✓) each project from **VERY LOW** to **VERY HIGH** on the aspect described above. Rate projects **RELATIVE TO ONE ANOTHER**, not according to some absolute standard for excellence. Consider projects in **ANY RANDOM ORDER**, and indicate the number of the project being rated [1 - 18] in the bracket provided on the left.

	VERY LOW								**VERY HIGH**
Project Number									
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__

The following list of consecutive numbers (1-18) has been provided for your convenience in crossing off projects during the rating process, if desired:

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

Judge No. _____

TECHNICAL MERIT: The degree to which the project, overall, is good technically.

Please rate (✓) each project from **VERY LOW** to **VERY HIGH** on the aspect described above. Rate projects **RELATIVE TO ONE ANOTHER**, not according to some absolute standard for excellence. Consider projects in **ANY RANDOM ORDER**, and indicate the number of the project being rated [1 - 18] in the bracket provided on the left.

	VERY LOW								**VERY HIGH**
Project Number									
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__

The following list of consecutive numbers (1-18) has been provided for your convenience in crossing off projects during the rating process, if desired:

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

Judge No. _____

THEMATIC EXPRESSION: The degree to which the design conveys the theme identified in the statement.

Please rate (✓) each project from **VERY LOW** to **VERY HIGH** on the aspect described above. Rate projects **RELATIVE TO ONE ANOTHER**, not according to some absolute standard for excellence. Consider projects in **ANY RANDOM ORDER**, and indicate the number of the project being rated [1 - 18] in the bracket provided on the left.

	VERY LOW								**VERY HIGH**
Project Number									
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__
[ ]	(1)__	(2)__	(3)__	(4)__	(5)__	(6)__	(7)__	(8)__	(9)__

The following list of consecutive numbers (1-18) has been provided for your convenience in crossing off projects during the rating process, if desired:

1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18

APPENDIX F

Correspondance with Judges

Virginia Tech
VIRGINIA POLYTECHNIC INSTITUTE
AND STATE UNIVERSITY

Department of Housing, Interior Design and
Resource Management

College of Human Resources
Blacksburg, Virginia 24061-0424
Dept.: (703) 231-6163 Office: (703) 231-

February 28, 1992

Dear

Because of your expertise as an interior design educator, I am writing to ask for your help with a research project currently in progress at Virginia Tech. The study is designed to examine the level of consensus among interior design professionals when evaluating student projects. It requires experts in the profession -- educators and designers -- to view a display of student projects and provide independent ratings on various aspects of project merit. Since the validity of such ratings depends heavily upon the expertise level of the judges, input from experienced IDEC members such as yourself is crucial to the study.

Thanks to cooperation from the FIDER accredited schools in Virginia, three separate one-day Judging Sessions have been scheduled at different locations in the state as follows:

Friday, March 20	Virginia Tech Blacksburg, VA
Friday, March 27	Virginia Commonwealth University Richmond, VA
Friday, April 3	Marymount University Arlington, VA

At each location, projects will be on display beginning at 9 a.m. on the scheduled date. Each expert judge may come by at a convenient pre-arranged time during the day to complete the untimed rating process, which requires approximately two hours.

In the next few days I will contact you by telephone to ask you to participate as a judge in the study. At that time I will be happy to answer any further questions you have about the research project or the judging session. I would also like to schedule a convenient time during the one-day session in your area for you to complete the rating process.

I hope that you will agree to participate in this important interior design research project. I look forward to talking with you soon. Thank you for your assistance.

Sincerely,

Susan Barnard

Jeanette Bowker
Major Advisor and Department Head

Virginia Tech
VIRGINIA POLYTECHNIC INSTITUTE
AND STATE UNIVERSITY

Department of Housing, Interior Design and
Resource Management

College of Human Resources
Blacksburg, Virginia 24061-0424
Dept.: (703) 231-6163 Office: (703) 231-

February 28, 1992

Dear

Because of your expertise as a professional interior designer, I am writing to ask for your help with a research project currently in progress at Virginia Tech. The study is designed to examine the level of consensus among interior design professionals when evaluating student projects. It requires experts in the profession -- designers and educators -- to view a display of student projects and provide independent ratings on various aspects of project merit. Since the validity of such ratings depends heavily upon the expertise level of the judges, input from experienced ASID Professional members such as yourself is crucial to the study.

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I hope that you will agree to participate in this important interior design research project. I look forward to talking with you soon. Thank you for your assistance.

Sincerely,

Susan Barnard

Jeanette Bowker
Major Advisor and Department Head

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AND STATE UNIVERSITY

Department of Housing, Interior Design and Resource Management

College of Human Resources
Blacksburg, Virginia 24061-0424
Dept.: (703) 231-6163 Office: (703) 231-

March 13, 1992

Dear Roanoke Area Judge:

Thank you for agreeing to participate as a judge in the interior design research study currently being conducted at Virginia Tech. I am writing to confirm the arrangements for the Roanoke judging session as follows:

Thursday, March 19, 1992
Roanoke Valley Graduate Center
(under City Parking Garage)
Room 120
117 West Church Ave. SW
Roanoke, VA

As noted in the previous letter, projects will be on display for judging beginning at 9 a.m. Since you indicated a preference to come by _____, I will look for you then. If needed, parking is available either in the city parking garage or in a nearby parking lot.

The projects you will be judging were created in a single six-hour session by a group of fourth-year interior design students at Virginia Tech. Enclosed you will find the **Instructions** which were given to students the week before the session, and the **Project Statement** which was distributed at the beginning of the session. In order to save yourself some time during judging, you may want to read these materials ahead of time to familiarize yourself with the requirements of the project.

Rating criteria and complete instructions for the judging task will be provided on Thursday. The scheduled agenda allows time for you to examine the judging materials and to preview the project display before beginning the actual judging process.

Without essential input from professional designers and educators such as yourself, this research study would be impossible. I am grateful for your willingness to help, and look forward to seeing you on Thursday.

Sincerely,

Susan Barnard
(703) 639-2060

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AND STATE UNIVERSITY

Department of Housing, Interior Design and Resource Management

College of Human Resources
Blacksburg, Virginia 24061-0424
Dept.: (703) 231-6163 Office: (703) 231-

March 20, 1992

Dear Richmond Area Judge:

Thank you for agreeing to participate as a judge in the interior design research study currently being conducted at Virginia Tech. I am writing to confirm the arrangements for the Richmond judging session as follows:

Friday, March 27, 1992
Virginia Commonwealth University
Pollak Hall, Room 411
325 N. Harrison Street
Richmond, VA

As noted in the previous letter, projects will be on display for judging beginning at 9 a.m. Since you indicated a preference to come by _____, I will look for you then. If needed, parking is available in the Academic Parking Deck, located at Main and Laurel Streets. Street parking is also permitted, but spaces may be limited.

The projects you will be judging were created in a single six-hour session by a group of fourth-year interior design students at Virginia Tech. Enclosed you will find the **Instructions** which were given to students the week before the session, and the **Project Statement** which was distributed at the beginning of the session. In order to save yourself some time during judging, you may want to read these materials ahead of time to familiarize yourself with the requirements of the project.

Rating criteria and complete instructions for the judging task will be provided on Friday. The scheduled agenda allows time for you to examine the judging materials and to preview the project display before beginning the actual judging process.

Without essential input from professional designers and educators such as yourself, this research study would be impossible. I am grateful for your willingness to help, and look forward to seeing you on Friday.

Sincerely,

Susan Barnard
(703) 639-2060

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March 25, 1992

Dear Washington Metropolitan Area Judge:

Thank you for agreeing to participate as a judge in the interior design research study currently being conducted at Virginia Tech. I am writing to confirm the arrangements for the Arlington judging session as follows:

Friday, April 3, 1992
Marymount University
Gailhac Hall, Room 35
2807 North Glebe Road
Arlington, VA

As noted in the previous letter, projects will be on display for judging beginning at 9 a.m. Since you indicated a preference to come by _____, I will look for you then. For your convenience, parking has been prearranged with campus security. Please ask the guard on duty at the entrance gate for instructions.

The projects you will be judging were created in a single six-hour session by a group of fourth-year interior design students at Virginia Tech. Enclosed you will find the **Instructions** which were given to students the week before the session, and the **Project Statement** which was distributed at the beginning of the session. In order to save yourself some time during judging, you may want to read these materials ahead of time to familiarize yourself with the requirements of the project.

Rating criteria and complete instructions for the judging task will be provided on Friday. The scheduled agenda allows time for you to examine the judging materials and to preview the project display before beginning the actual judging process.

Without essential input from professional designers and educators such as yourself, this research study would be impossible. I am grateful for your willingness to help, and look forward to seeing you on Friday.

Sincerely,

Susan Barnard
(703) 639-2060

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Department of Housing, Interior Design and
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College of Human Resources
Blacksburg, Virginia 24061-0424
Dept.: (703) 231-6163 Office: (703) 231-

May 11, 1992

Dear Interior Design Professional:

Thank you for participating as a judge in my interior design dissertation research study currently in progress at Virginia Tech.

Now that the judging is complete, it is possible to discuss the particular question under investigation in more detail. This research study was designed to explore the concept of creativity in interior design, to determine the level of agreement among professionals regarding the creativity of student projects, and to identify specific aspects associated with creativity in student work. The methodology utilized in the study, Consensual Assessment Technique, was adapted from a highly respected series of creativity studies conducted by Teresa Amabile, a psychology professor at Brandeis University. Over the past decade, Dr. Amabile's impressive program of research has examined creativity in several areas in the arts.

In accordance with the strict requirements of the methodology, a carefully controlled experimental environment was maintained throughout the duration of the study. Student projects were created especially for this research study during a single Saturday session, outside regularly scheduled class meetings. Students were unaware that the projects they were creating would be judged; neither students nor judges were informed that the focus of the investigation was creativity. The rating criteria, also adapted from the previous studies, was strikingly different from criteria commonly used in the familiar jury situation. These and other such controls were employed in meeting the specific requirements of this creativity assessment technique.

It is my hope that knowledge gained through a careful analysis of these ratings can be used in the future to foster creativity in student work. I am indebted to professionals such as yourself for making the study possible.

Once again, thanks for your help.

Sincerely,

Susan Barnard

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APPENDIX G

Instructions for the Project Creation Session

Instructions for the Project Creation Session

Your task is to create a one-board presentation of a design solution for the space described in the Project Statement. Working at your own drafting table and using your own drafting equipment and supplies, you will develop the drawings for the design on tracing paper/trash. The final presentation, showing important aspects of your design solution in graphic form, will be submitted on a single sheet (19" X 24") of good quality drawing paper which will be provided. Your name should not be included on this final presentation sheet.

Time allocated for the project creation session is 6 hours, beginning at 9:00 a.m. and continuing until 3 p.m. There will be no opportunity to leave the building during the session. A light lunch will be provided; other breaks may be taken individually when necessary and time permits. Since time needed to complete the project may vary from person to person, a strict time limit will not be imposed at 3 p.m. This deadline flexibility will ensure a finished presentation from each participant.

Each person will work independently, without benefit of discussion or collaboration. The overall goal is to produce a unique and innovative design solution which meets all technical and functional requirements of the Project Statement. The final presentation should communicate all aspects of the design solution, including materials used, within the format of a single well-composed sheet.

Required Drawings:
- Floor plan
- Interior Elevation or Section
- Axonometric
- Perspective vignette

Materials to be provided for you:
- Drafting table with parallel bar
- Project Statement and Instructions
- One sheet of good quality drawing paper, 19" X 24"

Equipment/Materials you will provide:
- Drafting equipment, including architects scale, triangles, drafting and sketching pencils, sharpener, eraser, etc.
- Roll of tracing paper/trash
- Calculator
- Color rendering medium -- colored pencils or markers, etc.

Schedule:

9:00 a.m.	Project Statement and Instructions; Questions
9:15 a.m.	First drawing session
12:00 a.m.	Lunch break
12:30 p.m.	Second drawing session
3:00 p.m.	Submit final presentation when completed

APPENDIX H

Consent Form

I have agreed to permit my "Childhood Imagination" project to be used in a study investigating creativity in interior design student work. The study will be conducted by Susan Barnard as part of her Ph.D. program in interior design at Virginia Polytechnic Institute and State University, and will provide important information helpful to educational programs in meeting FIDER accreditation requirements.

I understand that projects used in the study will be retained by Ms. Barnard for use throughout the duration of the study; projects will be photographed and a complimentary color slide will be provided for each participant. No names will be attached to projects and participants will not be mentioned by name at any time. All information collected during the study will remain strictly confidential and will be used for statistical purposes only.

If I have any questions I may call Dr. Jeanette Bowker, HIDM Department Head, at 231-6163 or Dr. Ernest Stout, Assistant Provost for Research, at 231-9559.

Signature: _____ Date: _____

I would like to have a color slide of my "Childhood Imagination" project.

YES ____ NO ____

APPENDIX I

Instructions for the Project Judging Session

Instructions for the Project Judging Session

Your task is to rate the interior design projects displayed in this room on 12 aspects of merit (**Dimensions of Judgment**) as described on the rating sheets. Please complete these subjective ratings independently, without discussion or collaboration.

You may proceed at your own pace to complete the judging tasks as outlined below. Since **it is imperative that all ratings be completed for all projects,** no time limits will be imposed for the judging session.

1. **Preparing for Judging:** A table has been provided for your convenience in reading and examining the judging materials provided on the clipboard:
   a. Project Statement
   b. Dimensions of Judgment for Interior Design Projects
   c. 12 Rating Sheets arranged in pre-determined order

2. **Previewing Projects:** Before beginning the actual judging process, take some time to browse through the display to familiarize yourself with the projects and to establish your own impression as to the overall range of project merit represented.

3. **Rating Projects:** Procedures to Follow

   a. Rating sheets are arranged on the clipboard in a **pre-determined order which must not be altered.** Rate all projects on the dimension described on the first sheet before proceeding to the second sheet.

   b. It is important that you select projects for rating in a **random order of your own choice** rather than advancing straight through the display. As you proceed, please indicate the project being rated by writing its corresponding number in the bracket provided to the left of each rating scale.

   c. Please rate projects on the dimension described on the sheet by placing a checkmark (__) at the appropriate position on the nine-point scale (1=VERY LOW; 9=VERY HIGH). It is important that you **rate projects relative to one another, not according to some absolute standard for excellence.**

   d. When all projects have been rated on the first dimension, remove the first rating sheet from the clipboard and place it behind all other sheets. Then, proceed to the second sheet and repeat the rating process on the second dimension, again selecting projects in any random order. Repeat the process for each sheet on the clipboard until all rating sheets, in turn, have been completed.

4. **Submitting Ratings:** When finished with all rating sheets, please make sure **all project numbers and ratings are complete.** When you are certain that nothing has been left blank, return the clipboard to the researcher. Thank You!

APPENDIX J

Demographics Sheet

Judge No. _____

Some Questions About Your Background

A. What is your current principal employment?

[ ] INTERIOR DESIGNER
[ ] INTERIOR DESIGN EDUCATOR

B. Whether a designer or an educator, how would you categorize your interior design focus and expertise?

[ ] PRIMARILY CONTRACT
[ ] PRIMARILY RESIDENTIAL
[ ] EQUALLY CONTRACT/RESIDENTIAL

C. What degrees do you hold?

DEGREE DATE INSTITUTION MAJOR

_____

_____

_____

D. What academic discipline or program area best describes your educational training in interior design?

[ ] ARCHITECTURE
[ ] ART
[ ] HOME ECONOMICS
[ ] OTHER? Describe:_____

E. Whether a designer or an educator, how many years have you been employed full-time in the interior design profession?

[ ] 0 - 5 YEARS
[ ] 6 -10 YEARS
[ ] 11-15 YEARS
[ ] 16-20 YEARS
[ ] 21-25 YEARS
[ ] 26-30 YEARS
[ ] 31 YEARS OR MORE

F. Are you?

[ ] MALE
[ ] FEMALE

G. What difficulties, if any, did you encounter during this judging session? For example, were there problems with:

INSTRUCTIONS? Describe:_____
_____
_____

DIMENSIONS OF JUDGMENT (rating criteria)? Describe:_____
_____
_____

PHYSICAL ENVIRONMENT? Describe:_____
_____
_____

FATIGUE? Describe:_____
_____
_____

OTHER? Describe:_____
_____
_____

APPENDIX K

Correlation Matrices

EDUCATORS

Correlations Between Dimensions of Judgment

	AESTAP	APPROP	ARTISM	COMPLX	CRAFTS	CREATV	FUNCTN	LIKING	NOVLTY	ORIGIN	TECHNM	THEMEX
AESTAP	1.00	.69[b]	.94[a]	.66[b]	.83[a]	.82[a]	.20	.80[a]	.73[a]	.79[a]	.57[c]	.66[b]
APPROP	.69[b]	1.00	.67[b]	.72[a]	.63[b]	.77[a]	.40	.76[a]	.85[a]	.71[a]	.72[a]	.84[a]
ARTISM	.94[a]	.67[b]	1.00	.71[a]	.92[a]	.85[a]	.38	.87[a]	.78[a]	.84[a]	.72[a]	.62[b]
COMPLX	.66[b]	.72[a]	.71[a]	1.00	.70[b]	.93[a]	.35	.91[a]	.88[a]	.82[a]	.74[a]	.82[a]
CRAFTS	.83[a]	.63[b]	.92[a]	.70[b]	1.00	.79[a]	.56[c]	.88[a]	.74[a]	.76[a]	.86[a]	.57[c]
CREATV	.82[a]	.77[a]	.85[a]	.93[a]	.79[a]	1.00	.32	.95[a]	.93[a]	.91[a]	.72[a]	.82[a]
FUNCTN	.20	.40	.38	.35	.56[c]	.32	1.00	.41	.44	.20	.76[a]	.28
LIKING	.80[a]	.76[a]	.87[a]	.91[a]	.88[a]	.95[a]	.41	1.00	.90[a]	.90[a]	.84[a]	.78[a]
NOVLTY	.73[a]	.85[a]	.78[a]	.88[a]	.74[a]	.93[a]	.44	.89[a]	1.00	.91[a]	.79[a]	.82[a]
ORIGIN	.79[a]	.71[a]	.84[a]	.82[a]	.76[a]	.91[a]	.20	.90[a]	.91[a]	1.00	.66[a]	.70[b]
TECHNM	.57[c]	.72[a]	.72[a]	.74[a]	.86[a]	.72[a]	.76[a]	.84[a]	.79[a]	.66[b]	1.00	.61[b]
THEMEX	.66[b]	.84[a]	.62[b]	.82[a]	.57[c]	.82[a]	.28	.78[a]	.82[a]	.70[b]	.61[a]	1.00

Note. Correlations with no superscripts are not statistically significant.

[a] $p < .001$
[b] $p < .01$
[c] $p < .05$

DESIGNERS

Correlations Between Dimensions of Judgment

	AESTAP	APPROP	ARTISM	COMPLX	CRAFTS	CREATV	FUNCTN	LIKING	NOVLTY	ORIGIN	TECHNM	THEMEX
AESTAP	1.00	.63[b]	.93[a]	.69[b]	.89[a]	.77[a]	.56[c]	.84[a]	.75[a]	.76[a]	.79[a]	.48[c]
APPROP	.63[b]	1.00	.35	.79[a]	.51[c]	.85[a]	.76[a]	.91[a]	.82[a]	.81[a]	.79[a]	.95[a]
ARTISM	.93[a]	.35	1.00	.53[c]	.90[a]	.59[c]	.41	.62[b]	.55[c]	.59[b]	.65[b]	.17
COMPLX	.69[b]	.79[a]	.53[c]	1.00	.66[b]	.94[a]	.62[b]	.91[a]	.91[a]	.94[a]	.83[a]	.67[b]
CRAFTS	.89[a]	.51[c]	.90[a]	.66[b]	1.00	.69[b]	.56[c]	.72[a]	.65[b]	.72[a]	.85[a]	.36
CREATV	.77[a]	.85[a]	.59[c]	.94[a]	.69[b]	1.00	.68[b]	.95[a]	.97[a]	.98[a]	.86[a]	.71[a]
FUNCTN	.56[c]	.76[a]	.41	.62[b]	.56[c]	.68[b]	1.00	.68[b]	.65[b]	.63[b]	.76[a]	.68[b]
LIKING	.84[a]	.91[a]	.62[b]	.91[a]	.72[a]	.95[a]	.68[b]	1.00	.93[a]	.93[a]	.88[a]	.81[a]
NOVLTY	.75[a]	.82[a]	.55[c]	.91[a]	.65[b]	.97[a]	.65[b]	.93[a]	1.00	.95[a]	.85[a]	.68[b]
ORIGIN	.76[a]	.81[a]	.59[b]	.94[a]	.72[a]	.98[a]	.63[b]	.93[a]	.95[a]	1.00	.86[a]	.69[b]
TECHNM	.79[a]	.79[a]	.65[b]	.83[a]	.85[a]	.86[a]	.76[a]	.88[a]	.85[a]	.86[a]	1.00	.65[b]
THEMEX	.48[c]	.95[a]	.17	.67[b]	.36	.71[a]	.68[b]	.81[a]	.68[b]	.69[b]	.65[b]	1.00

Note. Correlations with no superscripts are not statistically significant.

[a] $p < .001$
[b] $p < .01$

ALL JUDGES

Correlations Between Dimensions of Judgment

	AESTAP	APPROP	ARTISM	COMPLX	CRAFTS	CREATV	FUNCTN	LIKING	NOVLTY	ORIGIN	TECHNM	THEMEX
AESTAP	1.00	.63[b]	.95[a]	.69[b]	.88[a]	.79[a]	.43	.83[a]	.75[a]	.76[a]	.71[a]	.52[c]
APPROP	.63[b]	1.00	.44	.79[a]	.53[c]	.83[a]	.68[b]	.88[a]	.83[a]	.77[a]	.77[a]	.96[a]
ARTISM	.95[a]	.44	1.00	.60[b]	.91[a]	.70[b]	.38	.70[b]	.64[b]	.70[b]	.67[b]	.30
COMPLX	.69[b]	.79[a]	.60[b]	1.00	.69[b]	.95[a]	.54[c]	.93[a]	.91[a]	.94[a]	.83[a]	.74[a]
CRAFTS	.88[a]	.53[c]	.91[a]	.69[b]	1.00	.74[a]	.53[c]	.76[a]	.68[b]	.75[a]	.85[a]	.40
CREATV	.79[a]	.83[a]	.70[b]	.95[a]	.74[a]	1.00	.58[c]	.97[a]	.97[a]	.98[a]	.84[a]	.75[a]
FUNCTN	.43	.68[b]	.38	.54[c]	.53[c]	.58[c]	1.00	.58[c]	.59[b]	.50[c]	.76[a]	.59[b]
LIKING	.83[a]	.88[a]	.70[b]	.93[a]	.76[a]	.97[a]	.58[c]	1.00	.94[a]	.94[a]	.87[a]	.82[a]
NOVLTY	.75[a]	.83[a]	.64[b]	.91[a]	.68[b]	.97[a]	.59[b]	.94[a]	1.00	.95[a]	.84[a]	.74[a]
ORIGIN	.76[a]	.77[a]	.70[b]	.94[a]	.75[a]	.98[a]	.50[c]	.94[a]	.95[a]	1.00	.83[a]	.69[b]
TECHNM	.71[a]	.77[a]	.67[b]	.83[a]	.85[a]	.84[a]	.76[a]	.87[a]	.84[a]	.83[a]	1.00	.66[b]
THEMEX	.52[c]	.96[a]	.30	.74[a]	.40	.75[a]	.59[b]	.82[a]	.74[a]	.69[b]	.66[b]	1.00

Note. Correlations with no superscripts are not statistically significant.

[a] $p < .001$
[b] $p < .01$
[c] $p < .05$

VITA

Susan Smith Barnard, daughter of Rollie A. and Mattie Jo Smith, was born in Benton, Kentucky on December 25, 1941. She graduated from Benton High School in 1959. In 1963 she graduated with High Distinction from Murray State University, earning both the Bachelor of Music degree and the Bachelor of Music Education degree. From 1963 to 1964 she was enrolled in a masters program in piano performance at Louisiana State University and held a graduate assistantship in the music department.

From 1964 through 1982, Susan was employed as a music teacher, initially as a public school music specialist with the Richardson School District in Dallas, Texas, and later as a piano teacher in a home studio. In addition, she was a church organist, serving in various churches in several states.

In 1980 Susan enrolled as an interior design student at Radford University and completed a Master of Science degree in Home Economics in 1982. In 1985 she was accepted into the doctoral program in the Department of Housing, Interior Design, and Resource Management at Virginia Polytechnic Institute and State University. While completing course work for the degree from 1985 to 1987, she was an instructor in the interior design program at VPI&SU. In September,

1987, she accepted a full-time position as Instructor in the Design Department at Radford University where she presently teaches in the interior design program, having been promoted to Assistant Professor in 1991.

Susan has been inducted into the following honorary fraternities: Phi Kappa Phi, Omicron Nu, and Phi Upsilon Omicron. She holds Corporate membership in the Interior Design Educators Council and is an Allied member of the American Society of Interior Designers.

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