Vocational Personality Type, Personality Characteristics, and Satisfaction with College Major: An Investigation of Holland's Theory

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VOCATIONAL PERSONALITY TYPE, PERSONALITY CHARACTERISTICS, AND SATISFACTION WITH COLLEGE MAJOR: AN INVESTIGATION OF HOLLAND'S THEORY

by

Kent Allen Laudeman

A Dissertation Submitted to the Faculty of The Graduate College in partial fulfillment of the Degree of Doctor of Education

Western Michigan University Kalamazoo, Michigan August 1975
ACKNOWLEDGEMENTS

Sincere appreciation and thanks are herewith extended to the many people who have provided advice, assistance, and encouragement throughout this investigation. I wish to extend a special thanks and appreciation to Dr. Paul Griffeth, who served as my committee chairman, and to Drs. Robert Betz and Imy Holt, who served as committee members. Sincere appreciation also is extended to Dr. William Martinson, who provided valuable assistance in the writing of the dissertation.

Special mention is due to the many university administrators, department heads, and faculty members who assisted me in the identification of the subjects and granted me valuable class time to administer the battery of instruments.

All of the students in each of the college majors who participated in this study were most cooperative and willing to expend their time and energy in completing the instruments. They graciously gave their best in responding to the questions and instructions presented within the instruments.

I also wish to thank my wife, Dianne, who has faithfully served as a research assistant, typist, reviewer, and reader. She willingly played the role of both father and mother to our two sons while the study was being conducted and written.

Kent Allen Laudeman

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VOCATIONAL PERSONALITY TYPE, PERSONALITY CHARACTERISTICS, AND SATISFACTION WITH COLLEGE MAJOR: AN INVESTIGATION OF HOLLAND'S THEORY.

Western Michigan University, Ed.D., 1975
Education, guidance and counseling

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CHAPTER I

INTRODUCTION

The Problem for Study

The problem and the central concern of this study was the investigation of the relationship between male college seniors' choice of major fields of study and their personality types, their value dimensions, and their satisfaction with college majors according to Holland's (1959, 1966b, 1973) theory of vocational choice.

The Problem and Its Background

A major problem in the field of counseling has been the assessment of individual interests to assist college students in preparing for career choices through appropriate college majors. Academic advisors and counselors in the high school and college setting invariably are asked by students and parents to assist or give direction to students who are seeking self-identity and a goal or vocation in life. Often the counselor hears the words, "I don't know what I want to do."

Litz (1968) and Chickering (1969) indicated that identification with a particular goal or occupation in life was essential in establishing the adolescent's or young adult's
ego identity. In looking specifically at college youth, McCrea (1971) and Rochester and McBride (1970) reported that only 19 to 24 percent of the graduating college seniors in various schools of academic training at two state universities had indicated their selection of a college major or vocation prior to entering college. If students could be assisted in their selection of a vocation and college major early in their college careers, then their college study might be more goal- or vocation-oriented.

To assist current college and college-bound students in understanding their interests, counselors have used interest inventories such as the Strong Vocational Interest Blank, the Kuder Occupational Interest Survey, the Holland Vocational Preference Inventory, and a few other interest-measuring instruments. Cottle (1968, p. 2) indicated that counselors and other professional personnel used interest inventories "to a considerable extent" in their work with college students and adults. In an assessment of the emphasis upon individual and group testing, Anastasi (1968) referred to society's growing unrest with the current testing movement. From these statements it was apparent that counselors made extensive use of interest inventories, but the results might be viewed with skepticism.

Consistent with Cottle's and Anastasi's references to testing, counselor training programs have provided general instruction in test selection, administration, and interpre-
tation. A prevailing frame of reference in most training programs has been that the results from the available instruments should be integrated with the information obtained from interviews and other sources. To further assist counselors and advisors who are conducting vocational interviews, it behooves the theorist and the researcher to provide the user of test instruments with as much information as possible concerning selected tools or instruments used in vocational counseling.

The Problem and Holland's Personality Types

One of the many problems that vocational theorists and researchers have acknowledged has been the relationship between variables of an individual's personality and his/her vocational choice or development (Williams, 1972). In particular, Holland (1959, 1966b, 1973) theorized that six specific personality orientations were related to vocational interests and preferences. He organized his personality orientations to include the Realistic, Intellectual, Social, Conventional, Enterprising, and Artistic types of personalities. Within each orientation, Holland described the personality type in terms of various career choices, personality attributes and characteristics, and value dimensions. These three aspects of Holland's theory are presented in the following subsections.
Personality types--
career choices

Holland (1966b; Holland & Whitney, 1968; Holland, Whitney, Cole, & Richards, 1969) proposed that the Realistic personality type made career choices as mechanical engineers, foresters, laborers, farmers, and mechanics, whereas the Intellectual type preferred career choices as electrical engineers, biologists, chemists, mathematicians, physicians, and dentists. The Social type selected career choices as elementary teachers, interviewers, counselors, nurses, and therapists, while the Conventional type chose careers as accountants, librarians, bank tellers, secretaries, and data processors. The Enterprising type of personality indicated career choices as marketing personnel, salesmen, business managers, politicians, promoters, and lawyers. The last personality type, the Artistic, made career choices as artists, musicians, poets, philosophers, and journalists.

Personality types--model attributes and characteristics

Holland (1959, 1966b) not only described his personality orientations in terms of vocational interests or choices, but also in terms of model personality attributes and characteristics. An examination of the Realistic type of individual revealed a person who enjoyed "activities requiring physical strength, aggressive action, motor coordination and skill,"
preferred "dealing with concrete, well-defined problems as opposed to abstract, intangible ones," and showed "a lack of social skills and sensitivities" (1959, p. 36).

According to Holland, the Intellectual type of individual preferred to "think through rather than act out problems" and avoided "interpersonal problems which require interpersonal actions with groups of people from day to day" (1959, p. 37).

A review of the Social type of individual identified a person who preferred "teaching or therapeutic roles, which may reflect a desire for attention and socialization in a structured . . . setting," who accepted "feminine impulses and roles," and who possessed "verbal and interpersonal skills." This type of individual was threatened by "situations requiring intellectual problem-solving or physical skills" and would rather "deal with problems through feelings and interpersonal manipulations of others" (1959, p. 37).

The Conventional type of individual leaned toward "structured verbal and numerical activities, and subordinate roles" and avoided "conflicts and anxiety aroused by ambiguous situations or problems involving interpersonal relationships and physical skills" (1959, p. 37).

An examination of the Enterprising type of individual revealed a person who tended to make use of "verbal skills in situations which provide opportunities for dominating, selling and leading others." These individuals perceived
themselves as strong masculine leaders. They avoided "well-defined language or work situations as well as situations requiring long periods of intellectual effort" (1959, p. 37).

The last personality model described by Holland was the Artistic type of individual. This type felt more comfortable with "indirect relationships with others" and dealt with "environmental problems through self-expression in artistic media." They avoided "problems requiring interpersonal interaction, a high degree of structuring, or physical skill." The Artistic personality resembled "persons with an intellectual orientation in intraceptiveness and lack of sociability" (1959, p. 37).

Personality types—values

Holland (1962, 1966b) also described each personality type as a "theoretical complex" that consisted of personality traits, "coping mechanisms," aptitudes, vocational and educational goals, "life styles," and individual or life values. With respect to individual values, Holland portrayed the Realistic type as a holder of conventional values and especially economic and political values. Conversely, for the Realistic type of personality, aesthetic values were of little or no importance (1962, p. 1).

Holland (1966b) depicted the Intellectual type as a holder of unconventional values, theoretical values, and, to a lesser extent, aesthetic values.
According to Holland (1966b), the Social type placed value in social, ethical, and religious activities, whereas the Conventional type of individual was described as one who placed low value on aesthetic and religious activities and high value on economic matters.

In his description of the Enterprising type of individual, Holland (1966b) portrayed this person as one who held high or strong economic and political values and low theoretical and aesthetic values.

A review of the Artistic type individual revealed a person who placed high value on aesthetic activities and matters and, conversely, gave little or no importance to political and economic values.

In summarizing Holland's theoretical conceptualizations, it was evident that by knowing the personality type of a person, a prediction of the individual's vocational choice could be made (Osipow, 1973; Osipow, Ashby, & Wall, 1966).

Emanating from this theoretical background, a number of studies contributed empirical evidence to support Holland's theory of personality types and concomitant choice of occupational activity. However, most of these studies used high school National Merit Scholarship finalists (Holland, 1962, 1963); college freshmen (Osipow, Ashby, & Wall, 1966; Wall, 1969; Wall, Osipow, & Ashby, 1967; Walsh & Barrow, 1971; Walsh & Russell, 1969); college freshmen, with a
follow-up during their sophomore year (Holland, 1968); counseling center subjects (Bohn, 1966; Frantz, 1972; O'Shea & Harrington, 1972); selected and limited groups of college majors (Morrow, 1971; Van Hall, 1969; Wall, 1969); and small groups of college graduate students (Williams, 1972).

As an alternative approach in testing Holland's theory of vocational choice, the current investigation focused upon the vocational interests, personality type, value characteristics, and satisfaction with college major of six different groups of male senior undergraduate students at Western Michigan University. Each group was selected to represent one of Holland's vocational personality types, through the following majors: mechanical engineering (Realistic), electrical engineering (Intellectual), elementary education (Social), accounting (Conventional), marketing (Enterprising), and art and music education (Artistic). Male college seniors were selected as subjects for the present study to test Holland's theory and Vocational Preference Inventory (VPI) because they constituted a representative group of students who, as Osipow, Ashby, and Wall (1966) indicated, would be more "certain" of their occupational choices. Holland (1966a), also, indicated that greater confidence could have been placed in his results if he had used college seniors. Thus, he suggested indirectly that a sample should be drawn to represent this group.
Purpose of the Study

The purpose of this study was to investigate selected relationships as they pertained to Holland's Vocational Preference Inventory and Holland's theory of vocational choice. Specifically, this study was designed to use six groups of male college seniors, representative of the various personality types, to validate Holland's postulates of personality types, value dimensions, and satisfaction with college major. The investigators and researchers cited in the previous paragraphs did not use college seniors to represent each of Holland's personality types in an assessment of the validity of the VPI and other theoretical concepts and constructs proposed by Holland. Therefore, the present study directed itself toward answering the following questions:

1. Do college seniors, representing Holland's six personality types, select college majors that correspond with their primary personality types as measured by the Holland VPI?

2. Do college seniors, representing Holland's six personality types, hold Allport-Vernon-Lindzey Study of Values dimensions that correspond with their personality types?

3. Are college seniors, who have selected college majors corresponding to their personality types, more satisfied with their choices of college major?

Answers to these three questions would help the vocational theorist, counselor, and others in understanding the VPI and Holland's theory of vocational choice.
Significance of the Study

This investigation of Holland's theory of vocational choice and the validity of the VPI may provide information concerning the vocational personality type of students in six different college majors at Western Michigan University. The data and results may substantiate several aspects of Holland's theory of vocational choice and provide support for the VPI in its ability to differentiate vocational interests and personality classifications. The findings, discussion, and conclusions may provide additional information for high school counselors, college vocational counselors, and other professional personnel to assist them in understanding and utilizing Holland's theory and his VPI.

Limitations of the Study

The results of this study and, consequently, the analysis of data and discussion of the sampled groups were limited to the individual responses recorded on the Holland VPI, the Allport-Vernon-Lindzey Study of Values (AVLSV), and the constructed Attitude Toward College Major (ATCM) questionnaire. Although the instruments were administered to all subjects comprising the six groups during a brief period of time, various uncontrollable individual and situational variables could have influenced each individual's responses to one or all of the instruments.
Since the subjects used in the study included only senior-level college students pursuing major programs, general inferences should not be made to other student populations who do not resemble the major classifications or general institutional characteristics.

A third aspect of this study that received serious consideration was the limitation of the ATCM instrument to assess the subject's satisfaction with his college major. The questionnaire was developed to measure the degree of the student's general satisfaction with his college major. A review of the literature failed to identify a comprehensive instrument of more than three questions for the assessment purposes desired in this study. Therefore, an appropriate instrument (Appendix D) was developed for this study.

Assumptions

The following assumptions were made to derive the rationale for the methodology used in the study, the discussion and conclusions written from the data obtained, and the suggested recommendations for future research. It was assumed initially that the male college students selected from the six specific college majors were representative of Holland's six personality types. In addition, it was assumed that the college students selected in the various college majors were representative of all students found in the respective majors at Western Michigan University. Lastly,
the assumption was made that the three instruments used in this investigation provided valid, reliable, and objective measures of the subject's vocational interests and personality type, value characteristics or dimensions, and satisfaction with choice of college major.

Definitions

To facilitate the understanding of various terms used in this study, the following definitions were adopted for the present investigation:

**Seniors** were defined as those undergraduate students who had successfully completed a minimum of 86 semester hours of university credit and were pursuing coursework toward the completion of one of the selected majors.

**Mechanical engineering majors** were defined as those students who were classified as seniors and had declared mechanical engineering technology as their college major.

**Electrical engineering majors** were defined as those students who were classified as seniors and had declared electrical engineering technology as their college major.

**Elementary education majors** were defined as those students who were classified as seniors and had declared elementary education as their field of study. Choice of subject matter major areas varied, but all programs were designed to lead toward a baccalaureate and fulfillment of certain requirements necessary for certification as
elementary school teachers.

**Accounting majors** were defined as those students who were classified as seniors and had declared accounting as their college major.

**Marketing majors** were defined as those students who were classified as seniors and had declared marketing as their college major.

**Music and art education majors** were defined as those students who were classified as seniors and had either declared instrumental or vocal music education or art education as their college major.

**Primary vocational personality type** was defined as the dominant personality type among the Realistic, Intellectual, Social, Conventional, Enterprising, and Artistic personality orientations as measured by the scales of the Holland VPI. Operationally defined, the highest scale score among the six scales identified the primary vocational personality type. For the current study, vocational interests corresponded with the personality types as measured by the VPI.

**Value characteristics** were defined in terms of Spranger's (1928) six types of men. These were the Theoretical, Economic, Aesthetic, Social, Political, and Religious as measured by the AVLSV. Operationally defined, the six corrected scale scores were used to identify an individual's value dimensions.

**Major satisfaction** was defined as the degree of the student's satisfaction toward his college major as measured
by the 10 items of the ATCM questionnaire.

Overview

In Chapter I, the problem and its background were introduced. Also presented were discussions of Holland's personality types, the purpose and significance of the study, the limitations of the study, the assumptions relative to the study, the definitions for the terms used in the study, and a brief overview of the organization of the dissertation. Chapter II contains a review of the literature and research pertaining to the VPI, values as related to personality type, and satisfaction with college major. In Chapter III, a procedural overview is presented which includes methodology, subject selection, data collection, instrumentation, testable hypotheses, and methods of analyzing the data. Chapter IV contains a report of the findings and an analysis of the collected data. Chapter V consists of a summary of the findings, a discussion of the results, and suggestions for further research and study.
CHAPTER II

REVIEW OF LITERATURE

Chapter II contains, primarily, a review of the published literature and related research pertaining to Holland's theory of vocational choice. First, a brief overview is presented of several theories that propose a relationship between the individual's personality and vocational choice. The next section covers an assessment of subjects used in previous investigations of Holland's theory. Following the subject assessment, a review of literature and research concerning Holland's model orientations is presented. The next section provides a review of the literature relating Holland's personality types and value characteristics. The final review section covers student satisfaction with choice of college and college major. Chapter II is concluded with a summary of the published literature and related research relative to Holland's theoretical concepts.

Theories of Vocational Choice

Holland was one of several theorists who explored the relationship between personality variables and occupational choice. Super, Starichevsky, Matlin, and Jordann (1963) and Tiedeman and O'Hara (1963) developed theories on how an individual acquires self-knowledge and then implements his
self-concept through an appropriate vocational choice. Ginzberg (1972); Ginzberg, Ginsburg, Axelrod, and Herma (1951); Super (Whitley & Resnikoff, 1972); and Tiedeman (1961) related the individual's growth and personality in a developmental approach to occupational choice.

Bordin, Nachmann, and Segal (1963) and Brill (1949) related career choices to personality in terms of psychoanalytic concepts. Bordin et al. attributed career choice to a number of "psychic dimensions or body zones" (Osipow, 1973, p. 110) which are influential in vocational choice. Brill concluded that the process of sublimation plays the key role in career choices.

Hoppock (1957), Roe (1956), and Holland (1966b, 1973) were other major theorists who attributed personality variables to occupational choice. Hoppock emphasized individual needs and the satisfaction of needs through occupational choices. Roe proposed that the individual's early family environment influenced his development of needs which were expressed through the selection of vocations that were primarily people- or non-people-oriented.

Like Roe, Holland proposed that personality typologies are integral elements of his theoretical conception of occupational choice. Osipow (1973) described Holland's theory as a marriage between two streams of thought in vocational psychology, one of them popular and the other novel. The popular conception . . . is . . . that career choices represent an extension of personality and an attempt to implement broad behavioral styles in the context of one's
life work. The novel feature . . . is that the notion that people project their views of themselves and the world of work into occupational titles. (p. 41)

A more detailed description of the personality attributes related to Holland's six model typologies was presented in Chapter I above.

To provide an assessment of vocational interests, Holland (1958) developed, on an a priori basis, the Vocational Preference Inventory (VPI) to measure 8 personality characteristics or behavioral styles of an individual. Since the original instrument, the revised VPI (1965) has been used primarily to assess vocational interests as they relate to personality types rather than as a general personality instrument (Johnston, 1972; Lohnes, 1972).

Holland (1966b) also contended that "people in a vocational group have similar personalities" and "will respond to many situations and problems in similar ways" (p. 6). In this respect, the subjects selected to represent Holland's six personality orientations should respond with great similarity to the scales of the VPI, the scales of the Allport-Vernon-Lindzey Study of Values (AVLSV), and the Attitude Toward College Major (ATCM) questionnaire measuring college major satisfaction.

Assessment of Subjects Used in Earlier Studies

In reviewing related studies and literature, no investigation was identified that used the VPI to assess or classify the personality types of senior college students representing
Holland's six personality orientations. Holland's initial study (1962) concerned senior high school National Merit Scholarship finalists. In the most recent study, researchers (Gaffey & Walsh, 1974) used the VPI with male subjects whose ages ranged from 26 to 71.

Holland and other investigators, in their studies of the model orientations, used samples of National Merit Scholarship finalists, counseling center subjects, high school subjects, college freshmen and sophomores, samples representing one or two model orientations, graduate students, and employed adults.

Several arguments against the studied samples are presented as rationale for using college senior subjects as a validating group for Holland's theoretical orientations.

Borgen (1972) reported that National Merit Scholarship finalists typically obtain median scores exceeding 725 on the math and verbal scales of the Scholastic Aptitude Test (SAT). As few as 2 percent obtain scores lower than 600 on either sub-test of the SAT. With these scores, National Merit Scholarship finalists represent approximately 3 percent of the college population and have the academic skills to pursue virtually any college major and occupation. Any generalizations of findings from samples of National Merit Scholarship finalists should be reviewed with caution.

Bohn (1966) and Goodstein, Crites, Heilbrun, and Rempel (1961) indicated that counseling-center subjects may differ
in personality traits from non-counseling-center subjects.

Lehmann (1963) and Sanford (1956, 1967), in an investigation of personality characteristics of college freshmen and seniors, discovered that the personality characteristics, although present during the freshman year, become most pronounced during the senior year. Walsh and Lacey (1969) and Walsh, Vaudrin, and Hummel (1972) reported that males in some model orientations perceived themselves as changing in a direction consistent with their personality type.

Campbell (1968); Leonard, Walsh, and Osipow (1973); and Osipow, Ashby, and Wall (1966) alluded to the problem of using freshman subjects in vocational choice research: most of these students had not made any commitment to a vocation. Rochester and McBride (1970), in a study of college seniors, discovered that less than 3 percent chose their college majors after reaching their senior year. During a follow-up study of 403 seniors who represented 30 percent of their graduating class and who changed their major during their college career, Pierson (1962) discovered that 29 percent had changed their major during their freshman year, 45 percent during their sophomore year, and 26 percent during their junior year.

Caution also must be exercised when using graduate students in identifying or describing Holland’s personality orientations. Frantz and Walsh (1972) stated that personality and interest dimensions of graduate students may be influenced
by the "intellectual component" of the graduate school environment.

At least one study provided support for using college seniors as a validating group for Holland's theoretical concepts. Gross and Gaier (1974) sampled male college seniors, classified by college majors, and asked them to respond to self-ratings of Holland's personality types. Significant relationships were discovered between self-rated personality stereotypes and college majors. Gross and Gaier concluded that the degree of student "decidedness" was the most crucial factor affecting self-ratings in terms of Holland's theoretical concepts.

In summarizing the review section on subject selection, Osipow, Ashby, and Wall's (1966) suggestion was appropriate in that "maximum support for the theory [Holland's] is likely to be derived from data on those who are 'certain' of their choices" (p. 42).

Review of Literature Pertaining to Holland's Model Orientations

The first of several studies by Holland (1962) showed that two samples of National Merit Scholarship finalists responded with certain personality variables that were significantly related to the model orientations. Many of these variables were described in Chapter I. In addition, Holland found extracurricular activities, hobbies, fathers' values,
mothers' attitudes, choice of careers and major fields, and changes in vocational choice to be related to his model orientations. The VPI predicted correctly the major field of study for 33 percent of the males in both samples used in Holland's initial study. Since chance expectations were 16 percent, Holland concluded that the results were substantial.

Holland's second study, a four-year longitudinal study, used an earlier group of National Merit Scholarship finalists who were classified into his six model orientations through six scales selected from the Strong Vocational Interest Blank (SVIB). Again Holland concluded that subjects reported, through self-ratings and other personality measures, personality characteristics corresponding with the predicted personality type. In the prediction of senior college majors from the student's dominant personal orientation, as measured by the SVIB high-point code, Holland found that 34 percent of the male subjects were correctly identified. The chance expectancy was again 16 percent. For the prediction of vocational choice, the SVIB high-point code correctly identified 29 percent of the college senior choices. These results were consistent with those of Holland's initial study. In both the 1962 and 1963 studies, stability in major field was associated with the Intellectual and Realistic orientations, whereas change to other majors was associated with the remaining orientations.
In general, Holland (1963) concluded:

Students with different dominant personal orientations . . . have significantly different attributes, including scholastic aptitudes, self-concepts . . . personal traits, originality, daydreams, college majors, career choices, preferred roles, and achievement. (p. 592)

Holland and Nichols (1964), in a second one-year longitudinal study, investigated the change in college major-field plans for a National Merit Scholarship finalist sample. Each subject was asked during his senior year in high school to indicate his preference for a major field of study. Each subject's initial preference was then compared with major-field intention plans at the end of his freshman year. The results of a questionnaire containing choice of major field, personal history, and an inventory of 17 personality instruments indicated that a subject left a particular field of study because he lacked personal traits, self-concepts, and aptitudes associated with students in his original choice of major. Major "changers" ranked "interest, or lack of interest, in course content" and the "appeal of future occupational duties" (p. 239) as the primary reasons for changing majors.

Holland (1966a) asked freshman subjects to indicate their choices of college majors and vocations and to respond to a number of survey instruments. From these data, Holland constructed his psychological classification scheme for vocations and major fields. On the basis of the primary VPI scale, subjects were assigned to one of the model orientations. Second highest and third highest scale responses
provided the assignment to subgroups within an orientation model. As a result of the data collected from the spring male sample, students in the model orientations did differ significantly in self-ratings, competencies, life goals, and personal traits. From the results of a second analysis of both the spring and fall samples of males, Holland concluded that the VPI scales discriminated significantly among the six personality orientations.

Holland (1968), in a second study of the previous sample, discovered that subjects classified by their highest, two highest, and three highest VPI scale scores showed significant differences at the .05 level of confidence among his six personality orientations. Competencies, life goals, self-ratings, and personality and attitudinal scales all differed significantly. In addition to the comparison among vocational orientations, Holland compared the predictive value of the VPI high-point code against the student's first expressed vocational choice relative to the student's final vocational choice. A follow-up study, eight months after the initial survey, revealed correct final vocational choices were predicted from a low of 21 percent for the Artistic class to a high of 51 percent for the Intellectual class, by using the high-point VPI scale. Respective high and low predictions for the initial self-expressed vocational choices ranged from 63 percent for the Artistic class to 71 percent for the Conventional class. Even higher percentages were obtained.
when the subject's first two initial vocational choices fell within the same vocational class. The same comparisons were made on the fall sample. For this group, the time interval for the follow-up study was one year rather than eight months. Again Holland reported that the second analysis, without exception, duplicated the initial findings. As a result, Holland (Holland & Lutz, 1968) concluded that the "expressed vocational choices are clearly and substantially superior to the VPI" (p. 431).

Holland also used vocational choice stability to test his concepts of consistency, homogeneity, and institutional influence. Holland (1966b) referred to consistency as the patterning or profiling of the VPI codes and the corresponding pattern in the vocational choice or environment. Homogeneity was represented by the degree of spread between the highest and lowest VPI scale scores.

In 11 of 12 comparisons comprising both the male spring and fall samples, the percentage of non-changing students was greater for the consistent group than for the inconsistent group. Holland defined the consistent group as those individuals who had VPI scale codes that corresponded with their vocational choice codes, whereas the inconsistent group contained those individuals whose VPI scale codes did not correspond with the code of their vocational choices. However, in a review of the 12 comparisons, only 4 were significant.

For homogeneity, the male profiles were classified as
having either a high, medium, or low homogeneity. The results clearly supported the homogeneity hypothesis for men in that spiked profiles were significantly related to stability of vocational choice, whereas flat profiles were related to instability.

The last portion of Holland's 1968 study assessed the relationship between stability of final vocational choice and the institutional environment categorized by the Environmental Assessment Technique (EAT) in Astin and Holland (1961). Computation of the EAT scores revealed the model orientations in terms of Realistic, Intellectual, Social, Conventional, Enterprising, and Artistic for the subject's institution. Positive correlations were found between the stability of an individual's final vocational choice and a corresponding model classification of the institution. However, for the male sample the relationship was significant for only 2 of the 25 institutions.

In 1968, Holland used more representative freshman subjects and duplicated the research effects of his earlier studies. Holland presented some support for his theoretical concepts of consistency, homogeneity, and institutional influence.

With the results of the 1968 study and the Holland and Lutz (1968) report, Holland concluded that greater emphasis should be given to the self-expressed vocational interest rather than the inventoried interest. Campbell (1968), in
debate of this conclusion, indicated that too much validity was given to the use of a college freshman's expressed career choice. Rather than argue the merits and weaknesses of expressed interests versus inventoried interests, the present investigation attempted to measure the relationship between inventoried interests as measured by the VPI and expressed interest as determined by an individual's persistence in a college major.

Several recent investigations of Holland's vocational personality postulates have explored the relationships between Holland's personality typology and responses on the VPI or similar interest-measuring instruments (Cole, Whitney, & Holland, 1971; Holland, Whitney, Cole, & Richards, 1969; Wakefield & Doughtie, 1973). In 1969, Holland et al. proposed a hexagonal model configuration of the six personality types. The similarity or dissimilarity between the personality types was depicted by the distance between the points representing each of the personality orientations. Both of the studies by Cole et al. (1971) and Wakefield and Doughtie (1973) used intercorrelation and factor-analysis techniques to measure the relationships between the six personality types. In each of these studies, results were presented that indicated the personality types were interrelated, as Holland had indicated in his proposed hexagonal model.

An interpretation of the obtained results from the recent investigations provided empirical data to support
the correspondence between Holland's personality typology and the theoretical constructs used in measuring the factors contributing to the individual's occupational orientation.

In summary, several studies have contributed data and results to support Holland's proposed theoretical model of personality types and occupational orientations. The current study was designed to investigate the proposed personality typologies and other variables, such as value dimensions and satisfaction with college major, that are related to Holland's theory of vocational choice.

Review of Literature Concerning Holland's Personality Types and Value Characteristics

Early studies by Duffy (1940), Harris (1934), Jacob (1957), Rosenberg (1957), and Sternberg (1953), provided data to support the concept of a relationship between college majors or occupational choices and values as measured by the Allport-Lindzey Study of Values (AL-SV). Studies by Folsom (1969), Gray (1963), Poe (1954), Simpson and Simpson (1960), and Underhill (1966) used instruments other than either an early or later edition of the AL-SV to assess the proposed relationship. This section of the review of literature on college major or occupational choice type, as associated with predicted value dimensions, is concluded with studies by Johnson and St. John (1970), Kirchner and Hogan (1968), Munns (1972), and Williams (1972), which utilized the latest
In an early study of undergraduate male students majoring in arts (including some men in law, medicine, and teaching), business, and engineering (excluding chemical engineers), Harris (1934) discovered differences in student responses to the AL-SV theoretical, political, aesthetic, and religious scales. Significant differences were identified on the theoretical value responses in a comparison of arts students with business and engineering students. The group means for the comparisons were ranked as follows: (1) the arts students received the highest mean score, (2) the engineering students received the middle mean score, and (3) the business students received the lowest mean score.

Harris also indicated that significant differences were found in all group comparisons on the political scale. The group means used for the political value scale were ranked as follows: (1) business, (2) engineering, and (3) arts. For the aesthetic value scale, significant differences were found in a comparison of the arts students with the engineering and business students. No differences were discovered between the business and engineering students. The social value scores produced no significant differences between the three curricular groups. Harris also computed mean value scores for several vocational choices. Of concern in this study were the vocational choices in business and general engineering where the highest scores were obtained on the
political value scale. The highest theoretical value scale scores were obtained by students pursuing teaching and chemical engineering. General engineering students scored lowest on the aesthetic value scale.

Duffy (1940) reviewed several early studies by Duffy and Crissy (1940), Schaefer (1936), and Van Dusen, Wimberley, and Mosier (1939), who investigated AL-SV value responses as they pertained to college students who selected various college majors or indicated different vocational choices.

In an evaluation of the early studies, Duffy (1940) concluded:

There are characteristic differences between the evaluative attitudes of students in different colleges, between students in different fields of study within the same college, between individuals in different occupations . . . . (p. 609)

A thorough investigation of the early work concerning the AL-SV through Duffy's review lends considerable support to Holland's value characteristics attributed to his six personality types.

In a more recent study using the AL-SV, Sternberg (1953) examined the differences in interests, values, and personality among students studying in nine major groups comprising the sciences, social sciences, business-economics, and humanities-music. He concluded that students majoring in different fields differed significantly in value characteristics as measured by the AL-SV.

During 1957, two major pieces of literature relating to
values were introduced by Jacob and Rosenberg. Jacob (1957) discussed the constancy of basic values and indicated that values held by students when they arrived at college were "integral elements of their personality" and did not change when they left the institution as seniors. In a review of several studies that used the AL-SV, Jacob discovered that the investigations "convincingly demonstrated" the constancy of freshman and senior responses. The few differences that were discovered were not statistically significant.

In a review of values and the impact of the student's major field of study upon his values, little evidence was found to support the hypothesis that the individual's major field of study produced changes in values (Jacob, 1957). However, in a review of the AL-SV literature, Jacob did discover differences in values held among various college majors. Students in business showed higher economic values and lower social and aesthetic values in a comparison with theological or medical students. In an evaluation of engineering students, Jacob found these students to be most like business students. A comparison of physical education majors and social science majors showed the former group to be socially concerned and to place less value on material satisfaction.

Jacob reported that a new revision of the AL-SV did not distinguish differences in values held by various majors in several other studies. Several inconsistencies were discussed, but no specific conclusions were drawn regarding the
conflicting findings.

Rosenberg (1957) emphasized the individual's personality structure in terms of values as they related to occupational choice. He stated:

Whenever an individual makes a selection from a given number of alternatives, it is likely that some value is behind the decision. An occupational choice is not a value, but is made on the basis of values. For a value is a conception . . . of the desirable . . .; values are "things" in which people are interested--things they want, desire to be or become, feel as obligatory, worship, enjoy. When an individual chooses an occupation, he thinks there is something "good" about it, and this conception of the "good" is part of an internalized mental structure which establishes priorities regarding what he wants out of life. (p. 6)

In discussing the criteria for career choice, Rosenberg (1957, pp. 11-13) proposed three value complexes. These were (1) the "opportunity to work with people rather than things," or the "people-oriented" value complex; (2) the "chance to earn a great deal of money and give me social status and prestige," or the "extrinsic-reward-oriented" value complex; and (3) the "permitance to be creative and original and opportunity to use my special abilities or aptitudes," or the "self-expression-oriented" value complex.

In an evaluation of 18 major occupations, Rosenberg (1957, pp. 16-17) concluded that teaching--in contrast to art, engineering, and business--was more "people-oriented." Business and engineering were more "extrinsic-reward-oriented" than art or teaching. The "self-expression-oriented" value
complex was greatest for art, engineering, and teaching, while the business occupations strongly de-emphasized self-expression in work.

Simpson and Simpson (1960) investigated the interaction of values, personal influences, and occupational choice of three occupational classifications developed from Roe's (1956) typology. The subjects included undergraduate males enrolled in sociology classes at a southern university and a midwestern university. Their findings concerning values and occupational choices were similar to those of Rosenberg (1957). In a comparison of students in business occupations, scientific and aesthetic occupations, and general cultural occupations, Simpson and Simpson (1960, pp. 122-123) found that the business students showed greater value in "drive for income," advancements, and promotions than did either of the two remaining occupational groups. The scientific-aesthetic group (represented by premedical students, chemists, artists, and journalists) showed greater concern for social prestige and status and were less likely to emphasize income values. In contrast, the general-cultural occupational group (represented by teachers, ministers, and lawyers) was the least likely to cite prestige, advancement, esteem, or recognition. Conversely, they were more likely to rank "opportunity to be helpful to others or make contributions to society" as one of their highest occupational values.

Four additional investigations, that had implications
relative to the present problem, studied values as measured by instruments other than the AL-SV. Poe (1954) studied the differential value patterns of two samples of senior men in business administration and in the teachers' college with a constructed instrument, the Inventory of Values. His results indicated significant differences between the potential teachers and businessmen on material, intellectual aesthetic, and humanitarian values. Teachers' college men were higher on intellectual, aesthetic, and humanitarian values, whereas the business administration men were higher on material values.

In 1963, Gray used the Edwards Personal Preference Schedule (EPPS) and the Miller Occupational Values Indicator (MOVI) to investigate the needs and values of 50 adult accountants, engineers, and secondary teachers. No science or math majors were included in the latter group. From the MOVI values, Gray found significant differences between the teachers and the accountants. The teachers were higher on the social rewards value than the accountants, but lower on prestige and career satisfaction values. In comparisons between teachers and mechanical engineers, similar significant results were found as in the comparison between teachers and accountants. A comparison of the accountants and the mechanical engineers revealed that accountants were significantly higher on the prestige value than were the engineers.
Underhill (1966) studied student values with a self-administered questionnaire that was given to more than 33,000 college seniors in 135 universities. The students were categorized by major occupational fields which included education, humanities, business, and engineering. From the responses to the questionnaire, three value orientations were derived. The three value indexes were: (1) intellectualism, consisting of the values of ideas and originality and the adjective "intellectualism"; (2) enterprise, consisting of the values of money and leadership and the adjective "ambitious"; and (3) people orientation, consisting of the values of people and helpfulness. The most consistent value configurations were as follows: humanities—a combination of people orientation and intellectual values; education—people orientations alone; business—the enterprise value; and engineering—intellectualism in combination with enterprise.

Folsom (1969) used the College Student Questionnaire (CSQ) to investigate Holland's theory of vocational choice and the accuracy of his personal characteristics ascribed to the six personality types. Since the CSQ listed 69 college majors, freshman students' responses to the occupations were classified by judges into Holland's personality types. The CSQ provided a pool of information regarding student characteristics that corresponded to Holland's personality characteristics. Folsom hypothesized that no significant
differences would be found between the personality types when compared on the CSQ scales. The males representing the personality types differed significantly on the liberalism and cultural-sophistication scales of the CSQ. For the liberalism scale, the Intellectual personality type scored significantly higher than did males classified as Realistic. On the cultural-sophistication scale, the Artistic personality type scored significantly higher than all other personality types, with the exception of the Social type. On the same scale, Folsom's results also showed that the Social and Enterprising types scored significantly higher than either the Realistic or the Conventional males. A total review of Folsom's findings was generally supportive of Holland's personality types.

Some contradictions occurred in the combined assessment of male and female subjects used for the study. In particular, the Realistic group, second to the Artistic group, received the next highest mean score on the cultural-sophistication scale. Holland (1966b) stated that the Realistic personality type places low value on aesthetic matters. The results of this contradiction must be interpreted with caution, since the combining of the sexes and the small sizes of a few of the personality types may have influenced the results.

Kirchner and Hogan (1968) used the AVLSV to study the value patterns of college seniors preparing for teaching in
three curriculums: elementary education, special education, and secondary education. Although the independent variable was instruction in a required philosophy-of-education course, they found no significant differences in value change over a period of six months to one year. The consistency of the value patterns lends support to the earlier reports presented by Duffy (1940) and Jacob (1957). A second item observed in this study was the significant difference in the aesthetic scale value of females majoring in elementary education when compared with aesthetic scale values of females majoring in secondary education. The future elementary teachers scored much higher on the aesthetic value scale. Holland et al. (1969), in coding the VPI scales, gave the artistic scale a similar coding for female elementary teachers and many secondary teaching majors. However, in a review of the highest scale values for the male elementary teaching code, the artistic scale did not appear.

A major conclusion of the Kirchner and Hogan (1968) study was that in a comparison of females and males the latter group tended to score higher on the theoretical, economic, and political scales, but lower on the religious and aesthetic scales than did the female group.

Kirchner and Hogan, in a comparison of male education majors with Helton and Korn's (1964) industrial administration and engineering majors, noted that education students
scored 6 to 9 points higher on the social scale of the AVLSV than did either of the latter groups.

Further information regarding the relationship between vocational choices and values, as obtained in response to the newer edition of the AVLSV by freshman engineering majors, was provided by Munns (1972). The three highest mean scale scores were recorded for political, economic, and theoretical values while the lowest scores were obtained on the aesthetic, social, and religious value scales. Munns concluded that the values expressed by his subjects conformed more with peer values rather than parental values. Irrespective of the source of the value influences, Munns's engineering subjects indicated values during their freshman year of study that corresponded with Holland's postulated value conceptions for engineers in the Realistic personality type.

The review of literature concerning values as measured by the third edition of the AVLSV, and their relationship to Holland's personality types as represented by various college majors, is concluded with the presentation of studies by Johnson and St. John (1970) and Williams (1972). Johnson and St. John administered the AVLSV to males representing engineering technology, business administration, and liberal arts at a community college, and found no significant differences on any of the value scales. Williams used male graduate students from 18 different departments and classified them according to Holland's six personality types.
Williams found life values, as measured by the AVLSV, to be significantly related to the subject's choice of occupation as designated by his graduate college major. The classifications derived from a discriminate analysis showed the life values to be differentiated best in the Artistic and Intellectual groups and least in the Realistic and Conventional groups.

In summarizing the postulated relationship between values and personality types or occupational choices, researchers generally supported Holland's (1959, 1966b, 1973) value conceptualizations. Several inconsistencies have been noted, however, and it was the purpose of the present study to test and clarify value orientations as they relate to the various personality types.

Student Satisfaction with College and College Major

A review of the literature failed to disclose a systematic study of the relationship between a student's choice of college major and his satisfaction with college major across Holland's six personality types. A comprehensive, objective assessment instrument such as a college-major satisfaction questionnaire was not used to assess college seniors' satisfaction with their major fields of study. Holland (1966b), in his theoretical description of vocational choice, postulated vocational satisfaction depends on "the congruency between one's personality and the environment (comprised
largely of other people) in which one works" (p. 6). This concept of satisfaction was related to the problem proposed for study in this investigation.

A number of studies were conducted to determine a student's satisfaction with his choice of college (McConnel & Heist, 1962; Richardson, 1970). Newcomb and Wilson (1966) and Sanford (1962) indicated that student satisfaction concerns the relationship between the student and his assimilation into the culture of the campus. Cram (1969) discovered that student satisfaction was not dependent upon the size of the student's class. Lewis (1969), in an investigation of students' real and ideal college perceptions, found that students with congruent perceptions were more satisfied with their college choice.

In a study of numerous variables and student satisfaction, Diedrich and Jackson (1969) concluded that student satisfaction was not related to achievement or ability. Additional research, by Collins and Sedlacek (1970), contributed supportive data for the absence of a relationship between a consistent attitude pattern and student ability.

Recently, in an investigation of several variables affecting student satisfaction, Schmidt and Sedlacek (1972) indicated that student dissatisfaction among those who experienced the most difficult adjustment to college occurred in the selection of a major field of study or a career. Their results were consistent with the findings by Grienecks
(1969) and Waterman and Waterman (1970), who discovered that some forms of satisfaction were related to the student's ego identity.

Schmidt and Sedlacek (1972) suggested that student ego identity involves the congruent identification of a particular occupation or choice of major leading to a potential occupation. In fact, according to Schmidt and Sedlacek, this particular aspect of selecting a major contributed more to student dissatisfaction than did variables such as studying efficiently, getting to know other students, meeting expenses, getting to know faculty, earning satisfactory grades, budgeting time, and being away from home and friends.

Hecklinger (1972), in his review of a number of studies concerning the relationship between uncertainty in vocational plans and student differences (Abel, 1966; Baird, 1969; Bohn, 1966; Watley, 1965; Williamson, 1937), discovered that there were no consistent results. However, in an investigation of the relationship between student commitment and student performance, Thompson (1966) found that the stronger the commitment by the student, the more likely he was to persist in his field and to complete his college work. Hecklinger, in his study of 356 college juniors at Trenton State College, used the CSQ to determine students' satisfaction with their majors. He used both decided and undecided students. Significantly lower scores concerning satisfaction with college majors were found for those students who were undecided, in contrast to
those who were decided. Hecklinger's findings were significant for both long-range and immediate post-college plans.

Hecklinger's findings also supported those of Harren (1966), who suggested the student's perception of major choice and occupational choice was a single problem. It appeared that a student's selection of a college major prior to his senior year had implications relative to his vocational career. This observation was highlighted in a five-year postgraduate study by Sharp and Krasnegor (1966), who found that students had selected positions correlating with their undergraduate majors.

In an investigation of college seniors' satisfaction with their college majors, Rochester and McBride (1970) discovered, in responses to a "yes" and "no" satisfaction questionnaire, that 91 percent of first-semester college seniors were satisfied with their college majors, while 7 percent were dissatisfied. However, they discovered some contradictions when they reviewed the results from a question inquiring whether the student would change his major. If their graduation dates were not affected, 15 percent of the students stated that they would change majors. From this study it was concluded that a simple yes/no satisfaction question did not assess students' satisfaction with their college majors.

Considering the reviewed studies, a number of variables were related to the student's satisfaction or dissatisfaction
with his college or his college major. Some of the factors were: (1) culture of the campus, (2) perception of the campus, (3) class size, (4) achievement or ability, (5) selection of college major, and (6) occupational choice. At least one study explored the relationship between ego identity and the student's selection of a college major. None of the cited studies used a comprehensive satisfaction questionnaire to assess the student's satisfaction with his college major in terms of specific personality traits.

Satisfaction with College Major and Student Personality

As recently as 1971, in discussing related studies reported in the literature, Sherrick, Davenport, and Colina (1971) expressed surprise in finding very little empirical investigation correlating student personality and satisfaction with college major.

Norman and Redlo (1952), in an assessment of Minnesota Multiphasic Personality Inventory (MMPI) personality patterns of college seniors, observed similarities on the MMPI scales among students who were strongly satisfied with their major. Some of the MMPI scales were able to discriminate significantly between students in major groupings.

Kipnis, Lane, and Bergen (1969), in a study of 30 male juniors and seniors majoring in mathematics, physical science, and business, reported that impulsiveness for mathematics and physical science majors was negatively related to satisfaction
with college major. Impulsiveness for business majors was positively related to satisfaction with college major, as predicted. Their findings provided support for Holland's theory: people seek environments in which they can express and satisfy their personalities.

Sherrick et al. (1971), in a study of 118 seniors in the College of Arts and Sciences at the University of Cincinnati, reported students who showed similar personalities—as measured by the flexibility scale of the California Psychological Inventory (CPI)—were more likely to show satisfaction with their college majors. No significant relationships existed between scores concerning satisfaction with major and scores concerning flexibility when the type of major was ignored.

In a study of upperclassmen majoring in mathematics and sociology at the University of North Carolina, Morrow (1971) hypothesized that college students selecting college majors congruent with their personality types would express greater satisfaction with their chosen majors than would those students who selected college majors incongruent with their personality types. All students were administered the Holland VPI and were classified as one of Holland's six personality types. Morrow was the first investigator to use a specific-major satisfaction questionnaire, adopted from Brophy's (1959) job satisfaction questionnaire, to assess empirically the relationship between student VPI personality...
type and satisfaction with college major.

Morrow (1971) reported significant differences in major satisfaction scores between the congruent group of mathematics majors (Intellectual personality type) and the incongruent group of mathematics majors (Social, Conventional, Enterprising, and Artistic personality types). No significant differences were reported between the congruent Intellectual personality type of mathematics major and the incongruent Realistic personality type of mathematics major. However, the difference in group mean satisfaction scores was in the predicted direction. No significant differences in major satisfaction scores were reported in the comparison of the congruent and incongruent sociology majors. In a test of Holland's concepts of consistency and homogeneity relative to satisfaction with college major, Morrow's results failed to support Holland's theoretical postulates.

In the comparison of congruent and incongruent sociology subjects on Holland's postulate of satisfaction, Morrow suggested that the lack of obtained differences might have been caused by the absence of stereotype uniformity as perceived by sociology majors. Other answers include the possibility that the needs of the students in the identified majors may not be equally met in the expression of satisfaction with college major. Morrow, in analyzing the satisfaction scores, also combined the data for male and female subjects. Because differences between male and female findings were identified
in his earlier investigations, Holland reported his results separately for men and women. Morrow did not include in his study the environmental classification code for the institution from which his subjects were selected. Holland (1973) indicated that the student's satisfaction would be related to the hierarchial position of his congruent environmental orientation within the institution. Morrow's findings and the possible weaknesses of his study were considered in the design of the current investigation. This investigation attempted to duplicate certain portions of the Morrow study but used six representative groups, rather than limiting the study to two groups as was done by Morrow.

In summary, a review of the literature failed to identify a comprehensive study that attempted to assess the relationship between Holland's proposed personality types and satisfaction with college major. Several researchers identified environmental and personality factors contributing to the student's satisfaction with his college major. It was noted also that satisfaction cannot be adequately measured through a single-item questionnaire or, as Morrow found, through even a multiple-response, 3-item questionnaire.
CHAPTER III

RESEARCH METHODOLOGY

In this chapter are presented the research design, the sample, selection procedures, testing procedures, null hypotheses, instrumentation and data analysis, and scoring and computation procedures.

Design

An ex post facto comparative design was employed to determine if differences existed in vocational personality types, in value dimensions, and in satisfaction with college majors among students pursuing study in six selected programs at Western Michigan University (W.M.U.). Groups of college seniors nearing the completion of selected programs of study were compared on their responses to the Vocational Preference Inventory (VPI), the Allport-Vernon-Lindzey Study of Values (AVLSV), and the Attitude Toward College Major (ATCM) questionnaire.

Sample

The sample selected for study consisted of 316 male seniors who enrolled during the 1974 winter and spring semesters at W.M.U. and who were representative of Holland's six vocational personality types. Of the 316 students, 53 were
majoring in mechanical engineering technology (Realistic); 59 were majoring in electrical engineering technology (Intellectual); 53 were majoring in elementary education (Social); 55 were majoring in accounting (Conventional); 51 were majoring in marketing (Enterprising); and 45 were majoring in either art or music education (Artistic).

All subjects selected for this study were male students who appeared on the instructors' class rosters and who were currently attending classes during the specified semesters. No provisions were made to determine if the students were enrolled on either a full- or part-time basis. No procedures were implemented to identify or control ethnic origins of the selected subjects.

Holland and several other researchers have reported potential differences between male and female responses to instruments measuring interests, personality traits, values, and satisfaction variables related to occupational choices. Their results have provided the rationale for not including senior women in the current investigation.

Holland (1966a), in his determination of scale codes for various occupational choices, did not envision a precise overlapping of male and female codes or personality types. His research consistently depicted separate results for male and female subjects. Relative to sex, Holland (1966a) stated that the "Vocational Preference Inventory scales still discriminate significantly across classes but less efficiently
for women than men" (p. 284). Walsh and Barrow (1971) suggested differences in vocational development, behavior, personality, and goals for women. Harmon (1971), Holland (1966a), Levitt (1971), Osipow (1973), and Walsh and Barrow (1971) indicated that for each sex an independent theoretical conception might be necessary. Cole (1973) stated that the interests of women do differ from those of men; however, the spacial configuration of women's interests parallels that of men. Folsom (1969), Harvey (1971), Rose and Elton (1970), Stanfield (1970), Walsh and Lewis (1972), and Werner (1969) also suggested the possibility of sex differences relative to vocational personality types. Helton and Korn (1964) and Kirchner and Hogan (1968) have indicated that men and women in the same college majors respond differently to the AVLSV.

In a study by Morrow (1971), of personality types and satisfaction with college major, it was noted that the majority of subjects in his mathematics sample were male, whereas the majority of the subjects in the sociology sample were female. The congruent mathematics majors showed significant differences in satisfaction with their college major when compared with incongruent mathematics majors. However, the congruent sociology majors showed no significant differences. Because of potential differences between male and female responses, the present study did not include senior women in the selected samples of students.
Selection Procedures

Students representing Holland's personality types, through the use of selected college majors, were initially identified from the W.M.U. 1974 winter semester listing of students in various programs of study. Following the determination of a sufficient number of senior subjects, departmental chairmen and instructors were contacted to elicit their help and cooperation and to further identify and locate the selected subjects.

In the accounting and marketing departments, those students who were completing major requirements enrolled in a senior-level course, required in the respective department, during the fall or winter semester of the academic year. All male seniors enrolled in the required courses during the 1974 winter semester, and identified on the instructors' class rosters as majors in accounting or marketing, were selected for this study. In addition to the information obtained from the class roster, all students were polled prior to the administration of the instruments to check the accuracy of the major indicated on the instructor's class list. This procedure verified the student's major indicated on the class roster and provided a more accurate sample.

For the remaining majors (mechanical engineering technology, electrical engineering technology, elementary education, and art and music education), subjects were identified
individually by screening the winter semester class rosters of advanced classes in the respective majors, by screening the winter semester enrollment lists of advanced music education majors, and by reviewing the winter semester student teaching assignment lists for elementary education majors. Through this selection procedure, senior mechanical engineering majors were identified in 7 classes; senior electrical engineering majors, 8 classes; senior art education majors, 12 classes; senior music education majors, numerous classes and independent lessons; and senior elementary education majors, the Kalamazoo and 7 contiguous student teaching sites. To secure an adequate number of male elementary education majors at W.M.U., student teaching assignments for the Kalamazoo and surrounding sites were used during both the winter and spring semesters of 1974. By duplicating the identification and selection procedures for the elementary education majors, an attempt was made to control environmental factors by using subjects who were pursuing a student teaching assignment close to the W.M.U. campus.

Again, as for the accounting and marketing majors, all subjects were polled prior to instrument administration to verify the accuracy of the class roster, enrollment list, and student teaching lists in identifying the subject's college major. These particular procedures permitted the identification of all senior students who were enrolled in advanced courses during the winter semester, or student
teaching during the winter and spring semesters, in the six selected major programs of study.

Testing Procedures

The administration of the instruments was conducted during the months of March and April, 1974, for all subjects with the exception of the second group of elementary education majors. The instruments were administered to this group of 16 subjects during May, 1974. All subjects were read the standard set of instructions as presented in Appendix A.

Whenever possible, the instruments were given in a classroom setting during scheduled class periods. Several of the selected majors provided advanced classes where concentrations of seniors permitted the administration of instruments and data collection. All accounting majors were given the instructions in one class and asked to return the instruments at the next class meeting. All marketing majors were contacted in three marketing classes where they received the instructions and completed the instruments. More than half of the mechanical engineering, electrical engineering, elementary education, and music education majors received instructions and completed the instruments in a classroom setting at W.M.U.

Most of the remaining subjects were contacted at the beginning of their class period where they received the
standard set of instructions and then were given the instru-
ments. These students were asked to return the study instru-
ments to the investigator during their next scheduled class
period. If the student was absent during the period when
the instructions were given to the class or to individual
members, he was contacted during the following class period.
If the student failed to return the instruments during suc-
cessive class meetings, he was called prior to the next
class session and asked to bring the instrument package,
either completed or not completed, to his next scheduled
class.

Those few students who could not be reached during a
class period—because of student teaching or independent and
individual work in music or art—were called by telephone,
read the instructions, and asked if they would be willing to
participate in the study. If they were, the investigator
mailed or delivered the instructions, the instrument package,
and a stamped, return-addressed envelope to the subject.
This latter group comprised 22 subjects, or 7 percent of the
sample.

Through these three methods of data collection, the par-
ticipation of selected subjects in each of the six majors
exceeded 90 percent. Specifically, 98 percent of the mechanical engineering majors, 94 percent of the electrical engi-
neering majors, 95 percent of the elementary education majors,
93 percent of the accounting majors, 94 percent of the
marketing majors, and 94 percent of the art and music education majors participated in the study. Nonparticipants in each of the majors included those who indicated that they did not desire to participate, those who failed to return the instruments, and those who failed to complete all parts of the instrument battery.

Since the total test battery contained three different information instruments—the VPI, the AVLSV, and the ATCM questionnaire—the individual instruments were rotated systematically to make three test batteries. Through both the rotation of individual instruments and the total instrument packet during administration, the effect of instrument order was diminished.

Research Hypotheses

The general research questions to be answered in this study were presented in Chapter I. These questions, stated as research hypotheses, are:

1. College students representing one of Holland's six personality types respond with higher scores on a corresponding VPI scale than college students representing each of the remaining personality types. Furthermore, for those students within one personality type, the scores for the corresponding VPI scale are higher than the scores for the five remaining VPI scales.

2. College students representing Holland's six personality types differ in their responses to value dimensions as measured by the AVLSV.
3. College students who select college majors corresponding with their primary personality types show greater satisfaction with their majors than students who select college majors not corresponding with their primary personality types.

Edwards (1969) has indicated that research workers frequently choose probability values at the .05 level of confidence or less; therefore, the .05 level of probability was selected for the rejection of the null hypotheses presented in Chapter IV, below.

Instrumentation and Data Analysis

In this investigation, vocational personality type was operationally defined as the highest single scale score response obtained on the Holland VPI (Appendix B). The VPI, a personality and interest inventory, instructs the student to respond by "like" or "dislike" to a list of 160 occupational titles (1965 edition). The inventory provides a total of 11 scores: Realistic, Intellectual, Social, Conventional, Enterprising, Artistic, Self-Control, Masculinity, Status, Infrequency, and Acquiescence. Only the first 6 scale scores were used in the present investigation, since the primary focus of the current study evolved around the value of the VPI as an interest-measuring instrument.

Reviews by Johnston (1972) and Lohnes (1972) indicated that the VPI, as a vocational interest inventory, is a valid and reliable instrument. Studies by Bohn (1966); Gaffey and Walsh (1974); Osipow, Ashby, and Wall (1966); Wall, Osipow,
and Ashby (1967); and Williams (1972) have supported the validity of the VPI. Reliability coefficients (Kuder-Richardson 20) ranging from .87 to .89 for a sample of 6,289 male college students were reported by Holland (1965). Holland also indicated that the inventory shows evidence of construct and predictive validity. The purpose of the present study was to provide additional data relative to the validity of the VPI.

The statistical techniques used in the analysis of the data obtained with the VPI were the one-way analysis of variance for groups with unequal n's (Glass & Stanley, 1970) and the one-way analysis of variance for correlated subjects (Kerlinger, 1973). Following the computation of the one-way analysis of variance and the determination of significant differences, respective multiple comparison techniques—Sheffé (Glass & Stanley, 1970) and the t test for correlated subjects (Chase, 1967)—were employed. The analysis of variance and multiple comparison techniques provided the probability values used to determine the acceptance or the rejection of the null hypotheses at the .05 level of confidence.

Value characteristics have been operationally defined as the six scale scores obtained on the 1960 edition of the AVLSV. The AVLSV (Allport, Vernon, & Lindzey, 1970) describes a 45-item instrument that was designed to measure values, theoretically derived from Spranger's (1928) Types of Men,
through "six basic interests or motives in personality."
The six orientations are: theoretical, economic, aesthetic, social, political, and religious. A description of the value orientations has been provided in Appendix C.

Split-half reliability coefficients (Spearman-Brown) for the six scales range from .84 to .95, with a mean of .90. Test-retest reliability coefficients range from .77 to .92 for one month and .84 to .93 for two months, with respective mean coefficients of .89 and .88 (Allport et al., 1970).

The most direct and convincing evidence for establishing the validity of the value scales came from the scores of subjects whose selected characteristics were known (Allport et al., 1970). A number of studies contributed to the validity of the instrument (Kinnane & Gaubinger, 1963; Sciortino, 1970; Simon, 1970). Duffy (1940) wrote a critical review of the instrument and reported acceptable reliability and validity. Simon (1970) stated that the AVLSV "is probably the most widely used measure of personal values" (p. 263).

The statistical test used to analyze the data obtained by the AVLSV was the one-way analysis of variance for groups with unequal n's (Glass & Stanley, 1970). The statistical analysis permitted a comparison, on each of the AVLSV scale means, across the six selected majors representing Holland's six personality types.

Satisfaction with college major was operationally defined as the total raw score obtained on the ATCM questionnaire.
The major satisfaction questionnaire was an instrument that was used to determine the degree of student satisfaction with college major. As stated in the instructions, the student was asked to respond, on a 7-point bipolar scale containing the phrases "strongly agree" and "strongly disagree," to 10 questions involving satisfaction with his college major. The student was instructed to think about his college major in terms of how well the major fit with his personality rather than about specific instructors, courses, or employment possibilities.

As stated in the review of literature, a comprehensive questionnaire to assess satisfaction with college major could not be identified. Initially, three different questionnaires were administered to a group of 16 senior education majors representing all of Holland's vocational personality types, and to 12 paper technology majors representing one of Holland's vocational interest types. From these two samples, 21 students (75 percent) indicated that the ATCM questionnaire (Appendix D) represented the best assessment instrument.

The instrument selected for this study was constructed with modified questions from three indexes measuring job satisfaction, job motivation, and need satisfaction. Questions 1, 2, 3, 4, 5, 6, 7, and 10 were taken from Brayfield and Rothe's (1951) Job Satisfaction Index and were modified to read "college major." The bipolar phrases were also

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selected from the Brayfield and Rothe index; however, the scale itself was modified to provide a 7-point scale. The 7-point scale was used to elicit a wider range of responses. Question 8 was extracted from Patchen's (1965) Job Motivation Index and modified to read "college major courses" rather than "work." Question 9 was a modification of a question appearing in Schaffer's (1953) Need Satisfaction in Work questionnaire. In addition to these instruments, numerous other job satisfaction indexes were reviewed to identify the 10 questions that were selected for the college-major satisfaction questionnaire.

Since in this investigation the student's college major was perceived in terms of vocational choice, some content validity was established in the construction of the questionnaire. Additional validity was ascertained through the responses of two groups of senior students who identified the selected questionnaire as the best of three instruments that were systematically rotated and presented to the pilot study subjects.

Test-retest reliability coefficients were established over one- and four-week periods through the use of a junior/senior group of automotive, aviation, printing, and engineering technology majors, and a senior group of 14 secondary education majors. All students used for the ATCM reliability study were pursuing major programs of study at W.M.U. Reliability coefficients (Spearman rank order correlation, Glass &
Stanley, 1970) ranged from .93 for the one-week period to .89 for the four-week period. The ATCM instrument study provided sufficient evidence of instrument validity and reliability to permit the use of the instrument in this study.

In the analysis of the data obtained from the major satisfaction (ATCM) questionnaire, the one-way analysis of variance for groups with unequal n's (Glass & Stanley, 1970) was again employed to determine if significant differences existed in mean satisfaction scores for those students who had selected college majors corresponding with their personality types as compared with those students who had selected college majors not corresponding with their personality types.

Instrument Scoring and Data Computation

All data collected by the three research instruments were scored either through a computer program or by a research assistant. The 160 items from the VPI were keypunched onto IBM cards, verified for errors, and then scored through a program prepared for a model PDP 10 computer. The AVLSV responses were hand-scored, verified for errors, and recorded on an IBM answer sheet. The ATCM questionnaires were hand-scored, verified for errors, and also recorded on the same IBM answer sheet as the AVLSV data. The data were then read by either an opscanner or a card reader and placed in computer disk storage under the subject's social security number.
If the subject wished to remain anonymous, a fictitious social security number was used to identify the responses of the individual. Following the data-loading, a review of every 10th subject's responses confirmed the data for the sample had been marked or punched, read, and printed correctly.

The various statistical techniques used on the data were performed by statistical programs written for Western Michigan University's PDP 10 computer.
CHAPTER IV

RESULTS AND ANALYSES OF RESEARCH FINDINGS

Introduction

The research findings, based upon analyses of the data, are presented in this chapter. The format used was: presentation of the null hypotheses, description of the collected data, and review of the results of the statistical analyses.

The purpose of this study was to investigate the relationships between the subjects' college majors and their personality types, their value dimensions, and their satisfaction with college majors. Holland (1973) has consistently stated that individuals search for an environment—interpreted as "college major" in this study—in which they can "exercise their skills and abilities, express their attitudes and values, and take on agreeable problems and roles" (p. 4).

By identifying male college seniors representing Holland's six personality typologies, pursuing study in college majors, and representing Holland's six environmental orientations, this study was concerned with the relationship between personality typology and environmental orientation.

Research Findings

The selected sample consisted of 316 male seniors who were enrolled at Western Michigan University (W.M.U.) during
the spring of 1974 and who represented Holland's six vocational personality types. The research data were collected from instruments that included the Vocational Preference Inventory (VPI), the Allport-Vernon-Lindzey Study of Values (AVLSV), and the Attitude Toward College Major (ATCM) questionnaire.

Research findings concerning a description and an analysis of the data are presented in the following manner: a comparison of personality types with college majors, personality types with values, and personality types with satisfaction with college majors.

**Personality type and college major**

Research hypothesis 1, written as a null hypothesis, states that there are no differences in mean scores on corresponding VPI scales among students in Holland's six personality types or among all six VPI scales for students within each of Holland's personality types. In essence, there are two subsets of hypotheses within null hypothesis 1. These are: (1) there are no differences in group mean scores on any single scale of the VPI among students representing the six major groups; and (2) there are no differences among the mean scores of the six VPI scales within any one group of students majoring in mechanical engineering, electrical engineering, elementary education, accounting, marketing, and art and music education. The data collected for the
comparisons indicated in null hypothesis 1 are presented in Tables 1, 2, 3, 4, and 5. Also, Figure 1 contains additional information concerning Holland's personality type profiles and codes relative to null hypothesis 1.

The group means and standard deviations (Table 1) were computed for the six VPI scales from the responses provided by the subjects who were classified according to Holland's typology. These computations provided a comparison of corresponding VPI mean scale scores among subjects representing the six selected majors and among all six VPI mean scale scores for subjects representing each individual major. The first comparison among the subjects of all six majors revealed that, for a single scale of the VPI, the mechanical engineering, elementary education, accounting, marketing, and art and music education majors received their highest mean score on the respective corresponding scale. Only the electrical engineering majors failed to obtain the highest mean score on the scale (Intellectual) that was predicted to be their highest.

Mechanical engineering majors recorded the highest mean score (6.81) on the Realistic scale of the VPI when compared with the same mean scale scores for the subjects in the remaining majors. The elementary education majors obtained their highest mean score (7.02) on the Social scale when compared with all other subjects. The accounting majors recorded a mean score of 6.87 on the Conventional scale.
TABLE 1.—Means and standard deviations of Vocational Preference Inventory scale scores for six college major groups

<table>
<thead>
<tr>
<th>VPI Scale</th>
<th>Mean/SD</th>
<th>College Major</th>
</tr>
</thead>
<tbody>
<tr>
<td>Realistic</td>
<td>$\bar{X}$</td>
<td>6.81&lt;sup&gt;a,b&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>3.65</td>
</tr>
<tr>
<td>Intellectual</td>
<td>$\bar{X}$</td>
<td>6.25&lt;sup&gt;b&lt;/sup&gt;</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>4.64</td>
</tr>
<tr>
<td>Social</td>
<td>$\bar{X}$</td>
<td>2.26</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>2.38</td>
</tr>
<tr>
<td>Conventional</td>
<td>$\bar{X}$</td>
<td>2.49</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>2.33</td>
</tr>
<tr>
<td>Enterprising</td>
<td>$\bar{X}$</td>
<td>3.34</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>2.92</td>
</tr>
<tr>
<td>Artistic</td>
<td>$\bar{X}$</td>
<td>3.21</td>
</tr>
<tr>
<td></td>
<td>SD</td>
<td>3.63</td>
</tr>
</tbody>
</table>

<sup>a</sup> Highest mean scale value within this major.

<sup>b</sup> Highest mean scale value within a single scale among majors.
This was the highest mean score on the Conventional scale among all major groups. In a similar pattern, the marketing majors provided the highest mean score (8.65) on the VPI Enterprising scale. The art and music education subjects, when compared with the subjects representing the remaining majors, recorded the highest mean score (10.02) on the Artistic scale. The last group of subjects, the electrical engineering majors, obtained a mean score of 5.87 on the Intellectual scale. Their mean score was second highest to the score recorded by the mechanical engineers (6.25). The electrical engineering majors were the only subjects that failed to provide data that each major group would record the highest mean score on their respective scale of the VPI. However, five of the six groups provided data that contributed to the rejection of the first part of null hypothesis 1.

In order to provide data to reject or retain the second portion of null hypothesis 1, computed mean scale scores for the six VPI scales were compared among the subjects within each major. The second comparison revealed subjects within the majors of mechanical engineering, electrical engineering, elementary education, marketing, and art and music education received their highest mean score on the predicted scale of the VPI. The mean values on the predicted VPI scales are reported in the following paragraph.

The subjects within mechanical engineering, electrical engineering, elementary education, marketing, and art and
music education, respectively, recorded their highest mean score on the Realistic (6.81), Intellectual (5.87), Social (7.02), Enterprising (8.65), and Artistic (10.02) VPI scales. Only the accounting majors failed to respond with the highest mean score on the predicted Conventional scale. Their highest mean score was recorded on the Enterprising scale (7.11), rather than the Conventional scale (6.87) which received the second highest mean score value. Following the comparisons of the mean scale values, the data were subjected to an analysis by statistical techniques to determine if differences in mean values were sufficient to support the rejection or retention of null hypothesis 1.

A one-way analysis of variance of the two sets of comparisons provided F values to support the rejection of null hypothesis 1. For the comparison of the subjects among the six college majors on a single scale of the VPI, a one-way analysis of variance for groups with unequal n's was performed. All F values obtained in the comparisons of the subjects across each VPI scale were significant at less than the .05 level of confidence (Table 2).

In the comparison of all subjects within a single college major across the six scales of the VPI, the one-way analysis of variance for correlated groups was used. Again, all F values were significant at less than the .05 level of confidence (Table 3). Thus, the null hypothesis of no significant differences in the VPI scale responses for either
TABLE 2.—F values for the comparison of six college major groups on each Vocational Preference Inventory scale

<table>
<thead>
<tr>
<th>VPI Scale</th>
<th>F Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Realistic</td>
<td>8.56**</td>
</tr>
<tr>
<td>Intellectual</td>
<td>3.29*</td>
</tr>
<tr>
<td>Social</td>
<td>21.92**</td>
</tr>
<tr>
<td>Conventional</td>
<td>35.53**</td>
</tr>
<tr>
<td>Enterprising</td>
<td>41.09**</td>
</tr>
<tr>
<td>Artistic</td>
<td>31.29**</td>
</tr>
</tbody>
</table>

*df = 5

*p < .05

**p < .001

TABLE 3.—F values for the comparison of Vocational Preference Inventory scales within each college major

<table>
<thead>
<tr>
<th>College Major</th>
<th>Correlated F Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanical Engineering Technology</td>
<td>29.64*</td>
</tr>
<tr>
<td>Electrical Engineering Technology</td>
<td>45.99*</td>
</tr>
<tr>
<td>Elementary Education</td>
<td>20.23*</td>
</tr>
<tr>
<td>Accounting</td>
<td>20.79*</td>
</tr>
<tr>
<td>Marketing</td>
<td>20.08*</td>
</tr>
<tr>
<td>Art &amp; Music Education</td>
<td>57.03*</td>
</tr>
</tbody>
</table>

*df = 5

*p < .001

among or within the six college major groups was rejected. Since the statistics obtained from the one-way analysis of variance did not identify specific differences within each comparison, additional statistical techniques were employed.
To test further the differences reported in the preceding paragraph, a multiple comparison technique (the Sheffe) and a correlated t statistical technique were applied to the VPI data. The results of these computations (Tables 4 and 5) provided further evidence to identify the mean differences which permitted the rejection of null hypothesis 1.

In a comparison of the subjects from a selected major with the subjects from the remaining majors on a single predicted VPI scale, the results (Table 4) were significant at the .05 level of confidence in 26 of the 30 comparisons. When considering the 4 comparisons that were not significant, the VPI did not discriminate well on the Intellectual scale in a comparison of electrical engineering majors with mechanical engineering, elementary education, or art and music majors. Likewise, no significant differences were identified on the Realistic scale of the VPI in a comparison of mechanical engineers and electrical engineers.

Overall, the data obtained by the Sheffe statistical technique provided substantial support for Holland's personality types who selected college major environments corresponding with their personality typology. The interpretation of the data also provided further evidence to reject the first portion of null hypothesis 1.

To test the ability of the VPI to discriminate among responses within a single college major group (the second
TABLE 4.—Mean differences between college major groups on the predicted Vocational Preference Inventory college major scales

<table>
<thead>
<tr>
<th>Predicted VPI College Major Scale</th>
<th>Group Comparison</th>
<th>Mean Difference</th>
<th>Sheffé Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Corresponding vs. Other</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Realistic</td>
<td>Mechanical Engineering vs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Marketing</td>
<td>2.99</td>
<td>4.56***</td>
</tr>
<tr>
<td></td>
<td>Accounting</td>
<td>3.17</td>
<td>4.94***</td>
</tr>
<tr>
<td></td>
<td>Electrical Engineering</td>
<td>1.20</td>
<td>1.90</td>
</tr>
<tr>
<td></td>
<td>Elementary Education</td>
<td>3.23</td>
<td>4.97***</td>
</tr>
<tr>
<td></td>
<td>Art/Music Education</td>
<td>2.90</td>
<td>4.29***</td>
</tr>
<tr>
<td>Intellectual</td>
<td>Electrical Engineering vs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Marketing</td>
<td>2.16</td>
<td>2.76**</td>
</tr>
<tr>
<td></td>
<td>Accounting</td>
<td>1.61</td>
<td>2.10*</td>
</tr>
<tr>
<td></td>
<td>Mechanical Engineering</td>
<td>-0.38</td>
<td>-0.49</td>
</tr>
<tr>
<td></td>
<td>Elementary Education</td>
<td>0.03</td>
<td>0.04</td>
</tr>
<tr>
<td></td>
<td>Art/Music Education</td>
<td>1.11</td>
<td>1.37</td>
</tr>
<tr>
<td>Social</td>
<td>Elementary Education vs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Marketing</td>
<td>3.31</td>
<td>5.54***</td>
</tr>
<tr>
<td></td>
<td>Accounting</td>
<td>3.91</td>
<td>6.66***</td>
</tr>
<tr>
<td></td>
<td>Mechanical Engineering</td>
<td>4.75</td>
<td>8.02***</td>
</tr>
<tr>
<td></td>
<td>Electrical Engineering</td>
<td>5.22</td>
<td>9.04***</td>
</tr>
<tr>
<td></td>
<td>Art/Music Education</td>
<td>1.86</td>
<td>3.01**</td>
</tr>
<tr>
<td>Conventional</td>
<td>Accounting vs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Marketing</td>
<td>2.19</td>
<td>4.26***</td>
</tr>
<tr>
<td></td>
<td>Mechanical Engineering</td>
<td>4.38</td>
<td>8.61***</td>
</tr>
<tr>
<td></td>
<td>Electrical Engineering</td>
<td>4.70</td>
<td>9.49***</td>
</tr>
<tr>
<td></td>
<td>Elementary Education</td>
<td>5.14</td>
<td>10.10***</td>
</tr>
<tr>
<td></td>
<td>Art/Music Education</td>
<td>5.69</td>
<td>10.72***</td>
</tr>
<tr>
<td>Enterprising</td>
<td>Marketing vs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Accounting</td>
<td>1.54</td>
<td>2.72**</td>
</tr>
<tr>
<td></td>
<td>Mechanical Engineering</td>
<td>5.31</td>
<td>9.31***</td>
</tr>
<tr>
<td></td>
<td>Electrical Engineering</td>
<td>6.36</td>
<td>11.45***</td>
</tr>
<tr>
<td></td>
<td>Elementary Education</td>
<td>5.12</td>
<td>8.98***</td>
</tr>
<tr>
<td></td>
<td>Art/Music Education</td>
<td>5.47</td>
<td>9.20***</td>
</tr>
<tr>
<td>Artistic</td>
<td>Art/Music Education vs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Marketing</td>
<td>6.85</td>
<td>9.20***</td>
</tr>
<tr>
<td></td>
<td>Accounting</td>
<td>6.42</td>
<td>8.78***</td>
</tr>
<tr>
<td></td>
<td>Mechanical Engineering</td>
<td>6.81</td>
<td>9.23***</td>
</tr>
<tr>
<td></td>
<td>Electrical Engineering</td>
<td>8.01</td>
<td>11.16***</td>
</tr>
<tr>
<td></td>
<td>Elementary Education</td>
<td>4.06</td>
<td>5.50***</td>
</tr>
</tbody>
</table>

df = 310 for Sheffé comparisons.

* $p < .05$  ** $p < .01$  *** $p < .001$
part of the null hypothesis), the correlated t statistical
technique was utilized. For this comparative analysis, the
predicted VPI scale scores for the corresponding majors were
compared with each of the remaining VPI scale scores. In 25
of the 30 comparisons, the correlated t value was signifi­
cant at the .05 level of confidence (Table 5). The compari­
sions that were not significant provided further information
concerning the lack of differentiation on the Intellectual
and Realistic scales for the mechanical and the electrical
engineering majors. Again, the VPI failed to discriminate
between the college engineering groups. In the first com­
parison, no significant mean differences were detected when
comparing the mechanical and electrical engineers on either
the Realistic or the Intellectual VPI scales. In the second
comparison, no significant differences were identified when
comparing the Realistic and the Intellectual scale means
within the mechanical engineering group. Also, no signifi­
cant differences were identified in the comparison of the
Intellectual and Realistic scale means within the electrical
engineering group. In addition, the VPI failed to discrimi­
nate significantly between the Social scale and either the
Intellectual or the Artistic scales for the elementary edu­
cation majors. The fifth nonsignificant difference was
noted in the comparison of the Enterprising and Conventional
mean scale scores for the accounting majors.

In summarizing the data provided by the Sheffé and the
TABLE 5.—Scale comparisons between predicted and other Vocational Preference Inventory scale scores for six college major groups

<table>
<thead>
<tr>
<th>College Major Group</th>
<th>VPI Scale Comparisons</th>
<th>df</th>
<th>t Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mechanical</td>
<td>Realistic vs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engineering</td>
<td>Intellectual</td>
<td>51</td>
<td>0.98</td>
</tr>
<tr>
<td>Technology</td>
<td>Social</td>
<td>51</td>
<td>8.96*</td>
</tr>
<tr>
<td></td>
<td>Conventional</td>
<td>51</td>
<td>9.03*</td>
</tr>
<tr>
<td></td>
<td>Enterprising</td>
<td>51</td>
<td>7.17*</td>
</tr>
<tr>
<td></td>
<td>Artistic</td>
<td>51</td>
<td>6.25*</td>
</tr>
<tr>
<td>Electrical</td>
<td>Intellectual vs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Engineering</td>
<td>Realistic</td>
<td>59</td>
<td>-0.60</td>
</tr>
<tr>
<td>Technology</td>
<td>Social</td>
<td>59</td>
<td>9.04*</td>
</tr>
<tr>
<td></td>
<td>Conventional</td>
<td>59</td>
<td>8.57*</td>
</tr>
<tr>
<td></td>
<td>Enterprising</td>
<td>59</td>
<td>8.33*</td>
</tr>
<tr>
<td></td>
<td>Artistic</td>
<td>59</td>
<td>8.19*</td>
</tr>
<tr>
<td>Elementary</td>
<td>Social vs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>Realistic</td>
<td>53</td>
<td>5.61*</td>
</tr>
<tr>
<td></td>
<td>Intellectual</td>
<td>53</td>
<td>1.75</td>
</tr>
<tr>
<td></td>
<td>Conventional</td>
<td>53</td>
<td>9.60*</td>
</tr>
<tr>
<td></td>
<td>Enterprising</td>
<td>53</td>
<td>6.43*</td>
</tr>
<tr>
<td></td>
<td>Artistic</td>
<td>53</td>
<td>1.48</td>
</tr>
<tr>
<td>Accounting</td>
<td>Conventional vs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Realistic</td>
<td>55</td>
<td>6.26*</td>
</tr>
<tr>
<td></td>
<td>Intellectual</td>
<td>55</td>
<td>4.09*</td>
</tr>
<tr>
<td></td>
<td>Social</td>
<td>55</td>
<td>7.51*</td>
</tr>
<tr>
<td></td>
<td>Enterprising</td>
<td>55</td>
<td>0.53</td>
</tr>
<tr>
<td></td>
<td>Artistic</td>
<td>55</td>
<td>4.76*</td>
</tr>
<tr>
<td>Marketing</td>
<td>Enterprising vs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Realistic</td>
<td>51</td>
<td>7.46*</td>
</tr>
<tr>
<td></td>
<td>Intellectual</td>
<td>51</td>
<td>6.70*</td>
</tr>
<tr>
<td></td>
<td>Social</td>
<td>51</td>
<td>9.59*</td>
</tr>
<tr>
<td></td>
<td>Conventional</td>
<td>51</td>
<td>8.47*</td>
</tr>
<tr>
<td></td>
<td>Artistic</td>
<td>51</td>
<td>7.24*</td>
</tr>
<tr>
<td>Art/Music</td>
<td>Artistic vs.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Education</td>
<td>Realistic</td>
<td>45</td>
<td>11.47*</td>
</tr>
<tr>
<td></td>
<td>Intellectual</td>
<td>45</td>
<td>8.71*</td>
</tr>
<tr>
<td></td>
<td>Social</td>
<td>45</td>
<td>8.00*</td>
</tr>
<tr>
<td></td>
<td>Conventional</td>
<td>45</td>
<td>16.26*</td>
</tr>
<tr>
<td></td>
<td>Enterprising</td>
<td>45</td>
<td>12.80*</td>
</tr>
</tbody>
</table>

*; p < .001

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correlated t statistical techniques, the results of the comparisons showed that 51 of the 60 mean scale differences were significant at the .05 level of confidence. The results obtained through the use of the additional statistical techniques permitted the rejection of null hypothesis 1 and provided support for Holland's concept that individuals select occupational environments which correspond with their personality type. All comparisons to this point have dealt only with the separate scales of the VPI. In the following paragraphs, the separate scale data were combined to provide a personality profile for each of the college majors.

To explore in greater depth Holland's theoretical conception of congruent personality type and environment, a personality profile for the subjects within each college major was constructed (Figure 1). The profile permitted the identification of the personality or vocational codes of the college major groups and a comparison with Holland's postulated three-letter codes for the selected college major and personality types.

In general, the profiles again provided support for Holland's (1966a, p. 281) typologies as demonstrated by the subjects selected for this investigation. For the students majoring in mechanical engineering, Holland predicted a three-scale code of Realistic/Intellectual/Enterprising (RIE)*, and the data from the selected major group provided a personality profile of RIE. In Holland's terminology, the
Figure 1.--Vocational Preference Inventory scale profiles using group mean scale values for students in six college majors.
mechanical engineers were consistent within the highest, second highest, and third highest scale responses to the VPI. Similar profile data also were obtained for the electrical engineering majors. Their obtained three-scale profile code was IRE, which corresponded with Holland's proposed profile of Intellectual/Realistic/Enterprising (IRE). The electrical engineering majors also were consistent in their responses to the items on the first three scales of the VPI.

The elementary education majors, representing Holland's social personality typology, were not as consistent as either the mechanical or electrical engineering majors. As proposed, the first scale within the VPI profile code (Social/Intellectual/Enterprising; SIE) was consistent. However, Holland's profile code indicated that the elementary education majors would be second highest on the Intellectual scale and third highest on the Enterprising scale. The group means showed the elementary education majors to be second highest on the Artistic scale and third highest on the Intellectual scale.

The profile for the accounting majors provided the least support for Holland's typology. The proposed code identified the accounting majors as Conventional/Enterprising/Realistic (CER). The obtained code of ECI provided a reversal in the first and second profile scales and a third-position scale that was not identified by Holland.

In contrast to the accounting subjects, the marketing
majors responded as predicted on the Enterprising and Conventional scales. Holland suggested their VPI profile would be Enterprising/Conventional/Social (ECS), whereas the obtained profile code was ECR. Unlike the accounting majors, however, the marketing majors clearly distinguished themselves between the highest and the second-highest peaks on the VPI scales. The marketing majors recorded their strongest preference for Enterprising types of occupations listed in the VPI. The accounting majors were less discriminating in selecting Conventional over Enterprising types of occupations.

The last subjects portrayed with a profile pattern were the art and music education majors. Similar to the marketing majors, the art and music education majors clearly identified themselves as "liking" the corresponding Artistic types of occupations listed in the VPI. There was little question that the Artistic personality type was dominant for the art and music education majors. Like the mechanical and electrical engineering groups, the art and music education group was consistent in the highest, second highest, and third highest scale scores obtained on the VPI. Holland indicated that the personality profile pattern for the art and music education majors would be Artistic/Social/Intellectual (ASI), and the obtained data provided a profile code of ASI for these subjects.

In reviewing the three-position profile codes for the
six groups used in this investigation, the positions for 12 of the 18 profile code letters (66 percent) were correctly identified. Chance expectation for any one position within the three-letter code would have been 17 percent. The data have provided results that support Holland's theory at well beyond the level of chance expectancy. If the scales of the profile codes are reviewed separately, five of the six highest scales (83 percent), four of the six second-highest scales (67 percent), and three of the six third-highest scales (50 percent) were identified correctly according to Holland's profile codes. Thus, the profile analysis provided additional data to substantiate the findings of the earlier analyses.

In summary, the data obtained from the VPI, analyzed by the various statistical techniques, and portrayed in profile patterns provided support for Holland's theoretical conception of six personality typologies for the subjects used in the present study. The second aspect of this study explored the relationship between Holland's personality typologies and value dimensions as measured by the AVLSV.

**Personality type and values**

Research hypothesis 2, stated as a null hypothesis, postulates that there are no differences in AVLSV mean scale scores among the students in six college majors who represent Holland's personality types. As evidenced by the collected
data results, differences in AVLSV dimensions do exist within and among the six selected college major groups (Table 6).

By noting the group means obtained on the AVLSV scales, the dimensions can be ranked for each of the six college majors. For the mechanical engineering majors, the ranking of the value dimensions was as follows: (1) Theoretical, (2) Economic, (3) Political, (4) Aesthetic, (5) Social, and (6) Religious. The electrical engineering majors obtained the same value rankings, with the exception of the Social and the Aesthetic values which were reversed in comparison to the mechanical engineering majors. Elementary education majors provided a ranking of (1) Aesthetic, (2) Social, (3) Theoretical, (4) Political, (5) Economic, and (6) Religious.

As was found in the comparison of the value dimensions for the engineering groups, the two business groups of subjects responded with AVLSV value dimensions that were similar, with the exception of Aesthetic and Social values. The ranking of the mean value scores of the accounting majors was as follows: (1) Economic, (2) Political, (3) Theoretical, (4) Aesthetic, (5) Social, and (6) Religious. The ranking of AVLSV scores for the marketing majors was (1) Economic, (2) Political, (3) Theoretical, (4) Social, (5) Aesthetic, and (6) Religious.

The last group of subjects, the art and music education majors, provided responses for a ranking of (1) Aesthetic,
### TABLE 6.—Means and standard deviations of value dimension scores for six college major groups

<table>
<thead>
<tr>
<th>Value Dimension</th>
<th>Mean/ SD</th>
<th>College Major</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theoretical</td>
<td>X 47.09</td>
<td>X 47.70</td>
</tr>
<tr>
<td></td>
<td>SD 7.18</td>
<td>SD 5.61</td>
</tr>
<tr>
<td>Economic</td>
<td>X 45.75</td>
<td>X 43.91</td>
</tr>
<tr>
<td></td>
<td>SD 5.97</td>
<td>SD 7.28</td>
</tr>
<tr>
<td>Aesthetic</td>
<td>X 39.23</td>
<td>X 36.65</td>
</tr>
<tr>
<td></td>
<td>SD 8.10</td>
<td>SD 7.02</td>
</tr>
<tr>
<td>Social</td>
<td>X 37.17</td>
<td>X 37.60</td>
</tr>
<tr>
<td></td>
<td>SD 6.46</td>
<td>SD 6.59</td>
</tr>
<tr>
<td>Political</td>
<td>X 40.23</td>
<td>X 39.43</td>
</tr>
<tr>
<td></td>
<td>SD 5.85</td>
<td>SD 6.23</td>
</tr>
<tr>
<td>Religious</td>
<td>X 30.90</td>
<td>X 34.68</td>
</tr>
<tr>
<td></td>
<td>SD 10.53</td>
<td>SD 11.60</td>
</tr>
</tbody>
</table>
(2) Social, (3) Theoretical, (4) Religious, (5) Economic, and (6) Political. This group was the only one receiving a mean Religious scale score that permitted a ranking of other than sixth place. As proposed by Holland, this group would be high on Aesthetic and Social values and low on Economic and Political values.

In keeping with Holland's value descriptions of the six personality types, the art and music education subjects provided the most discrete and conclusive data. For the mechanical engineering group, Holland predicted high Economic and Political values and low Aesthetic and Social values. A review of the ranked value means showed the Economic and Political values to be ranked 2 and 3, and the Aesthetic and Social values to be ranked 4 and 5.

The means of the AVLSV responses for the electrical engineers provided a ranking of 1 for the Theoretical value, which was consistent with Holland's personality description. However, Holland indicated that the Intellectual group should respond with Aesthetic value dimensions, and the mean for this value was ranked fifth out of the six values.

Elementary education majors also deviated on one value dimension that was not consistent with Holland's value description for the Social personality type. In particular, the elementary education majors provided responses for a mean ranking of 2 on the Social scale and a ranking of 6 on the Religious scale. Holland postulated that, out of the
six selected groups, the Religious value would have been ranked higher for the elementary education majors.

A review of the AVLSV value dimension means provided support for Holland's personality descriptions for the accounting majors. They obtained their highest ranking on the Economic value and lower rankings (4, 5, and 6, respectively) on the Aesthetic, Social, and Religious values.

For the marketing majors, the results were again supportive of Holland's descriptions. The Enterprising group of subjects received their first and second rankings on the Economic and Political values, and their fifth ranking on the Aesthetic value.

In addition to the ranking of the value dimensions, another statistical technique was employed to test Holland's contention that the six personality types hold different value dimensions. A one-way analysis of variance for groups with unequal n's was applied to the AVLSV data provided by the subjects in the six college majors. The F values obtained in a comparison of the subjects in the six majors on each AVLSV scale were significant at the .05 level of confidence (Table 7).

Mean score differences were identified on each scale (Theoretical, Economic, Aesthetic, Social, Political, and Religious) of the AVLSV. A review of the mean scale scores contributing to the identified differences showed that the electrical and mechanical engineering majors recorded higher
TABLE 7.—F values for comparison of six college major groups on each of six value dimensions

<table>
<thead>
<tr>
<th>Value Dimension</th>
<th>F Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Theoretical</td>
<td>17.10**</td>
</tr>
<tr>
<td>Economic</td>
<td>20.05**</td>
</tr>
<tr>
<td>Aesthetic</td>
<td>27.54**</td>
</tr>
<tr>
<td>Social</td>
<td>6.20**</td>
</tr>
<tr>
<td>Political</td>
<td>10.40**</td>
</tr>
<tr>
<td>Religious</td>
<td>2.41*</td>
</tr>
</tbody>
</table>

\[ \text{df} = 5 \]

\*P < .05
\**P < .001

means on the Theoretical value scale than did any of the remaining majors. On the Economic scale, the accounting and marketing majors were noticeably higher than either of the education majors. The discrimination was less clear for the engineering majors. The means obtained on the Aesthetic value scale differentiated the art and music education majors from the five remaining groups of subjects. Likewise, the highest mean value was recorded on the Social value scale for the elementary education majors. The Political value scale identified the business majors as scoring highest on this scale and, conversely, showed the art and music education majors as scoring the lowest. A final notation showed that the education majors received the highest scores on the Religious value scale. All of these results were consistent with Holland's expectations.
In summary, the results obtained from the AVLSV, through either the ranking method or the one-way analysis of variance method, revealed that the subjects in the six different college majors held different value dimensions. Thus, the data obtained through the statistical analyses permitted the rejection of the second null hypothesis and provided support for the concept that value dimensions are associated with the various personality typologies. The last aspect of this study explored the relationship between the subject's primary personality type and satisfaction with college major.

**Personality type and satisfaction with college major**

Research hypothesis 3, written as a null hypothesis, states that there are no differences in mean satisfaction with college major scores between students who selected college majors corresponding with their primary personality types and students who selected college majors not corresponding with their primary personality types. Holland proposed that an individual would be satisfied if he were permitted to express his personality in an occupational orientation which corresponded with his personality type.

Under this section of the data presentation, some procedural problems were experienced in the identification of the subject's primary personality type. Since the definition of the primary vocational personality type (Chapter I above,
p. 13) permitted the use of the dominant personality type among the six scales of the VPI, only those subjects who obtained their highest score on a single scale were used in the data analysis. This procedure eliminated 33 subjects, who received equally high scores on two or more scales of the VPI. These subjects were excluded because Holland (1966b) indicated that these individuals would be in conflict in their occupational orientation. Consequently, the data presented in this section did not include those individuals who received tied high scores on the VPI scales.

As a result of the major group data collected in this investigation, null hypothesis 3 was accepted. The comparisons within each of the major groups did not produce significant differences (Table 8). In a one-way analysis of variance of the comparisons between the congruent subjects (corresponding college majors and personality types) and the incongruent subjects (noncorresponding college majors and personality types), no significant differences were identified at the .05 level of confidence.

To summarize the data presented in this section, the results of the major group analysis did not support Holland's contention that a student who had selected a college major corresponding with his personality type was more satisfied with his field of study than were the rest of the students.
TABLE 8.—Means, standard deviations, and F values of major satisfaction scores for congruent and incongruent personality types within six college major groups

<table>
<thead>
<tr>
<th>College Major</th>
<th>Primary Personality Type</th>
<th></th>
<th></th>
<th></th>
<th></th>
<th>df</th>
<th>F Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>n</td>
<td>Mean</td>
<td>SD</td>
<td>n</td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Mechanical Engineering</td>
<td>Congruent</td>
<td>22</td>
<td>44.86</td>
<td>11.45</td>
<td>24</td>
<td>48.46</td>
<td>6.71</td>
</tr>
<tr>
<td>Electrical Engineering</td>
<td>Incongruent</td>
<td>23</td>
<td>51.61</td>
<td>8.28</td>
<td>27</td>
<td>46.48</td>
<td>10.53</td>
</tr>
<tr>
<td>Elementary Education</td>
<td></td>
<td>20</td>
<td>51.50</td>
<td>6.75</td>
<td>30</td>
<td>50.33</td>
<td>11.52</td>
</tr>
<tr>
<td>Accounting</td>
<td></td>
<td>18</td>
<td>45.72</td>
<td>9.95</td>
<td>32</td>
<td>41.50</td>
<td>12.77</td>
</tr>
<tr>
<td>Marketing</td>
<td></td>
<td>30</td>
<td>44.20</td>
<td>7.89</td>
<td>15</td>
<td>41.00</td>
<td>12.51</td>
</tr>
<tr>
<td>Art &amp; Music Education</td>
<td></td>
<td>36</td>
<td>56.81</td>
<td>7.13</td>
<td>6</td>
<td>52.33</td>
<td>9.54</td>
</tr>
</tbody>
</table>

Note. All individuals receiving tied response scores on 2 or more scales have been excluded from the analysis.
Summary of Research Findings

The first two null hypotheses of this study were rejected at the .05 level of confidence. Through the use of the one-way analysis of variance, the Sheffé, and the correlated t comparison techniques, 51 of the 60 personality type comparisons were found to be significant. The data supported Holland's contention that different personality types select occupational orientations and college majors that correspond with their personality types. The results of the ranking of the AVLSV value dimensions and the results of the one-way analysis of variance supported Holland's proposed value descriptions for the subjects selected to represent each of Holland's personality types.

However, some contradictory results were obtained from the data provided in the investigation of the relationship between the subject's primary personality type and his satisfaction with his college major. A one-way analysis of variance test of the college-major group data did not provide values to support Holland's contention of satisfaction relative to corresponding personality type and occupational orientation.
Chapter V includes a brief review of the purpose and design of the study, a discussion of the research findings, and recommendations for further research.

Summary

During the 1950's, Holland (1959) presented a theory of vocational choice which indicated that an individual searched for an occupational environment congruent with his/her personality type. Through theoretical revisions presented in 1966 and 1973, Holland formulated an occupational choice model that included such factors as heredity, activities, interests, competencies, and disposition as they interacted with environmental factors such as home, school, relatives, and friends to influence the individual's occupational choice; however, Holland's theory of occupational choice has not been accepted without criticism.

For example, his theory has been criticized by Carkhuff, Alexik, and Anderson (1967), who indicated that Holland did not present a theory of occupational choice and that he only provided a description of personality types and environmental orientations. While the considerations raised by Carkhuff et al. are important, the present study did not attempt to
respond to these criticisms or to investigate empirically
the developmental shortcomings of Holland's theory.

The purpose of the present study was to provide addi­
tional descriptive information pertaining to Holland's postu­
lates by examining six different groups of college seniors
at a midwestern university. Specifically, the relationships
between the seniors' college majors and their personality
types, their value dimensions, and their satisfaction with
college majors were explored. While Holland, his associates,
and other investigators have studied the vocational choices
of college students early in their college careers, only
three investigators (Holland, 1963; Morrow, 1971; Walsh &
Lacey, 1969) have studied aspects related to the occupational
choices of students who were about to terminate their college
careers and enter the world of work.

This investigation was designed to include only males
who were seniors in six college majors. Each major was
selected specifically to represent the six personality types
that composed Holland's theoretical personality and environ­
mental orientations. All identified subjects in the selected
majors were administered the Holland Vocational Preference
Inventory (VPI), the Allport-Vernon-Lindzey Study of Values
(AVLSV), and the Attitude Toward College Major (ATCM) ques­
tionnaire, designed specifically for this research study,
during the spring of 1974 at Western Michigan University
(W.M.U.).
The data provided by the subjects were compared and analyzed through the use of appropriate statistical techniques to determine the relationship between the independent variable (college major) and the various dependent variables as derived from Holland's theoretical concepts and the three research instruments. The results of the comparisons were presented in Chapter IV above, and are discussed in the following section.

Discussion of Findings

The discussion of the findings has been presented in three sections related to personality types and college majors, personality types and values, and personality types and satisfaction with college majors.

Personality types and college majors

Null hypothesis 1 stated that there are no differences in mean scores for the VPI scales among students in Holland's six personality types or among students within each of Holland's personality types. A review of the data pertaining to the first null hypothesis showed differences at well beyond the .05 level of confidence between the mean VPI scale scores among students representing each of the college major groups and among students within a single college major. Results of a one-way analysis of variance revealed significant differences among students in the six selected college majors.
(mechanical engineering, electrical engineering, elementary education, accounting, marketing, and art and music education) and among students within each single college major. Through the use of multiple comparison techniques, additional data were reported to support the proposed mean differences, with the exception of comparisons involving the engineering, accounting, and elementary education groups.

For the engineering majors, the VPI failed to discriminate between the electrical and the mechanical engineers on the Realistic and the Intellectual scales, and also between the electrical engineers and the elementary education and the art and music education majors on the Intellectual scale.

These differences must be evaluated relative to both Holland's theoretical concepts and the environmental orientation of these majors at W.M.U. Holland has had difficulty in classifying engineers in either the Realistic or the Intellectual personality orientation. The findings of this study were consistent with those reported in two earlier studies. Lacey (1971) could not identify significant differences on the Realistic scale for an employed group of practical engineers; Wall (1969) discovered that freshmen in the College of Engineering received their highest mean score on the Intellectual rather than the Realistic scale. Both the Lacey and Wall studies, as well as the results reported in Chapter IV above, led to the conclusion that engineers might be found in either the Realistic or the Intellectual
personality type.

During the 1960's, Holland and his associates differentiated between the primary personality types of engineers according to their engineering specialty. This differentiation and categorization of engineering groups was used in selecting the subjects in mechanical and electrical engineering; in the present study, however, no significant differences were identified between the mean Realistic or Intellectual scale scores of the VPI for engineering majors. All other mean VPI scale scores differed significantly at less than the .05 level of probability. All students representing each of the engineering groups pursued similar basic coursework in completing their degree requirements. In fact, the academic environmental orientation of the two engineering groups at W.M.U. could be shown as being identical, with the exception of the advanced specialized coursework for each engineering major. In light of the similarities between the engineering groups, it was noted that the VPI scales managed to provide some discriminating differences.

The findings in this study—both the differences and the similarities—also provided support for Cole, Whitney, and Holland's (1971) and Wakefield and Doughtie's (1973) geometric relationships between the various personality types. As a result of their work, a strong positive relationship could be expected between the vocational choices representing the Realistic and Intellectual orientations.
Other explanations for the overlap of the Realistic and Intellectual personality types were provided by Holland (1966b) in his discussion of "attractiveness" between the personality types, and by Walsh, Vaudrin, and Hummel (1972) who showed the accentuation of personality attributes through the exposure of a college student to his college major environment. In this study, some of the engineering majors in both groups may have been blocked in pursuing their first vocational choice. Consequently, they may have made a second choice and developed personality attributes congruent with their latter choice. Thus, the accentuation effect would be more prominent for seniors than for underclassmen, since the seniors pursued their majors for the longer period of time. A similar explanation could be offered for several of the other inconsistencies observed in the first part of this investigation.

For the accounting majors, the literature would generally support a differentiation between the Conventional and Enterprising personality types. However, it was noted that the accounting majors and marketing majors pursued similar basic academic courses and only differentiated themselves in the final stages of their majors, where they were involved in coursework unique to their respective vocations. Holland (1966b) indicated that the "attractiveness" of the Social and Enterprising model environments would be greatest for the Conventional personality type. Conversely, the
Enterprising personality type was not attracted to the Conventional model environment. Again, the concept of "attractiveness" may have provided a partial explanation for the findings of this study.

Through an intra-group comparison of the VPI mean scale scores for the accounting majors, no significant differences were discovered between the Conventional and Enterprising scale responses; however, for the marketing majors, significant differences were identified in the comparison of the mean Conventional and Enterprising scale scores. Again, these findings may be explained in light of Holland's concept of conflict relative to vocational choice. Pursuit of a second vocational choice in relation to "attractiveness" would be consistent with the geometric relationships presented by Holland and his associates, and accentuation of personality attributes as presented by Walsh et al. (1972). The explanations offered for the engineering and the accounting groups did not explain the lack of intra-group differences for the elementary education majors.

For the Social personality type, Holland (1966b) indicated that the individual would be equally attracted to both the Enterprising and the Artistic model environments. In reviewing the findings of those investigators who studied the intra- and interclass relationships for the personality types and model environments, the strongest relationship existed between the Social and either the Enterprising or
the Artistic orientations. In presenting the three-letter profile code for the female elementary education majors, Holland (1966a) included the Artistic personality attribute. The inclusion of the Artistic attribute was consistent with the findings of Kirchner and Hogan (1968) who, in a comparison of female elementary education majors with secondary education majors, reported that elementary education majors scored significantly higher on the Aesthetic value scale of the AVLSV.

Holland's description of the male elementary education major did not include the Artistic personality attribute in the three-letter profile code (1966a). Consequently, the findings of this study were inconsistent with Holland's theoretical concept of the male elementary education major. No significant intra-group differences were identified between the mean scores on the Social and the Artistic scales, as would be expected. The finding was consistent with the "attractiveness" concept as proposed by Holland, and the geometric relationships as presented by Holland and his associates. The results of this study indicated that the code and the importance of the Artistic personality type within the male elementary education profile code should be reexamined in light of today's male elementary education major.

In summarizing the findings relative to the selected college major and personality types, the results were
interpreted as providing supporting evidence for Holland's postulates and theoretical concepts.

**Personality types and values**

Null hypothesis 2 stated that there are no differences in mean AVLSV scale scores among the students in six college majors who represent Holland's personality types. A review of the data pertaining to the second null hypothesis showed the results obtained in the present study to be consistent with Holland's value dimension postulates concerning the different personality types. Very few inconsistencies were noted in either a comparison with Holland's value descriptions or a comparison with the descriptions or results obtained from studies using earlier or later editions of the AVLSV.

In 1940, Duffy's review of student values indicated that students in various fields of study or occupations held different values as measured by the Study of Values. In an early study by Harris (1934), results were obtained that were consistent with the findings obtained in this investigation. In Harris' study, engineers (chemical) scored highest on the Theoretical scale, while the business majors scored highest on the Political scale and the art majors scored lowest on the Political scale. Other studies also reported results consistent with those recorded by the sample selected for the present study.
As did the study by Jacob in 1957, data reported in this study showed that business students provided higher mean scores on the Economic value scale than did the remaining major groups. Other similarities between the Jacob study and the present study included the lower rankings on the Aesthetic, Social, and Religious value scales (ranked fourth, fifth, and sixth) for both the engineering and business major groups. Jacob also reported results from his physical education majors that were similar to the data recorded from the sample of elementary education majors used in the present study. Holland subsequently coded the physical education major as a Social personality type. The Social personality type in this study, elementary education, received its highest mean score on the Social scale of the AVLSV. These findings were consistent with those reported for Jacob's physical education majors.

In a report by Rosenberg (1957, pp. 11-13), the findings concerning the concepts of "people oriented," "extrinsic reward oriented," and "self-expression oriented" value complexes were applicable to comparable majors used in this study of college seniors. The results obtained and reported in Chapter IV, above, corroborated those reported by Rosenberg.

Simpson and Simpson (1960) also studied the relationships between values and occupational choices. Although they did not classify their subjects according to Holland's
personality concepts, their findings from a study of male undergraduates enrolled in a college sociology class were consistent with the data provided by the students in the six college majors used in this study.

Two more recent studies, using the third edition of the AVLSV, provided data consistent with the data recorded by the engineering and education students. Munns (1972), in a study of freshman engineering students, discovered that the highest mean scale scores were recorded on the Theoretical, Economic, and Political values. Mechanical and electrical engineering students who participated in this investigation provided the following value rankings: (1) Theoretical, (2) Economic, and (3) Political. Likewise, Kirchner and Hogan (1968), in a comparison of male education majors with Helton and Korn's (1964) industrial and engineering majors, discovered that the former group recorded scores of 6 to 9 points higher on the Social value scale. The education majors in this study received the highest mean score on the Social value scale and scored approximately 5 points higher than did the engineering majors. Although many of the reported similarities were consistent with the findings of previous research studies, two inconsistencies were identified in the present study.

The first inconsistency between the data reported from previous studies and the data recorded for the current study involved the mean scale score obtained on the Aesthetic value
scale by the elementary education majors. Holland, in his theoretical conception of the occupational profiles, did not include the Aesthetic value as a value dimension for male elementary education majors. A review of the related literature failed to disclose a study that included a measure of the Aesthetic value for male elementary education majors. The results of the present study showed a ranking of 1 or a mean of 42.73 on the Aesthetic value scale, and a ranking of 2 or the second letter of the profile code (Artistic) on the VPI. These findings indicated that further study should be devoted to the VPI profile code for male elementary education majors. Additional substantiating evidence for this conclusion was provided also by the geometric configurations presented in the hexagon formulations of the inter- and intra-class relationships for the personality and environmental orientations proposed by Holland, Whitney, Cole, and Richards (1969) and Wakefield and Doughtie (1973).

The second major inconsistency occurred with the Aesthetic value scale score for the electrical engineering majors or the Intellectual group. Holland (1966b) stated that the Intellectual personality type valued "theoretical and, to a lesser degree, aesthetic problems and tasks" (p. 23). An interpretation of this statement would indicate that the electrical engineering majors would record a ranking for the Aesthetic value dimension that was slightly below the ranking for the Theoretical value. The electrical
engineers recorded a ranking of 1 for the Theoretical value and a ranking of 5 for the Aesthetic value. In a comparison with the mechanical engineers, the latter group recorded a ranking of 4 for the Aesthetic value. A comparison of mean Aesthetic scale scores for the engineering majors revealed a difference of approximately 3 points. It was noted that Holland did not include the Artistic personality type within the electrical engineering three-letter profile code of Intellectual/Realistic/Enterprising (IRE). A closer examination of the program for the electrical engineering group might reveal an explanation for this inconsistency. As with the male elementary education majors, further research should be conducted using various engineering groups to provide a better description of their personality type and their related value orientations. Again, the geometric relationships reported by Holland and others indicated that the Aesthetic value within the Artistic personality type should be a rather prominent part of the Intellectual personality type's value structure. Consequently, the abstract value of the scientific and the artistic orientations may have played a role in the individual's aesthetic values.

In summarizing the findings concerning the six college majors and reported value dimensions, the data provided support for Holland's value postulates and permitted the rejection of null hypothesis 2. Most of the postulated value dimensions recorded by the AVLSV (15 of the 17 value rankings)
were ranked as conceptualized by Holland. These results—as well as those reported by Duffy (1940), Harris (1934), Kirchner and Hogan (1968), Munns (1972), Rosenberg (1957), Simpson and Simpson (1960), Sternberg (1953), and Williams (1972)—provided support for the concept that value dimensions do differ significantly among students pursuing coursework in various college majors.

**Personality types and satisfaction with majors**

The third null hypothesis stated that there are no differences in mean scores of satisfaction with college majors between students who selected college majors corresponding with their primary personality types and students who selected college majors not corresponding with their primary personality types.

A review of the results obtained concerning null hypothesis 3 showed that five of the six comparisons between congruent and incongruent choices of college major with the subject's personality type and satisfaction with his major were in the hypothesized direction; however, none of the comparisons was significant at the .05 level of confidence.

Holland (1966b, 1973) proposed that an individual searched for an occupational environment in order to express his personality type. According to Holland (1973), satisfaction within the occupational environment depended upon "the congruency between one's personality and the environment."
(composed largely of other people) in which one works" (p. 8). This study attempted to measure the subject's satisfaction with his college major through an ATCM questionnaire.

The purpose of the third research hypothesis was to investigate a portion of Holland's theory regarding his concept of congruency and satisfaction with college major. If the senior subjects ignored such variables as instructors, specific classes, and employment possibilities and indicated their satisfaction with their college majors in terms of psychological similarity with their personality types, it was hypothesized that congruent seniors would show greater satisfaction with their college majors.

The findings reported in Chapter IV did not support Holland's satisfaction postulate. From the six comparisons, five major congruent groups recorded mean satisfaction scores in the predicted direction. These groups included electrical engineering, elementary education, accounting, marketing, and art and music education. Conversely, for the mechanical engineering majors, the congruent group recorded a lower mean satisfaction score than did the incongruent group. The latter finding was the opposite of what was hypothesized.

In summarizing the discussion of the research findings concerning the subject's personality type and his satisfaction with college major, the results provided no significant differences in a comparison of male samples to support the hypothesized relationship as proposed by Holland. For males,
the congruence between personality type and environmental orientation, as identified by college major, in a comparison with satisfaction with college major did not appear to play a significant role in the student's satisfaction with his college major.

Further research should be conducted to identify those variables that play the most important role in satisfaction with major. This and other recommendations are suggested as a result of the findings presented in this study.

Recommendations

As a result of the research findings, several recommendations concerning Holland's theoretical concepts are proposed.

In reviewing the male group data obtained in the present study, counselors might use the VPI to identify individual personality types and interests of their counselees. The results permitted the conclusion that the VPI discriminated among male seniors in six college majors and among male seniors within any single college major selected for the current study. In addition to the VPI data, counselors might use the results obtained from the AVLSV in group guidance situations.

Generally, the seniors in the six college major groups reported value dimensions consistent with their personality types. With these findings, counselors--once they have
identified the personality type through either interview techniques or vocational measurement instruments—might make some assumptions concerning the value dimensions held by their counselees. The estimated value dimensions might be used in conjunction with the results obtained on the Strong Vocational Interest Blank relative to Holland's personality types (Campbell, 1971; Campbell & Holland, 1972; Lee & Hedahl, 1973; O'Shea & Harrington, 1972) or with information obtained from the Directory of Occupational Titles (Viernstein, 1972).

In addition to the VPI and AVLSV data, the counselor should view with caution the data concerning satisfaction with major. Some variables within the personality structure may operate as factors that influence students' reported satisfaction with their college majors. However, it is recommended that further studies should be conducted to identify the particular variables, if any, as they relate to personality and value dimensions, which contribute to college major satisfaction.

Additional areas suggested for further investigation in regard to the present study and Holland's theoretical concepts include the study of other majors in the same institution and other institutions, the study of females in various college-major environmental orientations, and the use of the VPI and its relationship to other variables found in Holland's new instrument, the Self Directed Search (Holland,
Additional longitudinal studies of both male and female subjects in various majors should be conducted in light of personality types, value dimensions, and satisfaction with college major during and following their college careers.

Future investigations should include a follow-up phase, conducted after college graduation, to determine the stability of the personality type and the environmental orientation. More studies pertaining to vocational interests, vocational personality types, vocational value dimensions, and vocational satisfaction should be conducted to assess the variables that are essential in counseling the vocationally floundering student or to provide information concerning multiple opportunities for those students who have initially chosen an occupation or career.
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APPENDIX A

INTRODUCTION TO ALL PARTICIPATING STUDENTS
INTRODUCTION TO ALL PARTICIPATING STUDENTS

Introduction

You are asked to participate in a research project in which this researcher is giving a vocational interest inventory, a values questionnaire, and a student-attitude-toward-college-major questionnaire to students in several different college majors.

The information from each of you will be compared with that collected from other college students.

Please rest assured that none of this material will be given to any academic or administrative officials at Western Michigan University. I will handle your material with the utmost of confidence.

Since I may wish to conduct a follow-up study in five or ten years, I am asking you to voluntarily place your social security number along with your college major on the first page of your questionnaire.

The three questionnaires used for this study will take approximately an hour to an hour and fifteen minutes to complete. The instructions are found on the front cover of each questionnaire.

When finished, please check to see if you have marked an answer for each of the questions.

Your cooperation and participation will be appreciated. Thanks for your assistance with this research project.
Questionnaire Cover Sheet

College major ____________________

Social security number ____________

Please return all questionnaires to:

Kent Laudeman

Or to the department secretary for intracampus mailing to:

Kent Laudeman
Department of Counseling and Personnel
W.M.U.
APPENDIX B

VOCATIONAL PREFERENCE INVENTORY
VOCATIONAL PREFERENCE INVENTORY

Developed by John L. Holland, Ph.D.

Instructions

This is an inventory of your feelings and attitudes about many kinds of work. Fill out your answer sheet by following the directions given below:

1. Show on your answer sheet the occupations which interest or appeal to you by blackening Y for "Yes."

2. Show the occupations which you dislike or find uninteresting by blackening N for "No."

3. Make no marks when you are undecided about an occupation.

Occupations

1. Aviator
2. Private investigator
3. YMCA secretary
4. Detective
5. Post office clerk
6. Route salesman
7. Electronic technician
8. Humorist
9. Photographer
10. Interplanetary scientist
11. Airplane mechanic
12. Meteorologist
13. Foreign missionary
14. Bookkeeper
15. Speculator
16. Poet
17. Deep sea diver
18. Newspaper editor
19. Nursery school teacher
20. Lawyer

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21. Fish and wildlife specialist
22. Biologist
23. High school teacher
24. Quality control expert
25. Buyer
26. Symphony conductor
27. Wrecker (building)
28. Narcotics inspector
29. Elementary school teacher
30. School principal

31. Power station operator
32. Astronomer
33. Juvenile delinquency expert
34. Budget reviewer
35. Stock & bond salesman
36. Musician
37. Prize fighter
38. Diplomat
39. Experimental laboratory engineer
40. Crane operator

41. Master plumber
42. Aeronautical design engineer
43. Speech therapist
44. Traffic manager
45. Manufacturer's representative
46. Author
47. Fireman
48. Army general
49. Interior decorator
50. Novelist

51. Power shovel operator
52. Anthropologist
53. Marriage counselor
54. Statistician
55. Television producer
56. Commercial artist
57. Wild animal trainer
58. U.N. official
59. Sculptor
60. Automobile mechanic
61. Surveyor
62. Zoologist
63. Physical education teacher
64. Court stenographer
65. Hotel manager
66. Free-lance writer
67. Stunt man (motion picture)
68. Criminal lawyer
69. Professional athlete
70. Carpenter

71. Construction inspector
72. Chemist
73. Playground director
74. Bank teller
75. Business executive
76. Musical arranger
77. Jockey
78. Ventriloquist
79. Army officer
80. Banker

81. Radio operator
82. Independent research scientist
83. Clinical psychologist
84. Tax expert
85. Restaurant manager
86. Art dealer
87. Motorcycle driver
88. Police judge
89. Referee (sporting events)
90. Truck gardener

91. Filling station attendant
92. Writer of scientific or technical articles
93. Social science teacher
94. Inventory controller
95. Master of ceremonies
96. Dramatic coach
97. Blaster (dynamiter)
98. Mind reader
99. English teacher
100. Sales manager
101. Tree surgeon
102. Editor of a scientific journal
103. Director of a welfare agency
104. IBM equipment operator
105. Traveling salesman
106. Concert singer
107. F.B.I. agent
108. Prosecuting attorney
109. Factory foreman
110. College professor

111. Tool designer
112. Geologist
113. Assistant city school superintendent
114. Financial analyst
115. Real estate salesman
116. Composer
117. Mountain climber
118. Congressional investigator
119. Portrait artist
120. Machinist

121. Locomotive engineer
122. Botanist
123. Personal counselor
124. Cost estimator
125. Industrial relations consultant
126. Stage director
127. Explorer
128. Supreme Court judge
129. Draftsman
130. Judge

131. Photoengraver
132. Scientific research worker
133. Psychiatric case worker
134. Pay roll clerk
135. Sports promoter
136. Playwright
137. Test pilot
138. Criminologist
139. Children's clothing designer
140. Truck driver
141. Electrician
142. Physicist
143. Vocational counselor
144. Bank examiner
145. Political campaign manager
146. Cartoonist
147. Racing car driver
148. Book censor
149. Social worker
150. Locksmith

151. Funeral director
152. Counter-intelligence man
153. Architect
154. Shipping & receiving clerk
155. Criminal psychologist
156. Insurance clerk
157. Barber
158. Bill collector
159. Ward attendant
160. Masseur
APPENDIX C

ALLPORT-VERNON-LINDZEY STUDY OF VALUES

Scale Descriptions
ALLPORT-VERNON-LINDZEY STUDY OF VALUES

Scale Descriptions

1. The THEORETICAL. The dominant interest of the theoretical man is the discovery of truth. In the pursuit of this goal he characteristically takes a "cognitive" attitude, one that looks for identities and differences; one that divests itself of judgements regarding the beauty or utility of objects, and seeks only to observe and to reason. Since the interests of the theoretical man are empirical, critical, and rational, he is necessarily an intellectualist, frequently a scientist or philosopher. His chief aim in life is to order and systematize his knowledge.

2. The ECONOMIC. The economic man is characteristically interested in what is useful. Based originally upon the satisfaction of bodily needs (self-preservation), the interest in utilities develops to embrace the practical affairs of the business world--the production, marketing, and consumption of goods, the elaboration of credit, and the accumulation of tangible wealth. This type is thoroughly "practical" and conforms well to the prevailing stereotype of the average American businessman. In his personal life the economic man is likely to confuse luxury with beauty. In his relations with other people he is more likely to be interested in surpassing them in wealth than in dominating them (political attitude) or in serving them (social attitude).

3. The AESTHETIC. The aesthetic man sees his highest value in form and harmony. Each single experience is judged from the standpoint of grace, symmetry, or fitness. He regards life as a procession of events; each single impression is enjoyed for its own sake. He need not be a creative artist, nor need he be effete; he is aesthetic if he but finds his chief interest in the artistic episodes of life.

   . . . In the economic sphere the aesthete sees the process of manufacturing, advertising, and trade as a wholesale destruction of the values most important to him. In social affairs he may be said to be interested in persons but not in the welfare of persons: he tends toward individualism and self-sufficiency.
4. The SOCIAL. The highest value for this type is love of people. In the Study of Values it is the altruistic or philanthropic aspect of love that is measured. The social man prizes other persons as ends, and is therefore himself kind, sympathetic, and unselfish. He is likely to find the theoretical, economic, and aesthetic attitudes cold and inhuman. In contrast to the political type, the social man regards love as itself the only suitable form of human relationship. Spranger adds that in its purest form the social interest is selfless and tends to approach very closely to the religious attitude.

5. The POLITICAL. The political man is interested primarily in power. His activities are not necessarily within the narrow field of politics; but whatever his vocation, he betrays himself as a Machtmensch. Leaders in any field generally have high power value. Since competition and struggle play a large part in all life, many philosophers have seen power as the most universal and most fundamental of motives. There are, however, certain personalities in whom the desire for a direct expression of this motive is uppermost, who wish above all else for personal power, influence, and renown.

6. The RELIGIOUS. The highest value of the religious man may be called unity. He is mystical, and seeks to comprehend the cosmos as a whole, to relate himself to its embracing totality. Spranger defines the religious man as one "whose mental structure is permanently directed to the creation of the highest and absolutely satisfying value experience." Some men of this type are "immanent mystics," that is, they find their religious experience in the affirmation of life and in active participation therein. A Faust with his zest and enthusiasm sees something divine in every event. The "transcendental mystic," on the other hand, seeks to unite himself with a higher reality by withdrawing from life; he is the ascetic, and, like the holy men of India, finds the experience of unity through self-denial and meditation. In many individuals the negation and affirmation of life alternate to yield the greatest satisfaction.

The above scale descriptions were repeated verbatim from the Allport-Vernon-Lindzey Study of Values (1970, pp. 4-5).
APPENDIX D

STUDENT ATTITUDE TOWARD COLLEGE MAJOR

Major Satisfaction Questionnaire
STUDENT ATTITUDE TOWARD COLLEGE MAJOR

Major Satisfaction Questionnaire

The following scales are constructed with words with opposite meanings. Place a check mark (✓) on a blank space in the scale that best represents your feelings about your college major. Think of your college major in terms of how it fits with your PERSONALITY rather than about specific instructors, courses, or employment possibilities.

1. My college major is like a hobby to me.

   Strongly AGREE ---:----:----:----:----:----:---- Strongly DISAGREE

2. My college major is usually interesting enough to keep me from getting bored.

   Strongly AGREE ---:----:----:----:----:----:---- Strongly DISAGREE

3. I enjoy my college major more than my leisure time.

   Strongly DISAGREE ---:----:----:----:----:----:---- Strongly AGREE

4. I am satisfied with my college major.

   Strongly AGREE ---:----:----:----:----:----:---- Strongly DISAGREE

5. Most of the time I have to force myself to study for my college major courses.

   Strongly AGREE ---:----:----:----:----:----:---- Strongly DISAGREE

6. Most days I am enthusiastic about my college major.

   Strongly AGREE ---:----:----:----:----:----:---- Strongly DISAGREE
7. I find enjoyment in my college major.

   Strongly AGREE       Strongly DISAGREE
   ___:___:___:___:___:___

8. I often do extra work in my college major courses because I am deeply interested in them.

   Strongly DISAGREE       Strongly AGREE
   ___:___:___:___:___:___

9. My college major offers me an opportunity for self-identification and self-expression.

   Strongly AGREE       Strongly DISAGREE
   ___:___:___:___:___:___

10. I like my college major more than the average student does.

    Strongly DISAGREE       Strongly AGREE
    ___:___:___:___:___:___