INFORMATION TO USERS

This material was produced from a microfilm copy of the original document. While the most advanced technological means to photograph and reproduce this document have been used, the quality is heavily dependent upon the quality of the original submitted.

The following explanation of techniques is provided to help you understand markings or patterns which may appear on this reproduction.

1. The sign or “target” for pages apparently lacking from the document photographed is “Missing Page(s)”. If it was possible to obtain the missing page(s) or section, they are spliced into the film along with adjacent pages. This may have necessitated cutting thru an image and duplicating adjacent pages to insure you complete continuity.

2. When an image on the film is obliterated with a large round black mark, it is an indication that the photographer suspected that the copy may have moved during exposure and thus cause a blurred image. You will find a good image of the page in the adjacent frame.

3. When a map, drawing or chart, etc., was part of the material being photographed the photographer followed a definite method in “sectioning” the material. It is customary to begin photoing at the upper left hand corner of a large sheet and to continue photoing from left to right in equal sections with a small overlap. If necessary, sectioning is continued again—beginning below the first row and continuing on until complete.

4. The majority of users indicate that the textual content is of greatest value, however, a somewhat higher quality reproduction could be made from “photographs” if essential to the understanding of the dissertation. Silver prints of “photographs” may be ordered at additional charge by writing the Order Department, giving the catalog number, title, author and specific pages you wish reproduced.

5. PLEASE NOTE: Some pages may have indistinct print. Filmed as received.

Xerox University Microfilms
300 North Zeeb Road
Ann Arbor, Michigan 48106
HOLLAND PERSONALITY TYPES' DIFFERENCES

IN PREFERENCE FOR STIMULUS COMPLEXITY

DISSERTATION

Presented in Partial Fulfillment of the Requirements for
the Degree Doctor of Philosophy in the Graduate
School of the Ohio State University

By

Evelyn Janice Gauthier, B.A., M.A.

* * * * *

The Ohio State University

1975

Reading Committee:

W. Bruce Walsh, Ph.D.
Samuel H. Osipow, Ph.D.
Frank Fletcher, Ph.D.

Approved by

W. Bruce Walsh
Adviser
Department of Psychology
ACKNOWLEDGMENTS

I wish to acknowledge my appreciation to Dr. Bruce Walsh for his support, direction, and patience. Also, my thanks to my family and friends who have encouraged me through the entire process of my graduate education. And finally, I owe a debt of gratitude to my unknown sisters in this country whose collective aspirations have supported, and demanded, my achievement.
VITA

June 6, 1945. Born - Salinas, California

1967. B.A., Occidental College, Los Angeles, Calif.

1967-1969. Student Personnel Assistant, Residence Halls, The Ohio State University, Columbus, Ohio

1969. M.A., Counseling Psychology, The Ohio State University, Columbus, Ohio

1969-1970. Psychology Intern, Lakeshore Psychiatric Hospital, Toronto, Ontario, Canada

1970-1971. Teaching Assistant, Counseling Psychology Department, The Ohio State University, Columbus, Ohio

1971-1972. Psychologist, Columbus State Hospital, Columbus, Ohio

1972-1974. Psychologist, Counseling and Consultation Services, The Ohio State University, Columbus, Ohio

1974. Psychologist, Student Health Center, Kansas State University, Manhattan, Kansas

FIELDS OF STUDY

Major Field: Counseling Psychology

Preference and Choice Behavior. Professors W. Bruce Walsh and Frank Fletcher.
# TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>Section</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACKNOWLEDGMENTS</td>
<td>ii</td>
</tr>
<tr>
<td>VITA</td>
<td>iii</td>
</tr>
<tr>
<td>LIST OF FIGURES</td>
<td>vi</td>
</tr>
<tr>
<td>LIST OF TABLES</td>
<td>vii</td>
</tr>
<tr>
<td>Chapter</td>
<td></td>
</tr>
<tr>
<td>I. STATEMENT OF PURPOSE</td>
<td>1</td>
</tr>
<tr>
<td>II. REVIEW OF THE LITERATURE</td>
<td>3</td>
</tr>
<tr>
<td>Theoretical Complexity Research</td>
<td></td>
</tr>
<tr>
<td>Complexity Preference Research</td>
<td></td>
</tr>
<tr>
<td>Individual Differences in Preference for Complexity</td>
<td></td>
</tr>
<tr>
<td>Research on Holland's Vocational Interest Blank</td>
<td></td>
</tr>
<tr>
<td>Summary</td>
<td></td>
</tr>
<tr>
<td>III. METHODOLOGY</td>
<td>21</td>
</tr>
<tr>
<td>Hypotheses</td>
<td></td>
</tr>
<tr>
<td>Sample</td>
<td></td>
</tr>
<tr>
<td>Instrument</td>
<td></td>
</tr>
<tr>
<td>Stimuli</td>
<td></td>
</tr>
<tr>
<td>Procedure</td>
<td></td>
</tr>
<tr>
<td>Scoring</td>
<td></td>
</tr>
<tr>
<td>Analysis</td>
<td></td>
</tr>
<tr>
<td>IV. RESULTS</td>
<td>30</td>
</tr>
<tr>
<td>V. DISCUSSION</td>
<td>39</td>
</tr>
<tr>
<td>VI. SUMMARY, CONCLUSIONS, LIMITATIONS, AND IMPLICATIONS.</td>
<td>47</td>
</tr>
</tbody>
</table>
LIST OF FIGURES

1. Mean Interestingness-Pleasingness Difference
   Scores by Vocational Group in Hexagonal Form 43
LIST OF TABLES

1. Factorial Analysis of Variance - Interestingness. ........................................... 34
2. Factorial Analysis of Variance - Pleasingness. ............................................. 35
3. Factorial Analysis of Variance -
   Interestingness-Pleasingness Difference .................................................. 36
4. Descriptive Statistics for Sample Distribution -
   Interestingness Ratings ................................................................................... 37
5. Descriptive Statistics for Sample Distribution -
   Pleasingness Ratings ....................................................................................... 37
6. Descriptive Statistics for Sample Distribution -
   Interestingness-Pleasingness Difference ..................................................... 38
I. STATEMENT OF PURPOSE

The purpose of this study is to examine whether or not differing groups of people differ systematically in their preference responses to complexity in stimuli. This is proposed as an initial step in further understanding the nature and impact of differences between people in the ways they react to complexity in their stimulus world. The underlying assumption is that there may be an important correlation between an individual's preference for, or at least his tolerance of, high levels of complexity and his ability to adapt to a complex and rapidly changing society.

Previous research in the area of preference for complexity has focused initially on the levels of complexity most preferred by the general populations. These studies have usually yielded a normal curve with a moderate amount of complexity the most preferred when all the subjects are considered together. However, the validity of generalizing this preference curve to any individual is questionable. It seems likely that many individual differences are being masked in this general pool of data. Therefore, researchers are now attempting to examine those individual preference patterns for systematic relationships with other personality dimensions. The present study follows that model.

The issues examined in this study fall into three main areas. The first is a test of whether men and women differ in their preference
reactions to complexity. The second issue is whether groups of people representing different personality types (based on a theory of vocational choice) differ in their preference for complexity. The third area is a closer examination of two facets of preference behavior, how a person responds when asked about how pleasing a stimulus is, and how he responds when asked about how interesting it is. The purpose of this comparison is to ascertain whether interestingness and pleasingness are perceived as different dimensions of stimuli; and if so, how each relates to the complexity of the stimulus.

Knowledge of the differing ways in which people respond to complexity has various potential applications in the social sciences. Once we understand the developmental process behind receptivity to complexity, we have the possibility of teaching those skills to individuals and thus expanding their repertoire of coping behaviors. This could be of use in educational, remedial, and therapeutic settings. Examining the differences in complexity tolerance among specific groups might allow the identification of those more vulnerable to stress reactions. On an individual counseling level, the dimension of the client's response to increasing complexity could be an aid in conceptualizing some types of client problems. For instance, many situational reactions may be viewed as the result of a discrepancy between the client's present ability to absorb complexity and the degree of change occurring in his life.

The identification of individual differences in peoples' preference responses to stimulus complexity thus has a variety of potential applications.
II. REVIEW OF THE LITERATURE

This section will begin with a review of the relevant literature on subjects' preference for and interest in varying degrees of stimulus complexity. First the main theoretical stances will be summarized. Then the research designed to measure the general population's response to increasing complexity will be reviewed. The final area of complexity research to be covered will be those studies aimed at identifying between-subject variables which correlate with differences in response to complexity. The chapter will then move on to the literature concerning Holland's personality types and the research demonstrating his Vocational Preference Inventory as a meaningful indicator of individual style differences.

Theoretical Complexity Research

Dember and Earl (1957) propose a conceptual framework for behaviors which do not appear to be motivated by drive-reduction. They view exploration and curiosity as forms of attention. In their view, attention can be aroused either by temporal change (novelty) or by spatial change (complexity) in the stimuli. The concept of change used here is obviously a relative one, defined by Dember and Earl as "a discrepancy between what is observed by the subject and what is expected." Novelty and complexity, then, are not absolute properties of the stimulus but are the results of an interaction between the
subject's prior experience and the stimulus' degree of variation from the subject's expectations. Dember and Earl symbolize this in Coombsian measurement terms, in which a stimulus attribute is the result of the interaction between the stimulus variable, the individual, and the point in time for that person.

Dember and Earl further state that an unexpected stimulus variation provides information which the subject can then incorporate and use in the future. These authors suggest that there is an ideal amount of stimulus uncertainty which allows maximal increase in information while still falling in the acceptable range of the subject's ability to understand. Stimuli which are just enough different from the subject's expectations to let him learn useful new information are called "pacers". Subjects will attend to pacers more than to other levels of change, while attention to a stimulus drops as its difference from the pacer increases. Exposure to a pacer will eventually render it useless as a pacer and will allow a more complex level of stimulus to then act as the new pacer. Dember and Earl assume that the direction of subject movement is always toward more novel or complex stimuli, assuming no confounding factors (such as anxiety) interfere.

Berlyne's original theoretical position (1960, 1963) was a rather traditional physiologically-based drive reduction model. He viewed either the lack of sufficient stimulation or the presence of excessive stimulation as a deviation from homeostasis and thus as increasing arousal in the organism. Any stimulus which reduced this arousal was rewarding. Thus, an animal who was activated due to boredom would find novel, complex stimuli rewarding. The over-stimulated animal, on the
other hand, would prefer less challenging stimuli. The organism can reduce the activation caused by the introduction of a new stimulus by either continuing to interact with it or by avoiding it. Novelty, complexity, and surprisingness are the major stimulus variables which determine its ability to arouse the organism.

Berlyne's more recent work (1970) suggests a shift away from the original assumption that the organism seeks absolute homeostasis to a position more resembling an optimal arousal level. He finds that moderate levels of increased arousal may be rewarding to a moderately activated subject. The individual is viewed as an information-seeking, conflict-reducing organism who finds the processing of data a rewarding activity. Human beings will seek to resolve conflict, but not to the extent that they no longer have to engage in cognitive activity. As in Dember and Earl's theory, the interaction of the subject's level of arousal and the arousal properties of the stimulus is a central factor. Berlyne sees the correlation between these two as nonmonotonic.

This concept of an optimal arousal level was further illustrated in a study (Berlyne and Crozier, 1971) which varied the darkness and other general stimulation levels of the experimental setting. When subjects' attraction to complex stimuli varied inversely with the level of prechoice stimulation, the authors postulated "...a homeostatic mechanism keeping the average input of information fairly stable over quite short periods."

In addition to his interest in the patterns and causation of arousal, Berlyne has also examined the types of behavior arising from external stimulation of the organism. These reactive patterns can be
generally termed exploratory behaviors. Berlyne has differentiated two basic types of exploration. The first, specific exploration, usually occurs in a state of heightened arousal, when the subject is seeking specific, goal-directed information. This type of exploration, Berlyne suggests, operates when a subject is asked to judge a stimulus' interestingness. The second type, divergent exploration, is related to a less formal, more generalized search for entertaining or pleasant stimuli, and is operationalized when we ask subjects for a rating of pleasingness. Increasing stimulus complexity apparently contributes more to its interestingness than to its pleasingness.

Evans and Day (1971) conducted a factorial study of subjects' responses to perceptual complexity. They found, consistent with Berlyne, that the higher levels of complexity result in increased interestingness ratings and decreased pleasingness. In addition, the more complex stimuli were met with changes in galvanic skin response and heart rate, indicators of arousal. This lends support to Berlyne's contention that interestingness is related to the arousal-producing properties of the stimulus, while pleasingness relates to the stimulus' arousal-reducing properties.

Like Berlyne, Munsinger and Kessen (1964) view the human being as an information-processing organism. Beginning with the premise that humans have physiological limits to the amount of sensory data they can handle at one time, these authors suggest that we have overcome our limitations by developing cognitive codes. By structuring various bits of data into chunks, we can handle much more incoming information. We develop these organizing codes through our continuing experiences with
the environment, so that at any point in time each individual may have a different capacity for structuring and absorbing new data.

Munsinger and Kessen then propose the term "cognitive uncertainty" to describe the state resulting from a discrepancy between the person's present cognitive capacity for structuring various environmental data and the actual variability of the stimulus being presented. They predict that human beings will prefer stimuli which are at or slightly beyond their present ability to code information, while ignoring stimuli which are either too simple or too confusing. This process of attending to progressively more demanding stimuli is the basic way in which we expand our cognitive structures. It is also one method of reducing cognitive uncertainty. Avoiding the stimulus also reduces uncertainty, but does not expand our coding ability.

From Munsinger and Kessen comes the prediction that there is a nonmonotonic relationship between expressed preference for a stimulus and its degree of variability (complexity). The location of this peak of preferred stimulus variability should indicate the level of the individual's capacity for processing information. This coding ability can then be increased by systematic exposure to stimuli falling within the subject's optimal range of cognitive uncertainty.

Fiske and Maddi's (1961) theory, based on animal research, proposes an optimal activation level in the organism which varies with the sleep-wakefulness cycle. Certain internal states, such as hunger, can increase activation. The organism will either approach or avoid variations in stimuli depending on his present level of activation, the absence or presence of a goal-directed internal drive, and the degree
of the stimulus' meaningfulness, intensity, or variability. This theory contains certain elements of previous conceptualization: namely, that an organism seeks some ideal degree of stimulation, and that this optimal level varies with both internal physiological states and with the external properties of the stimulus conditions. They predict that a strong internal need will produce dominant goal-directed behavior, but that in the absence of such a motive the organism will engage in some general, exploratory behavior to maintain its optimal level of stimulation.

McClelland and Clark (1953) base their motivation theory on Helson's adaptation level concepts (1947, 1959, 1964). Helson suggests that a judgmental frame of reference for a stimulus property is developed from the subject's previous experience with stimuli. Situational factors are also relevant for any specific incidence of subjective judgment. In general, however, McClelland and Clark predict that the affect attached to a stimulus depends on its distance from the subject's adaptation level to that particular stimulus property. They suggest that stimuli falling at the same level as adaptation will elicit neutral reactions, while moderate variations in either direction will be viewed positively with a gradual shift to negative reactions as the degree of variation increases.

Glanzer (1958) also draws upon Helson's adaptation concepts. He assumes that stimuli which provide the average amount of information as the subject's previous experience with stimuli will be the most preferred. Stimuli will be avoided to the extent that they vary from the preferred, accustomed degree of input.
While both the McClelland and Clark theory and the Glanzer theory are based on an adaptation level concept, the first theory predicts preference for slight variations from the adaptation level, while the second sees preferred stimuli as those which match the subject's level of adaptation. Again we see the conflict between the premise of optimal activation versus the premise of homeostasis.

Complexity Preference Research

This section will consider the experimental evidence of general tendencies in the preference of human beings for more or less complexity.

In the Munsinger and Kessen (1964) studies, which formed the basis of their previously noted theory, they found a nonmonotonic function between the complexity (number of turns) of a random polygon and subjects' expressed preference for the figure. The curve revealed an optimal preference for figures of ten turns, with a drop as figures became either more or less complex. They found no significant difference between female and male subjects' preference patterns.

However, another experiment reported in the same article showed that art students showed continually increasing preference for random shapes as their complexity increased. The authors suggested this result may be due either to the art students' increased experience with stimuli of a visual nature or to some personality factors in the selection of art students. This same generally monotonic positive function between preference and number of turns in a polygon is found when general subjects are shown symmetrical shapes. It is suggested
that symmetry reduces cognitive uncertainty in a variable stimulus.

The final experiment in this series by Munsinger and Kessen was designed to test the effects of exposure to stimuli above the subject's established level of preferred complexity. They found that subjects exposed to stimuli at their own specific preference level, when tested a day later, showed even stronger preference expressed for their optimal level and decreased ratings for higher levels. Subjects who were exposed to greater than preferred levels of complexity, however, showed an increased preference for higher levels the following day. The authors conclude that the subjects experimentally exposed to more complexity were forced to develop cognitive codes for the new data and that those results are not due to either adaptation or satiation.

Munsinger and Kessen draw two main conclusions from this series of experiments: first, that there is an intermediate amount of cognitive uncertainty (determined by the complexity and meaningfulness of the stimuli) which is most preferred by the subject; and secondly, that the subject's preferred level varies with his experiences of variable stimuli in the past.

Several other experimenters have found an inverted U-shaped correlation between preference and degree of stimulus complexity. Two studies by Vitz (1966) show greatest preference is expressed at a moderate degree of complexity for both visual and auditory stimuli. Unikel (1971), using variations in the complexity of a series of lights, found his college subjects consistently preferring greater complexity. He suggests the steady climb in preference may be due to his use of levels of complexity which are still in the ascending ranges of the
curve. The other interesting finding in this study is that subjects showed a general preference for change, from any level to any other level of complexity.

Wohlwill (1968) compared the complexity of his visual stimuli with both subjects' time spent exploring the picture and with their preference ratings of the slides. He, too, found preference reaching its height at an intermediate level of complexity. Exploration time, however, continued to increase linearly with complexity. Wohlwill uses Berlyne's theory of specific versus divergent exploration to explain this difference between stated preference and looking time.

The exploration of complex stimuli was further studied by Gaschk, Kintz, and Thompson (1968). For both objects and pictures, amount of time spent with the stimulus increased as a function of complexity. This study additionally documents the position that the relationship between stimulus complexity and exploration may be different than the interaction between stimulus complexity and expressed preference.

Berlyne (1970) reviewed the earlier work indicating a generally negative correlation between interestingness and pleasingness along the dimension of complexity. His present work compares interestingness and pleasingness of stimuli when their familiarity to the subject is also varied. He found the unfamiliar stimuli to be rated both more pleasing and more interesting, but the interestingness seems to drop more rapidly with increased familiarity. He then reexamined these results, varying the complexity of the stimuli as well as their relative familiarity. He concludes "the hedonic value of complex stimuli tends to rise as they become less novel while the opposite holds for simple
stimuli". Reich and Moody (1970) examined this same interaction of familiarity/complexity/liking. They found that novelty tended to increase liking for simple stimuli, while complex stimuli became more pleasant with increased familiarity.

In his more recent research, Berlyne excludes the familiarity factor in order to more closely study the behavioral (rather than the verbally expressed) preference correlates of complexity. In one study (1972) subjects were given a choice between viewing a more or a less complex visual pattern. In terms of both choice and looking time, the subjects tended to seek exposure to stimuli which other subjects had judged as more interesting but less pleasing. In another experiment (Berlyne, 1972), he pursued this trend using nonverbal operant behavior. Again, subjects were found to have higher response rates for the key which produced a more complex pattern than for the key which produced the less complex pattern when the duration of exposure per response was held constant. He concluded that greater complexity has a greater reinforcement value.

The reinforcement value of complex stimuli was also illustrated for rats in a study by Taylor (1971). When hungry rats were given a choice between an alley containing food and one containing a complex variety of stimulus objects, "they frequently chose the complexity alley". While at first choices in favor of the more complex alleys were low, eventually the rats' behavior moved to exploration and then to preference. "The highly complex stimuli serve originally as a low incentive which gradually becomes a high positive incentive capable of completing with food for hungry rats." When the degree of complexity
was reduced, the rats' preference for that alley also quickly dropped. This study with animals seems to parallel several of the findings with human subjects, particularly the tendency to explore unfamiliar stimuli, and the tendency to seek exposure to more complex environmental stimuli.

These studies have formed the basis for two concepts to be tested in this experiment. The first is the tendency for a nonmonotonic relationship to occur between the complexity of a stimulus and subject preference for it. The second premise is that the attributes of pleasingness and interestingness of a stimulus are separate phenomena, each relating differently to the variable of complexity.

**Individual Differences in Preference for Complexity**

The existence of differences in individual subjects' responses to complexity was noted by the early researchers in the area. For example, a footnote in the Munsinger and Kessen (1964) monograph states that "there are consistent and significant individual differences among subjects in their preferences for variability". These authors make the suggestion that this systematic between-subject variation may be related to creativity, but do not pursue this experimentally.

Dorfman and McKenna (1966) followed this suggestion and studied their subjects in smaller groups, according to their most preferred level of complexity. Their results point out the potential statistical contribution of individual differences: "The group results (a curvilinear relation between uncertainty and preference) are the average effect of a set of subjects with wide individual differences, some of whose data are curvilinear and some of whose data are essentially
linear with respect to relation of preference level and uncertainty."

Looft (1971) also followed up the possibility of a statistical artifact producing the unimodal curve found in most complexity-preference research. When he pooled his data, he too found the inverted U-shaped curve. However, when the analysis was done on an individual basis with a Coombsian measurement procedure, he found a bimodal curve most frequent. This study, then, suggests previous analyses may be misleading in their support for the concept of one optimally preferred level of complexity for a group of subjects. Looft interprets the individual bimodal curves as supporting Helson's adaptation level model, described previously in relation to McClelland and Clark's theory.

Lane (1971), also concerned that previous research resulting in the unimodal function may be masking individual differences, used a factor analysis approach to subjects' preference for complexity. He found four separate groups of subjects which represented four different response patterns. The largest group exhibited a positive linear relationship between preference and complexity.

These two studies, with their differing methodologies and results, do overlap in their support for a more individualized approach to the study of complexity preference. While a pooled subject population may produce an optimal level of complexity in a unimodal, inverted U-shaped curve, it may not be appropriate to generalize or predict individual response patterns from that. The next task, then, is to search for systematic individual variations.

Perhaps the most basic approach to individual differences is the study of demographic variables. Stock and Looft (1969), using a
paper-and-pencil test as their measure of preference for stimulus complexity, correlated the scores with a variety of demographic variables (birth order, sex, parents' occupations, political preference, etc.). The only significant correlation achieved was between preference for complexity and a self-rating of liberal political ideology.

Birth order and sex have been studied extensively by Eisenman (1967, 1968). His findings include a general tendency for females to prefer more complexity than males. The birth order data shows first-born males preferring more complexity than later-born males, but this effect is reversed for females. This same research revealed a relationship between moderate anxiety levels and preference for complexity.

Looft and Baranowski (1971) attempted a replication of Eisenman using a college population. The only significant finding was the sex difference, with females preferring more complexity than males. The findings for birth order were in the predicted direction, but not significant. An interesting result in this study is the general skewedness of this sample toward a preference for the more complex levels of stimuli. This may be a characteristic specific to college students.

Several studies have included academic or vocational variables to differentiate among subjects. As was noted earlier, Munsinger and Kessen (1964) noted the increased preference for complexity among art students. Looft and Stock (1968) sought to correlate complexity with curriculum choices of college freshmen, but found no meaningful differences. The lack of significant results might be due to the use of relatively young subjects or of broad curriculum categories.
A French study by Frances (1970) compared the preference for and exploration of complex polygons among a group of students and a group of manual laborers, both groups matched for age. The student group showed greater preference for complexity as well as greater differentiation between what they saw as pleasing and what they saw as interesting.

Kish and Leahy's 1970 data also suggest some relevant differences among academic groups. High scores on a stimulus-seeking test (which, like creativity measures, may relate to a preference for complexity) correlated positively with science, arithmetic, and composite scores on the Kuder, but negatively correlated with clerical interests.

The concept of creativity has been linked to a preference for complexity by several authors. Eisenman (1969) found preference for complexity to be highly correlated with two other measures of creativity, the Unusual Uses Test and the Barron-Welsh Art Scale. In later studies this author has subsequently used preference for complexity as an independent variable representing creativity.

Kuusinen (1970) has tested the hypothesis that a preference for complexity is curvilinearly related to creativity. Using a personal inventory scale as her measure of complexity preference, the subjects were then measured for the originality and fluency (total number) of their responses to a hypothetical problem. The results showed creative performance increasing with complexity at first, but eventually dropping in the uppermost ranges of complexity preference. She interprets the results as indicating that very high levels of complexity preference show "more concern with nonconformity and rejection of conventionality than with fondness for novelty and tolerance of ambiguity." She also
proposes an alternative interpretation in Berlyne's constructs. In
this case, the extremely high levels of preference may represent arousal
above the optimal levels which are more conducive to learning and
productivity.

Several theoretical personality constructs have been developed
around the concepts of creativity and complexity. Barron (1963) found
the complexity-simplicity factor in his subjects represented perceptual
decisions that in turn had a marked effect on values, beliefs, and
personal style. One of his findings again shows greater overt anxiety
to be related to preference for complexity. Generally, preference for
simplicity was associated with order, balance, personal stability, and
a generally conservative stance. Preference for complexity, on the
other hand, indicated greater independence, unconventionality, high
valuation of creativity, and a liking for change.

A conceptually similar approach was undertaken by the Karlins
group (Karlins, Coffman, Lamm, and Schroeder, 1967) which tested some
of the conceptual complexity ideas put forth by Harvey, Hunt, Schroeder,
et. al. (1961). Viewing individuals as information-processing systems
with varying levels of integrative complexity, they found that
integratively complex subjects had more perceptual categories for
receiving information, more conceptual rules for organizing information,
are more active in their search for information, and in the search
process seek out different types of information than the conceptually
simpler subjects.

The present study is concerned with the relationship between
preference for complexity and vocationally-related personality styles.
Sex differences and the interaction of pleasingness with interestingness will also be examined.

**Research on Holland's Vocational Preference Inventory**

Holland (1966) has developed a theory of vocational choice and satisfaction which is based on the individual's style of interacting with his work (and larger) environment and the types of interactions most appropriate to various vocations. The Vocational Preference Inventory is simply a list of various occupations to which the subject responds with a rating of like, dislike, or undecided. From this instrument are derived eleven different subject scores. The first six scores specifically relate to the subject's vocational preferences, the other five being more indicative of response styles. The six vocational groups, which are not mutually exclusive but rather occur in various hierarchies within each person, are briefly summarized below:

1. **Realistic** - focuses on physical strength, motor coordination, and mechanical skills while avoiding verbal, artistic, or abstract functions; interpersonal style more toward aggressive than sensitive.

2. **Intellectual** - focuses on detached, critical, rational manipulation of ideas and abstractions; interpersonal style tends to be logical.

3. **Artistic** - emphasizes emotions, imagination, aesthetics; underplays self-control; nonconforming, asocial.

4. **Social** - deals with the manipulation of interpersonal relations in a supportive way; focus on feelings, tends toward humanistic, nurturant values.

5. **Enterprising** - uses verbal skills for dominating, manipulating, and leading others; often engaged in persuasive or selling functions.

6. **Conventional** - focuses on conformity, self-control, rules; social acceptance important.
Holland's recent work (1970) suggests a hexagonal arrangement of these six types, in the order given above. The adjacent styles in the hexagon are seen to be more similar than those situated opposite to one another.

The remaining five scores on the Vocational Preference Inventory are:

1. Self-control - impulsiveness versus overcontrol.
2. Status - reflecting need for prestige.
3. Masculinity - frequency of masculine role choices.
4. Infrequency - socially typical versus deviant choices.
5. Acquiescence - impact of social desirability on choices.

Of specific interest to this study is the validity of the VPI as a general personality measure that can measure broader individual differences than merely vocational choice. Holland (1962, 1965) has himself correlated the VPI with various personality measures such as the California Psychological Inventory, Cattell's Sixteen Personality Factor Questionnaire, the Minnesota Multiphasic Personality Inventory, and the Edwards Personal Preference Schedule.

Osipow and Gold (1968) studied the construct validity of the VPI by comparing students' self-rankings on six personality descriptions (designed to resemble Holland's six types) and their occupational preferences. The results of this study support the use of Holland's theory as a general personality indicator.

Folson (1968) found correlations consistent with Holland's theory between the VPI and the College Student Questionnaire.
A more recent study (Bodden and Klein, 1972) found that the various VPI groups do not significantly differ on a measure of cognitive complexity. If there is some intra-subject correlation between cognitive complexity and preference for stimulus complexity (as it seems there might be) then this study would predict that the VPI groupings would not differentiate among subjects' preference behavior.

Summary

Several theoretical explanations of the curvilinear relationships found between stimulus complexity and subjects' preference have been reviewed. The main theoretical controversy seems to be that between the drive-reduction models and the optimal arousal models.

Several studies were noted which focused on systematic between-subject differences in preference for complexity. The present study is an extension of this work on individual and group differences. Since sex was found to be significantly correlated with preference for complexity by at least two previous studies, it was selected as one variable to be considered here. The frequent finding that pleasingness and interestingness are differentially related to stimulus complexity was also chosen for testing in the present study. Additionally, the possibility of differences existing among subjects' preference for complexity on the basis of personality traits was selected as a focus of inquiry. Holland's VPI was discussed as a general personality measure. Its ability to identify a constellation of personality attributes recommends its usefulness for the present study.
III. METHODOLOGY

Hypotheses

The following hypotheses were tested in this study:

1. There are no significant differences among VPI subject groups in their ratings of varying stimulus complexity levels as pleasing.

2. There are no significant differences among VPI subject groups in their ratings of varying stimulus complexity levels as interesting.

3. There are no significant differences between females and males in their ratings of varying stimulus complexity levels as pleasing.

4. There are no significant differences between females and males in their ratings of varying stimulus complexity levels as interesting.

5. There are no significant differences within each VPI subject group between the ratings of stimulus complexity levels as interesting and their ratings as pleasing.

6. There are no significant differences between subjects' ratings of stimulus complexity levels as interesting and their ratings as pleasing.

While these hypotheses are stated in the null form, it is expected that significant differences will occur between sexes, between VPI groups, and between the dimensions of interestingness and pleasingness. Previous research provides strong evidence to predict that interestingness and pleasingness would emerge as different variables, in the direction of interestingness correlating with more complexity and pleasingness with less complexity. The research on sex differences is less substantial, however, and there is no notable body of research on differences among vocational groups which would justify predicting the
nature or direction of any differences that may occur. Therefore, lacking adequate justification for predicting the direction of possible differences for some of the dimensions being tested, all of the hypotheses have been stated in the null form to maintain consistency.

Sample

Subjects were taken from the undergraduate population at Kansas State University. Students in the sample pool were given the Vocational Preference Inventory and also asked to record their name, major, class rank, and sex. Only subjects whose major field of study was consistent with their highest category on the VPI profile according to Holland's classification scheme of college majors (Holland, 1968) and who were of junior rank or above, were included in the data analysis. For example, a female student majoring in Art would have to be at least a junior, and her VPI profile would have to show the Artistic category as her highest, before she could be included in the sample. The four VPI groups used in this study were Social, Artistic, Enterprising, and Intellectual. The Conventional and Realistic classifications were excluded from this study due to their relative infrequency in the college population, as illustrated in Holland's 1968 monograph. In that paper he lists no college majors as fitting into the Realistic class for female subjects, while the Conventional class fits just three college majors for males and only one for females. In the present study, equal numbers of males and females were obtained for each of the VPI groups. There were a total of ten males and ten females for each VPI group, yielding a total sample of eighty subjects.
Instrument

The Vocational Preference Inventory used in this study was developed by John Holland as a personality assessment device based on the individual's response to occupational titles. The form used in this study is the Sixth Revision (Holland, 1965).

The rationale for using this inventory as a personality measure rests on several assumptions. Holland sees the choice of an occupation (or the preference response to an occupational title) as a projective choice reflecting values, satisfactions, and the individual's preferred style of dealing with the world. Further, this choice is based on stereotypes that most people have of various occupations which include much more than their perceptions of merely the isolated work functions of that occupation.

To validate these assumptions, Holland has intercorrelated the VPI with established personality measures such as the California Psychological Inventory, the Minnesota Multiphasic Personality Inventory, and the Sixteen Personality Factor Questionnaire (Holland, 1970). A factor analysis (Forsyth and Fairweather, 1961) also supported the construct validity of this instrument. While the VPI yields scores on eleven dimensions relating to personality and behavior styles, the present study is mainly concerned with the six occupational scales.

The predictive validity of the VPI, either predicting vocational choice or achievement, has been only moderate. However, the reliability coefficients under test-retest conditions have been fairly strong. The coefficients for a sample of college freshmen tested again at a one-
year interval range from .61 to .86 for the occupational scales. For college seniors, which is a group closer in age to the sample used in the present study, retests after a six-week interval yielded occupational scale coefficients ranging from .74 to .98. Therefore, the VPI has been shown to be a fairly reliable instrument measuring a variety of personality dimensions.

Stimuli

The stimuli used in this study are black-on-white line drawings of asymmetrical polygons, generated by Owen (1966) with the aid of a computer. Since previous research has shown that perceived complexity of these forms increases logarithmically (Munsinger and Kessen, 1964), log intervals rather than equal intervals were used. Therefore, the stimuli in this study included polygons which have 4, 8, 12, 16, and 20 turns. There are fifteen different polygons used in this study, three representing each level of complexity. Ten of the polygons were shown without being rated in order to familiarize the subjects with the type of stimuli and the range of complexity involved. The remaining five polygons were then presented for actual rating by the subjects. The five polygons used for the rating process had been found by Owen (1966) to represent the mean judged complexity for their class (number of turns) among a field of twenty polygons of the same range. Therefore, the 8-turn polygon which the subjects in this study rated can be assumed to be representative of the general level of stimulus complexity presented by this type of 8-turn figure, and the same representational quality can be assumed true of the 4, 12, 16, and 20-turned polygons used in the
rating process. (The five polygons used in the rating procedure are reproduced in the appendix.)

Procedure

Subjects were tested in their classroom, during a regular class session. In most cases, the instructor had announced at a previous session that this class period would be used for a psychology experiment and that attendance was optional. The experimenter was introduced by the instructor at the beginning of the class session and the students were again informed that this was a voluntary project and that students were free to leave if they wished. Then the stimulus rating sheets were distributed while the following introduction was given by the experimenter:

I appreciate your cooperation in this study. There are two parts to it, and it will take approximately forty minutes. I will need your names on these sheets, though if you wish to use a pseudonyme, that is acceptable. Just make sure you use the same name throughout the experiment.

I am interested in getting your reactions to a new form of art, computer-drawn designs. Before I ask you to make some judgments of these designs, I will show you several of them to give you an idea of what they look like. Please watch the slides as they appear on the screen. I also request that you remain silent as you view the slides.

The first ten slides were then presented for ten-second exposures.

Then the following instructions were given:

Now that you have an idea of what these designs are like, I would like your opinions on some similar designs. You have a rating sheet with ten lines on it, each line divided into seven intervals representing the range from very low (on the left) to very high (on the right). I want you to look at each of the next slides and decide
how interesting it is to you. Then indicate your decision by checking the appropriate space on the seven-point scale. If the slide strikes you as not very interesting, you would check a space toward the left end of the line; if it is highly interesting to you, you would check one of the spaces toward the right end of the line. Please look at the slide carefully while it is on the screen; a black slide will follow each design to allow you time to mark your sheets.

The five slides to be rated were then presented in random order; they were exposed for ten seconds, followed by a five-second blank projection to give the subjects time to record their ratings. The experimenter then randomized the same five slides, putting them back into the slide tray while giving the following instructions:

Now I would like you to do the same kind of rating, but this time on the basis of how pleasing the particular design is to you. Again, the scale ranges from a very low level of pleasingness on the left to a very high level of pleasingness on the right. Watch the screen and then mark your rating sheet during the pause that follows each design.

The ratings of interestingness and pleasingness were alternated with each classroom group, one class rating pleasingness first, the next class rating interestingness first. When the second phase of rating was completed, the following instructions were given:

Now please pass your rating sheets to the aisle and I will collect them. The second part of the project consists of a vocational preference inventory which is being distributed to you now. You should have the inventory, which is a list of various occupational titles, and an answer sheet. Please put your name, or whatever name you used on the rating sheet, on the top of the answer sheet. The instructions are printed at the top of the inventory. For each occupation that interests you, blacken the Y for yes; if it does not appeal to you, blacken the N for no; if you are undecided, leave it blank. Work at your own pace, as there is no time limit. When finished, please bring them to me. If some of you wish to discuss the results of your vocational
interest inventory, please make a note at the top of your answer sheet and a phone number where I can contact you.

As the VPI's were completed, the students were allowed to leave the class. Students who indicated a particular interest were later contacted for some brief vocational feedback and possible referral. Instructors were given a brief summary of the study to read to the class at a later session, if they chose:

This study was designed to compare peoples' reactions to different levels of complexity in visual designs. Past research has shown that more complex designs are usually seen as more interesting, but that less complex designs are usually seen as more pleasing. This experiment is intended to test whether that difference between interesting and pleasing is true for this population. In addition, we are looking to see if there is any difference between men and women in their liking of complexity, and also whether or not there are any differences among people who are majoring in different occupational areas. Since others on campus may be taking part in this experiment in the near future, it is requested that you not discuss the research with those outside this class.

Scoring

The subject rating sheets were skimmed and any students who were below junior rank were not further scored. However, in the instance that a freshman or sophomore had indicated interest in his VPI results, the VPI was scored later and only for purposes of the individual's information. The VPI scores for the remaining students were then computed and plotted on profile sheets. The student's highest VPI classification group was then checked against his major area of study. If the student scored highest on Artistic, Intellectual, Social, or Enterprising, and his or her college major was consistent with this peak VPI group (according to Holland's 1968 classification of college majors)
then his or her name was recorded in the data pool. This process was continued until ten males and ten females were found for each of the four VPI groups used in this study.

The stimulus rating sheets for those students included in the data pool were then pulled and a complexity score for each was generated. Since a Likert scale was used for the ratings, it was impossible to assess complexity preferences simply on the basis of which stimulus design received the highest score, it being possible that more than one stimulus might receive the same Likert rating. Instead, an overall score was generated for each subject on each of the two dimensions, interestingness and pleasingness. This was accomplished by multiplying the Likert rating given (1 through 7) by the interval complexity level represented by that stimulus (4-turn polygon = 1; 8-turn polygon = 2; 12-turn polygon = 3; 16-turn polygon = 4; 20-turn polygon = 5). Thus, each stimulus rated by the subject has a score which is the product of the stimulus' complexity level and his rating of it. These products were then added to produce an overall score for the subject on pleasingness; this process was repeated to derive a score on interestingness. These derived preference/complexity scores were then analyzed.

Analysis

Three separate two-way analyses of variance were performed. In all of the two-dimensional analyses sex and vocational group (yielding a 2 x 4 table) were the independent variables. The three analyses utilized the dependent variables of the derived interestingness score, the derived pleasingness score, and an interestingness-pleasingness
difference score, respectively. Difference scores were obtained by subtracting the pleasingness/complexity score from the interestingness/complexity score for each subject.

To compare interestingness and pleasingness scores for males and for females, t-tests for related measures were performed.

In addition, computer analyses of the sample distribution were generated to assess approximation to the normal curve.
IV. RESULTS

The first hypothesis predicted that there are no significant differences among VPI subject groups in their ratings of varying stimulus complexity levels as pleasing. No significant differences were found, and the hypothesis was retained ($F=2.354$, $df=3$, 72, n.s.). These results are reported in Table 2.

The second hypothesis predicted that there are no significant differences among VPI subject groups in their ratings of varying stimulus complexity levels as interesting. No significant differences were found, and the hypothesis was retained ($F=0.391$, $df=3$, 73, n.s.). These results are reported in Table 1.

The third hypothesis predicted that there are no significant differences between females and males in their ratings of varying stimulus complexity levels as pleasing. Significant results were obtained and the hypothesis was rejected ($F=5.045$, $df=1$, 72, $p<.05$; means = 55.550 for males, 47.775 for females). The data indicate that male subjects rate higher levels of stimulus complexity as significantly more pleasing than do females. These results are reported in Table 2.

The fourth hypothesis predicted that there are no significant differences between females and males in their ratings of varying stimulus complexity levels as interesting. No significant differences were found and the hypothesis was retained ($F=0.169$, $df=1$, 72, n.s.). These results are reported in Table 1.

30
The fifth hypothesis predicted that there are no significant differences within each VPI subject group between the ratings of stimulus complexity levels as interesting and their ratings as pleasing. No significant results were found and the hypothesis was retained \((F=0.890, \ df=3, 72, \ n.s.)\). These results are reported in Table 3.

The sixth hypothesis predicted that there are no significant differences between subjects' ratings of stimulus complexity levels as interesting and their ratings as pleasing. The results of the t-test for related measures did yield significant differences (means = 51.663 for pleasingness, 66.200 for interestingness; \(SD=1.979, F=7.346, \ df=79, \ p<.001\)) and the hypothesis was rejected. These results indicate that the subject sample taken as a whole rated more complex stimuli as more interesting while rating less complex stimuli as more pleasing. The direction of these results is consistent with previous research.

As a check on the approximation of this data to normality, sample distribution statistics were computed. Observation of these statistics indicates that the three distributions were closely approximating normality and were symmetrical. The sample distribution statistics are reported in Tables 4 through 6.

In addition to the variables outlined in the hypotheses, three of the non-vocational scores from the VPI were then analyzed for purely exploratory purposes. These were: Self-control, defined as impulsiveness versus overcontrol; Masculinity, defined as the frequency of masculine role choices; and Acquiescence, defined as reflecting the impact of social desirability on choices. These three were selected
because, of the five non-vocational dimensions on the VPI, they seemed the most likely to correlate with the sex and personality dimensions under study. These analyses were undertaken merely to identify possible trends that might be pursued in future research, and so were not very refined. Subjects were assigned to one of two groups, depending on whether they scored above or below the mean on the scaled scores for each dimension. When these three additional variables were introduced into the analyses of variance, only one significant result was obtained.

When the Self-control scores were analyzed with the interesting-pleasing difference scores, significant results emerged ($F=4.224$, df=1, 57, $p<.05$). This indicates that subjects who score in the lower range of Self-control scores on the VPI produce a smaller range of difference between their ratings of stimuli as interesting and as pleasing (mean difference score = 9.812). Subjects who score in the higher range of Self-control scores produce a more pronounced difference between their ratings of interestingness and their ratings of pleasingness (mean difference score = 19.705). It appears that subjects with higher Self-control scores make a greater differentiation between the two dimensions of pleasingness and interestingness.

A Pearson Correlation Coefficient incorporating these three additional variables (Self-control, Masculinity, and Acquiescence), the pleasingness scores, the interestingness scores, and the difference scores yielded the expected correlation between the difference scores and the pleasingness and interestingness scores. The only other significant correlation that emerged was between the variables of Self-control
and Acquiescence ($r = -0.5419$, $p < .001$). This indicates that subjects who score in the higher ranges on Self-control tend to score in the lower ranges of Acquiescence, and vice-versa. Apparently the tendency to be influenced by social desirability is negatively correlated with the tendency to control one's impulsivity.

Other than those mentioned above, there were no other significant correlations from the Pearson, suggesting that the variables in question do represent a multidimensional space.
### TABLE 1

**FACTORIAL ANALYSIS OF VARIANCE**

**INTERESTINGNESS**

<table>
<thead>
<tr>
<th>Source</th>
<th>DF</th>
<th>SS</th>
<th>ms</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>1</td>
<td>36.450</td>
<td>36.450</td>
<td>0.169</td>
<td>n.s.</td>
</tr>
<tr>
<td>Vocation</td>
<td>3</td>
<td>252.700</td>
<td>84.233</td>
<td>0.391</td>
<td>n.s.</td>
</tr>
<tr>
<td>S x V</td>
<td>3</td>
<td>207.450</td>
<td>69.150</td>
<td>0.321</td>
<td>n.s.</td>
</tr>
<tr>
<td>Error</td>
<td>72</td>
<td>15504.273</td>
<td>215.337</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Total</td>
<td>79</td>
<td>16000.797</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
</tbody>
</table>
### TABLE 2

**FACTORIAL ANALYSIS OF VARIANCE**

**PLEASINGNESS**

<table>
<thead>
<tr>
<th>Source</th>
<th>DF</th>
<th>SS</th>
<th>ms</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sex</td>
<td>1</td>
<td>1209.012</td>
<td>1209.012</td>
<td>5.045</td>
<td>.05</td>
</tr>
<tr>
<td>Vocation</td>
<td>3</td>
<td>1692.437</td>
<td>564.146</td>
<td>2.354</td>
<td>n.s.</td>
</tr>
<tr>
<td>S x V</td>
<td>3</td>
<td>660.137</td>
<td>220.046</td>
<td>0.918</td>
<td>n.s.</td>
</tr>
<tr>
<td>Error</td>
<td>72</td>
<td>17254.348</td>
<td>239.644</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Total</td>
<td>79</td>
<td>20815.887</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Source</td>
<td>DF</td>
<td>SS</td>
<td>ms</td>
<td>F</td>
<td>p</td>
</tr>
<tr>
<td>--------</td>
<td>----</td>
<td>-------</td>
<td>-------</td>
<td>-------</td>
<td>-------</td>
</tr>
<tr>
<td>Sex</td>
<td>1</td>
<td>825.612</td>
<td>825.612</td>
<td>2.690</td>
<td>n.s.</td>
</tr>
<tr>
<td>Vocation</td>
<td>3</td>
<td>819.737</td>
<td>273.276</td>
<td>0.890</td>
<td>n.s.</td>
</tr>
<tr>
<td>S x V</td>
<td>3</td>
<td>1014.437</td>
<td>338.146</td>
<td>1.102</td>
<td>n.s.</td>
</tr>
<tr>
<td>Error</td>
<td>72</td>
<td>22094.102</td>
<td>306.862</td>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>Total</td>
<td>79</td>
<td>24753.887</td>
<td>...</td>
<td>...</td>
<td>...</td>
</tr>
</tbody>
</table>
**TABLE 4**

DESCRIPTIVE STATISTICS FOR SAMPLE DISTRIBUTION

**INTERESTINGNESS RATINGS**

<table>
<thead>
<tr>
<th>Measure</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>66.200</td>
</tr>
<tr>
<td>Median</td>
<td>67.250</td>
</tr>
<tr>
<td>Mode</td>
<td>69.00</td>
</tr>
<tr>
<td>Range</td>
<td>71.000</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>0.753</td>
</tr>
<tr>
<td>Skewness</td>
<td>-0.659</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>14.232</td>
</tr>
</tbody>
</table>

**TABLE 5**

DESCRIPTIVE STATISTICS FOR SAMPLE DISTRIBUTION

**PLEASINGNESS RATINGS**

<table>
<thead>
<tr>
<th>Measure</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>51.662</td>
</tr>
<tr>
<td>Median</td>
<td>52.167</td>
</tr>
<tr>
<td>Mode</td>
<td>57.000</td>
</tr>
<tr>
<td>Range</td>
<td>75.000</td>
</tr>
<tr>
<td>Kurtosis</td>
<td>-0.333</td>
</tr>
<tr>
<td>Skewness</td>
<td>0.173</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>16.232</td>
</tr>
</tbody>
</table>
## TABLE 6

DESCRIPTIVE STATISTICS FOR SAMPLE DISTRIBUTION

INTERESTINGNESS-PLEASINGNESS DIFFERENCES

<table>
<thead>
<tr>
<th>Statistic</th>
<th>Value</th>
<th>Statistic</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>14.537</td>
<td>Range</td>
<td>84.000</td>
</tr>
<tr>
<td>Median</td>
<td>13.500</td>
<td>Kurtosis</td>
<td>-0.052</td>
</tr>
<tr>
<td>Mode</td>
<td>3.000</td>
<td>Skewness</td>
<td>0.346</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>17.701</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
V. DISCUSSION

The results of this study lend support to the existence of a difference between the sexes in their preference ratings of stimulus complexity, though not in the expected direction. Eisenman (1967, 1968) found women rating more complex stimuli as more preferred, and this sex difference was later replicated by Looft and Baranowski (1971). In the present study, a significant difference was found between men and women on their ratings of stimuli as pleasing, though no significant difference emerged between the sexes on their ratings of interestingness. An inspection of the data shows, in fact, that the mean ratings of males and females on the dimension of interestingness are very similar (mean = 66.874 for males, 65.524 for females). On the ratings of pleasingness, however, the means show the females preferring a significantly lower level of stimulus complexity than do males (mean = 55.550 for males, 47.775 for females). These results, while confirming a sex difference, do not support previous research which found that females prefer more complex stimuli than do males. The results of the present study may be interpreted to mean that, when both males and females are requested to respond to stimuli on a dimension called "pleasingness", the optimal level of stimulus complexity is significantly lower for female subjects than the optimal level of stimulus complexity for males.
There are several possibilities suggested by this sex difference. Pleasingness as a perceptual judgment may be a somewhat different dimension for females than it is for males. For instance, it may be that what makes a stimulus interesting to males may be a larger factor in what makes it pleasing as well. Females may experience the dimensions of interesting and pleasing as more independent than males.

Another contributing factor in the presence and direction of this sex difference in regard to pleasingness may be the nature of the stimuli themselves. The sharp-cornered, abstract, flat-textured polygons used in this study have a rather mechanical appearance. Cultural exposure may have provided males subjects with more exposure to, and thus more familiarity with, mechanical types of stimuli. It has been generally found that increased familiarity with a stimulus tends to decrease its complexity for the subject. If it is assumed that the stimuli used in this study are, as a general type of visual stimuli, more familiar to males in this culture than to females, then one might moderate the interpretation of the preference differences between the subjects. While the objective level of preferred complexity is higher for men, the subjective level of complexity represented by that stimulus may be lower for men than for women due to the men's increased familiarity. Thus, the two sexes may in fact be closer in their optimal level of subjective stimulus complexity than these results would indicate.

The results of this study confirm previous research which has found interestingness and pleasingness to be different dimensions of perceptual preference, with more complexity contributing to a stimulus'
interestingness and less complexity contributing to its pleasingness. Berlyne (1970) offers a theoretical explanation for this phenomenon. He sees preference responses as exploratory behaviors, and he posits two distinct types of exploration with two distinct purposes. The first type, specific exploration, occurs in states of heightened arousal and its purpose is to gather information about specific stimuli. This type of behavior occurs in goal-directed or threatening situations. Diverse exploration, on the other hand, is correlated with decreased arousal and is more general in its search for stimulation. This type of behavior occurs when the subject seeks diversion or relaxed entertainment.

Berlyne interprets the difference between interestingness and pleasingness in terms of these two types of exploratory behavior. He suggests that when a subject is asked to assess the interestingness of a stimulus, the mode of specific exploration takes over and the more complex stimuli gain his attention because they contain more information. The concept of pleasingness, however, is related to diverse exploration and the subject selects a less complex stimulus which requires less attention and reduces arousal.

The results of this study certainly add to the previous literature indicating that pleasingness and interestingness are unique dimensions and are systematically correlated with complexity. Berlyne's explanation seems the most elegant at the present time and is widely supported.

One confounding issue in this area of research is that merely requesting interestingness and pleasingness as two different ratings
in the experimental session implies to the subjects that they are two
different dimensions. Nevertheless, the suggestion that they may be
different evokes systematic and significantly different responses from
the subjects as a whole. This may be interpreted to mean that college
subjects interpret a direction of interestingness as task-oriented and,
in Berlyne's terms, engage in specific exploration of the more complex,
more involving stimuli. However, when the direction given is for a
rating of pleasingness, they seem to accept permission to move to a more
relaxed stance, as suggested by the concept of dersive exploration.

Given the rich heterogeneity of a student's stimulus world,
combined with the volume and variety of academic tasks required of him,
the ability to discriminate between when specific exploration is neces-
sary and when dersive exploration is adequate may be a very valuable
skill. For example, a professor recommends a book to his class; it is
then usual that some student will ask if the book is required, or if it
will be covered on an exam. If so, the book would require specific
exploration; if not, dersive exploration may be sufficient unless some
specific need in the individual intervenes. Due to these situational
factors, it may be that the college experience produces a more pro-
nounced differentiation among a college population between what is
interesting and what is pleasing.

The two previously discussed findings in this study, the presence
of sex differences in the levels of complexity found most pleasing, and
the differing effect of stimulus complexity upon interestingness versus
pleasingness, generally confirm previous research findings. The
additional dimension tested in this study, the possibility of differences in preference for complexity among the VPI groups, was not supported by the results. While this may indicate that there are indeed no systematic group differences on the basis of these personality types in their preferred levels of complexity, the comparison of the four groups with one another may be masking an important trend.

A closer look at the data in the context of Holland's arrangement of the vocational groups suggests the existence of differences between pairs of groups. As discussed previously, Holland's conceptualization of the relationship among the VPI groups is that of a hexagon, with adjacent groups being more similar to one another than opposite groups. This hexagon is arranged in the following order: Intellectual, Artistic, Social, Enterprising, Convention, and Realistic. An inspection of the data shows that the means of the difference scores (interestingness minus pleasingness) for the four groups descend in the order suggested by the hexagonal arrangement, as illustrated in Figure 1.

![Figure 1](image)

**FIGURE 1**

**MEAN INTERESTINGNESS-PLEASINGNESS DIFFERENCE SCORES**

BY VOCATIONAL GROUP IN HEXAGONAL FORM

<table>
<thead>
<tr>
<th>Group</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intellectual</td>
<td>17.9</td>
</tr>
<tr>
<td>Artistic</td>
<td>17.3</td>
</tr>
<tr>
<td>Realistic</td>
<td>12.6</td>
</tr>
<tr>
<td>Social</td>
<td>10.3</td>
</tr>
<tr>
<td>Conventional</td>
<td></td>
</tr>
<tr>
<td>Enterprising</td>
<td></td>
</tr>
</tbody>
</table>
These difference scores can be interpreted as an indicator of how much the subjects in that group discriminate between the levels of complexity they see as pleasing and as interesting. On inspection, it can be seen that the means of the Intellectual and Artistic groups, who are both mainly involved in abstractions, are quite similar. The Social and Enterprising groups, both of whom are mainly involved in interpersonal interactions, also have means similar to one another. It appears then that the Intellectual and Artistic groups exhibit more pronounced differences in their preferred complexity levels when the pleasingness and interestingness dimensions are compared. The Social and Enterprising groups produce notably smaller differences.

While these trends are not conclusive, they do suggest the possibility of differences among pairs of VPI groups which cluster according to Holland's hexagonal arrangement. The addition of data for the two remaining groups, Conventional and Realistic, would be necessary for a complete testing of this clustering trend.

The discussion will move now to a brief consideration of the results obtained from the exploratory analyses of the three additional variables not included in the formal hypotheses, Self-control, Masculinity, and Acquiescence.

The first significant finding is that greater differentiation between interestingness and pleasingness ratings is positively correlated with the dimension of self-control. In other words, the tendency to more clearly discriminate between those stimuli which require greater attention due to their greater complexity and those which are less
demanding is correlated with the tendency to control impulsivity. Referring back to the preceding discussion of the role this ability to discriminate may play for a college population, this additional piece of information suggests a behavioral dimension to the situation. The ability to accurately perceive which stimuli require attention and which do not may contribute to the ability to control impulses by helping the subject set priorities more clearly. With more attention focused on the task-oriented stimuli in the environment, the subject may be less susceptible to distractions and less likely to respond impulsively to extraneous stimuli.

We might also reverse the direction of the correlation and hypothesize that subjects who, as a personality style, tend to control impulses have learned to compartmentalize the stimuli coming into their perceptual field as an aid in maintaining control. From this point of view, the more extreme discrimination between interestingness and pleasingness might represent an unnecessarily harsh exclusion of those stimuli not deemed necessary or functional.

The reciprocal correlation, that more impulsive subjects tend to make less pronounced discriminations between the complexity levels they find interesting and those they find pleasing, is also open to interpretation. It may mean that these subjects are more labile in their reactions to varying levels of stimuli, that their behavioral exploration of stimuli is not limited to those which are related to some important goal. On the other hand, a reduced ability to discriminate may hinder the subject's ability to move from a diversive type of
exploration to a specific type. This might result in a constant state of moderate arousal producing a tone of distractibility in the subject. It might also represent a general withdrawal from productive involvement with any stimuli. Thus, in task-oriented situations, the tendency to discriminate more distinctly between interesting, complex stimuli and more pleasing, simpler stimuli may be an asset.

The significant negative correlation between Self-control and Acquiescence scores has little bearing on the main issues under study in this research. Briefly stated, however, this result indicates that subjects scoring in the lower ranges of the Self-control dimension tend to score in the upper ranges of the Acquiescence dimension, and vice-versa. This negative relationship seems reasonable given the definition of Acquiescence as the susceptibility to social desirability and the definition of Self-control as the control of impulsivity. These two dimensions seem, then, to represent the polarities of the internal control of one's behavior versus the influence of external factors on one's behavior.
VI. SUMMARY, CONCLUSIONS, LIMITATIONS, AND IMPLICATIONS

Summary

The purpose of this study was to examine the relationship between subjects' preferred levels of stimulus complexity, sex differences, and personality types. Two preference measures were used, pleasingness and interestingness, and the correlation of each with level of stimulus complexity was examined.

The sample was taken from a college population. Subjects were selected on the basis of their classification on Holland's Vocational Preference Inventory, their majoring in a field of study consistent with their VPI group, and upperclass rank. Four VPI groups were represented, Artistic, Intellectual, Social, and Enterprising, with equal numbers of males and females in each group. A total of eighty subjects were used.

Subjects were shown a series of asymmetrical, computer-generated polygons representing five levels of stimulus complexity. Ratings of interestingness and pleasingness were obtained for each of the five complexity levels, using a 7-point Likert scale.

Likert ratings were multiplied by complexity levels, producing derived scores for interestingness and pleasingness. These derived scores were tested with two-way analyses of variance for sex and VPI groups. Pleasingness and interestingness were compared by means of a t-test for related measures.
A comparison for sex differences demonstrated females preferred a significantly lower level of stimulus complexity than males on the dimension of pleasingness. The preference dimensions of pleasingness and interestingness were found to be significantly different, interestingness correlating with greater stimulus complexity and pleasingness correlating with less stimulus complexity. No significant differences were found between VPI groups. However, a trend emerged for pairs of VPI groups to cluster on the dimension of the difference between levels of complexity found most pleasing and levels of complexity found most interesting.

Conclusions

The results of this study allow us to conclude that the preference dimensions of interestingness and pleasingness are, for this sample, perceived as significantly different; further, interestingness is systematically correlated with higher levels of stimulus complexity and pleasingness with lower levels of stimulus complexity. This finding is consistent with previous research.

The evidence for differences between the sexes in their preferred levels of stimulus complexity occurs only for the dimension of pleasingness in this study. While statistically significant, this result is not in the direction suggested by previous research. We may conclude that, for this sample and these stimuli, females show significantly greater differences than do males between the levels of complexity they find most interesting and those they find most pleasing. This difference is due to the lower levels of stimulus complexity females find most
pleasing. This result does support the study of sex differences as a meaningful variable in research on preference for complexity, but is not very conclusive in determining the nature or direction of the sex difference.

The present findings do not support the conclusion of systematic differences occurring among personality groups (as determined by the VPI) on their preferred levels of stimulus complexity. The presence of a trend toward pairs of VPI groups differing from other pairs, however, prevents us from concluding that no systematic differences might exist. These results, then, do not support any firm conclusions at this time but do suggest that further exploration of the personality type variable may be productive.

Limitations

The sample used in this study may have limited the results in two important ways. First, while subjects in this study were carefully screened on the combined basis of VPI group, college major, and class rank, all the subjects were nevertheless college students on the same campus. This may have created a more homogeneous sample than if the same study were conducted with subjects living and working in a wider variety of environments. This homogeneity of subjects may have tended to minimize group differences.

The second important limitation of the sample is the inclusion of only four of Holland's six vocational groups (Artistic, Intellectual, Social, and Enterprising) and the exclusion of the two remaining groups (Realistic and Conventional). This decision was made largely on the
practical basis that the two excluded groups are not frequently found in a college population. For this very reason, however, they may have contributed to the discovery of group differences by providing a more heterogeneous sample. An additional limitation resulting from the exclusion of these two groups is the inability to further test the trend discovered in the data for pairs of VPI groups to cluster and differ from one another. The Realistic and Conventional classes, if the trend carries through, would form a third cluster and allow more complete analyses.

As discussed previously, the stimuli employed in this study may possess some qualities which have differing impact on men and women other than just their levels of complexity. It has been suggested that the rather mechanical appearance of the polygons may seem more familiar to males than to females. Previous research on stimulus complexity has employed a variety of stimuli - music, series of tones, paintings, series of lights, even types of humor. The abstract nature of the visual stimuli used here was intended to help screen out as many affective dimensions as possible, to focus on the dimension of complexity as the most relevant variable. Since the sex difference occurring in this study was in the opposite direction of previously reported sex differences, the nature of the stimuli may be one source of the variance.

The absence of sex differences in regard to the interestingness dimension might also be a result of the limitations of the stimuli used. Since interestingness has been found to relate to higher levels of stimulus complexity, the introduction of polygons in the higher
ranges of visual complexity would allow more expansion upward in the interestingness scores. For a college population, then, the range of stimuli employed in this study may have limited the preference ratings usually associated with the upper levels of stimulus complexity.

The use of Holland’s VPI as an instrument for the determination of personality type may have imposed some limitations on this study. Of all students screened for inclusion in this study, only 30% (approximate) qualified by the stated criteria. That is, less than one-third of the upperclass students tested were majoring in areas consistent with their VPI profiles. This may reflect on the choices students are making. However, it may also reflect on the validity of the VPI when only the top classification in the subject's profile is considered. While the VPI, when interpreted as a complete profile, may be useful as a counseling tool, its use as a screening device in research may be less appropriate.

A significant limitation of this study in the design was the use of a Likert scale for preference ratings. Since a Likert rating cannot indicate which stimulus is most preferred among a series, it was necessary to compute derived scores rather than work with just one preferred level of complexity. This complicates the interpretation of results, since the derived score reflects a subject’s response style (making extreme ratings or making more moderate ratings) as well as the level of stimulus complexity preferred. In computing the derived score it is also necessary to assume that the seven points on the Likert scale represent equal intervals, which is a questionable assumption.
There are notable limitations in the present study concerning the sample, the polygons used as stimuli, the use of the VPI as a screening instrument, and the type of preference ratings obtained. Recommendations for changes in these areas will be discussed below.

Implications

The first implications for future research to be considered will be the suggestions for changes in the design. Then the implications of the results obtained in this study will be explored.

Future research which may use the VPI vocational classifications as a determinant of personality types would be strengthened by the inclusion of all six categories, rather than the four studied here. This may necessitate moving outside the college subject pool, but the inclusion of a more diverse variety of subjects may aid the identification of differences between groups, if indeed differences exist. The sampling of all six classifications would also allow further testing of the clustering trend suggested in the present study.

The stimuli involved could be expanded to include more examples in the higher complexity range. This would allow a check on whether the similarity between sexes on their interestingness scores is really a reflection of similarity or whether it is an artifact of the ceiling imposed by the stimuli. Since there is a possibility that these particular stimuli may be more familiar to males than to females, it is recommended that further research might use a variety of types of visual stimuli to see if sex differences emerge among them.
The use of Holland's VPI as an independent variable reflecting personality type may be reconsidered in the future. At this time it seems useful as a general device, since the various groups represent personality types involving a variety of specific personality attributes. If differences are discovered among these groups, further research could move in the direction of distilling what personality variables most contribute to the differences in preference for complexity. It seems likely that variables such as cognitive complexity, authoritarianism, or internal versus external locus of control might be studied in the future for possible correlations with preference for complexity.

The use of a Likert scale for obtaining preferences ratings is not recommended in future research. Other methods, such as rank ordering or paired comparisons, would provide simpler data with which to work, since they would not require the computation of derived scores.

The results of this study strongly imply that future research should continue to produce results indicating a difference between the dimensions of interestingness and pleasingness and their respective interactions with stimulus complexity.

The present findings also suggest that future research on differences between sexes on preference for complexity would be useful. This study yields the presence of a sex difference, but no conclusive data on the nature of that difference. Since previous studies have reported sex differences in the opposite direction, it would be worthwhile to pursue this variable further to get more specific clarification.
The results of this study regarding the absence or presence of differences among personality types in their preference for complexity are inconclusive. While no significant differences emerged among the four VPI groups studied, a trend toward differences between pairs of groups was evident. This would be worth pursuing, both because of the information it may yield about relationships among VPI categories and also because it may help isolate some underlying personality dimensions which are systematically correlated with the preference for complexity.

The study of possible individual differences in preferred levels of stimulus complexity has a variety of potential applications for the social sciences in general and for counseling in particular. The results of the present research do not significantly confirm the existence of systematic differences, but neither do they conclusively reject the possibility. It is suggested that, with improvement and expansion of the design, this type of research still has some potential contribution to our understanding of human behavior.
APPENDIX

Polygons Used in Preference Ratings

Four-turn polygon (complexity level 1)

Eight-turn polygon (complexity level 2)
Twelve-turn polygon (complexity level 3)

Sixteen-turn polygon (complexity level 4)
Twenty-turn polygon (complexity level 5)
LIST OF REFERENCES


