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A FOLLOW-UP STUDY INVESTIGATING THE RELATIONSHIPS
BETWEEN HOLLAND'S PERSONALITY TYPES AND
SELECTED CAREER CHOICE VARIABLES

by

Kennard S. Brackney, Sr.

A Dissertation Submitted to the Faculty of the Darden College of
Education of Old Dominion University in Partial Fulfillment of
the Requirements for the Degree of

DOCTOR OF PHILOSOPHY

URBAN SERVICES

OLD DOMINION UNIVERSITY

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B.S. August 1966, University of Maryland
M.Ed. December 1970, University of Maryland

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MARCH 1993

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ABSTRACT

A FOLLOW-UP STUDY INVESTIGATING THE RELATIONSHIPS BETWEEN HOLLAND'S PERSONALITY TYPES AND SELECTED CAREER CHOICE VARIABLES

Kennard S. Brackney, Sr.
Old Dominion University, 1993
Director: Dr. Dana D. Burnett

This follow-up study utilized John L. Holland's theory of vocational personalities and work environments to examine the relationship between students personality types and their career choices. The study sought to determine whether data collected using Holland's Self-Directed Search (SDS) was a valid predictor of (1) career goal, (2) eventual choice of college major, (3) persistence to graduation, (4) occupation (type of job held at the time the data was collected), and (5) level of satisfaction with occupation (job) at the time data was gathered.

The stratified random sample for the study was composed of 180 subjects drawn from a population of entering freshmen at a middle-sized, southern, urban university in 1979. The initial set of data gathered by the SDS from these subjects was compared with data collected from the same individuals ten years later (1989-90). Global job satisfaction was also measured in 1989-90 by administering the Job-in-General scale of the Job Descriptive Index.

Congruence (the level of agreement) between subjects' personality type (as determined by the SDS) and the choices they made with regard to the five areas listed in the first paragraph was measured by the Iachan Index. Statistical significance for the congruence results was set at .05.

For the total sample, the results of the Chi-square distribution showed no significant difference between subjects with high-moderate congruence between Personality Type (Summary) code and Occupational Aspiration (Daydream) code and those with weak poor congruence for persistence to college graduation. However, results from Fisher's Exact Probability test showed that subjects with high-moderate congruence in sub-groups R, I, and S were more likely to persist to graduation than those with weak-poor congruence.

For the total sample and the majority subjects in sub-groups R, I, and S, the results of Cohen's Weighted Kappa test showed that Personality Type (Summary code) was a moderately efficient predictor of College Major.

For the total sample, the results of the Chi-square distribution showed that subjects with high-moderate congruence between Summary code and College Major code were more likely to be satisfied with their college major than those who had weak-poor congruence between the two codes. Results from Fisher's Exact Probability test showed that subjects with high-moderate congruence in sub-groups R, I, A and S were more likely to be satisfied with their college major than those with weak-poor congruence.

For the total sample and the majority subjects in sub-groups R, S, and E, the results of Cohen's Weighted Kappa test showed that the Summary code was a moderately efficient predictor of College Major.

For the total sample, the results of the Chi-square distribution showed that subjects with high-moderate congruence between the Summary code and Present Occupation code were more likely to be satisfied with their present occupation than those who had weak-poor congruence between the two codes. Results from Fisher's Exact Probability test showed that subjects with high-moderate congruence in sub-groups R, I, A, and E were more likely to be satisfied with their present occupation than those with weak-poor congruence.

Simple and stepwise multiple regression analyses were used to determine which of a set of twelve personal and career choice variables had the highest correlation with job satisfaction. The findings of these analyses indicated that for the total sample and sub-groups R, A, and E, high-moderate congruence between the Summary code and Present Occupation code was the best predictor of job satisfaction.

Let the wise listen and add to
their learning,
and let the discerning get
guidance.

Proverbs 1:5

. . . wisdom is found in those
who take advice

Proverbs 13:10

Blessed is the man who finds
wisdom,
the man who gains
understanding.

Proverbs 3:13

The fear of the Lord is the
beginning of wisdom;
all who follow his precepts
have good understanding.

Psalms 111:10

In love and gratitude ---

To my wife, Elizabeth M. Brackney

my parents, Mildred P. Brackney
 Samuel H. Brackney

my Lord and God

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CHAPTER I

INTRODUCTION

Does an individual's personality significantly influence his or her educational plans and vocational choice decisions? Can the determination of students' personality type during the first year of college predict their choice of college major and persistence to graduation, and choice of career? Do people whose personality types are well suited to their occupations have a higher degree of job satisfaction than those whose personalities are incongruent with their occupations? These are serious questions that have important ramifications for millions of people in our society today. They are worthy of thorough study and deserve a measured response.

The selection of a career is generally recognized as a priority concern of contemporary high school¹ and college students.² Establishing career goals and making decisions relating to those goals represent a considerable challenge for most young people in our society. Despite the support and assistance of parents, school counselors, and interested others, many young adults struggling with these decisions, experience a high level of anxiety.³ Some end up making

unsuitable decisions regarding career choice, vocational preparation, and job selection.⁴ As a result, these individuals can be frustrated in their work situation and may have a consequent low level of job satisfaction.⁵ A significant number of these people, possibly most of them, may be working in environments not compatible with their interests and personality. This circumstance can readily become a major factor contributing to their negative attitude and work disposition. Clearly, this undesirable scenario is one that counselors would like to change—even prevent—whenever possible.

Issues related to dissonant career choice have prompted scientists and educators in this century to study how and why people make career decisions. This effort has given rise to the field of career development theory and practice. This field includes a number of career and vocational choice theories and a substantial amount of expanding research. These theories and approaches have been classified in a variety of ways.

Osipow organized them as trait-factor approaches, sociology and career choice, self-concept theory, and vocational choice and personalities.⁶ Crites perceives them as non-psychological theories (i.e., accident, economic, cultural, and sociological) and psychological theories (i.e., trait-and-factor, psychodynamic, developmental, and

decision).⁷ Super contends that they "fall into three main categories: those that match people and occupations, those that describe development leading to matching, and those that focus on decision making."⁸

Herr and Cramer contend that the categories depicted by the various theories and approaches are not mutually exclusive or independent but rather the attempt "to explain differential career behavior and choice from somewhat varied vantage points."⁹ Others note that while there is similarity among many of the models, the components are not always interchangeable.¹⁰ From this brief summary of the various major categories describing the most prominent approaches and theories in the field of career development, the study of Herr and Cramer clearly points out the existence of a number of different views on why and how people make career and vocational decisions.

One of the approaches in the field, that of John L. Holland, has been chosen as the basis for this study because its "theory and instrumentation are among the most widely used if not the most widely used today by researchers and counselors alike."¹¹

The proposal for the study herein presented follows this organizational scheme. Chapter I introduces and discusses the research problem. In addition to a statement of the research questions and the defining of terms, attention is given to these aspects of the proposed study:

its purpose, its importance, its theoretical rationale, and its limitations.

Chapter II provides the theoretical framework for the study. The review of literature is presented in two major sections: (1) Theoretical Foundation, and (2) Research Related to Holland's Theory. A third section of this chapter contains a statement of the research hypotheses.

Chapter III presents the research methodology for the study. This methodology is discussed under the headings of (1) Overview, (2) Sample Population, (3) Research Design, (4) Methods of Collecting Data, and (5) Procedure for Analyzing Data.

Statement of the Problem

Helping college students to make satisfying career choices and to implement career plans continue to be central concerns for campus counselors and academic advisors. These issues have been studied by theorists and researchers since the first decade of this century and the pioneering work of Frank Parsons.¹²

Frequently career counseling focuses on providing the student client with enough information so that good career decisions will be made. This service sometimes involves the administering and interpreting of a battery of tests and inventories. Too often, however, insufficient time is spent helping the student relate the available information to the career decision-making process.¹³

In view of the high dropout and change of major rates reported annually by a large number of colleges and universities in the United States,¹⁴ and in light of the high level of job dissatisfaction present in the American work force,¹⁵ and considering the substantial investment being made each year in the total educational enterprise on our nation's campuses, an increased effort in the last decade to provide better academic advisement and career counseling services by high schools and colleges comes as no surprise. John Holland's theory has been a major influence for the college/university community and his Self-Directed Search (SDS) is widely used in this setting. In fact, the SDS has been administered at the university from which the subject pool will be taken for at least a decade.

Therefore, a study that will test the validity of certain aspects of Holland's work as it relates to the use of the SDS is proposed. Given the widespread use of the SDS in higher education, such a study would appear to have good potential for important generalizability.

The Purpose

The purpose of this study is to determine whether data collected using Holland's Self-Directed Search (SDS) was a valid predictor of (1) career goal, (2) eventual choice of college major, (3) persistence to graduation, (4) present occupation, and (5) current level of job satisfaction. These five variables were chosen because they are key criteria of

vocational choice according to the research literature, and therefore have important implications for college counselors and advisors attempting to assist students in their career choices.

This follow-up study will utilize Holland's theory of vocational personalities and work environments in order to examine the relationship between student personality types and their career choices. Data collected in 1979 from entering freshmen at a middle-sized, southern, urban university using the Self-Directed Search, will be compared with data collected from the same individuals ten years later on the five dependent variables identified in the previous paragraph.

Specific Research Questions

The following research questions will guide this study:

1. Is congruence between personality type and career goal (as measured by Holland's Self-Directed Search) related to persistence to graduation from college?
2. Are students' personality type codes (as measured by the Self-Directed Search) predictors of their choice of college major?
3. Is there a higher frequency of satisfaction with college major for subjects with congruence between personality type and chosen college major than there is for students with incongruence between them?

4. Is there congruence between students' personality type as measured in the summer of 1979 by Holland's Self-Directed Search and their present occupation?

5. Is job satisfaction (as measured by The Job Descriptive Index) at a significantly higher level for subjects with congruence between personality type and present occupation than for subjects with incongruence between personality type and present occupation?

Importance of the Study

The study proposed herein seeks to (1) validate Holland's theory through a long-range follow-up study, (2) determine the utility and validity of the SDS as a useful tool for providing educational guidance to student clients regarding the selection of a college major and the attainment of academic success (i.e., persistence to graduation), and (3) determine the utility and validity of the SDS as a predictor of job satisfaction for student clients after entering an occupation. An extensive review of the literature did not find a single longitudinal study dealing with the set of variables named above, thus establishing the uniqueness of this study. This finding was confirmed in a personal phone conversation with Dr. Holland at which time he expressed strong interest in the study. At his request, a copy of the proposal was sent to Dr. Holland. In a subsequent phone conversation, Dr. Holland affirmed his positive view of the proposed study and offered assistance

in several areas with it. He had previously written that such studies of his theory and instruments were needed.¹⁶

If the hypotheses posed above are confirmed, the value of using the SDS would be further confirmed as a tool which enables advisors and counselors to better aid undergraduate students—especially those in academic jeopardy and those uncertain about college major and/or career goals—in making the best possible academic and vocational decisions at the time.

Theoretical Rationale

This study is based upon the theory of John Holland and others who have built upon his research. Holland's work has contributed significantly to the understanding of career choice and how personality and work environment interact to affect vocational decisions.¹⁷ His theory of vocational choice derives from the premises that vocational interests are an important aspect of personality and that the description of an individual's vocational interests is related to that person's personality.¹⁸ In light of the extensive research that has been conducted on vocational choice theory, personality is today generally perceived as an integral aspect of career development. Holland states that "a person's behavior is determined by an interaction between his personality and the characteristics of his environment."¹⁹ He further expresses his understanding of

the interaction between a person and his environment in this way, "The choice of vocation is an expression of personality."²⁰ Holland's theory holds that both people and environments can be characterized by their resemblance to each of six model types: realistic, investigative, artistic, social, enterprising, and conventional.²¹ The more an individual resembles a specific type the more that person will likely show traits and behaviors associated with that type. He adds, "where people congregate, they create an environment that reflects the types they are, and it becomes possible to assess the environment in the same terms" as individuals are assessed.²² Holland explains that an individual's personality type determines the primary direction of the person's vocational choice.²³

Holland's theory has been perceived as "an elaboration of the hypothesis that career choices represent an extension of personality and an attempt to implement broad personal behavioral styles in the context of one's life work."²⁴ The general hypothesis underlying Holland's work and similar research studies is that individuals "select their jobs because they see potential for the satisfaction of their needs."²⁵

One of the unique aspects of Holland's theory suggests that individuals will choose occupations consistent with their personality orientations. Holland contends that most people view the vocational world in terms of vocational

stereotypes.²⁶ He maintains that such stereotyping is based on an individual's experience with the real world of work and therefore it can possess a high degree of accuracy and utility. Research in this area led Holland to develop a set of occupational titles onto which an individual can project a preferred behavioral style. This work is represented in Holland's Vocational Preference Inventory (VPI). Holland's Self-Directed Search and related Occupations Finder utilize this information and additional assessments to associate particular personality types with corresponding occupational environments.

As a result of extensive research, Holland asserts that a finite number of work environments exist within our society. Work in this area has produced the formulation of six model environments which characterize the common social and physical work environments in American society: realistic, investigative, artistic, social, enterprising, and conventional.²⁷ Holland contends that people "search for environments that will let them exercise their skills and abilities, express their attitudes and values, and take on agreeable problems and roles."²⁸ From this assertion a supposition can be derived: if an individual's personality pattern and the pattern of that person's environment is known, a prediction from such a pairing can be made of the anticipated outcomes (i.e., satisfaction, achievement, and vocational stability). The extensive research of Holland and

others seems not only to substantiate this but also to demonstrate specific cases where such predictions have been made and subsequently validated.²⁹ These ramifications have had considerable impact on career choice theory over the past twenty years and they are significantly affecting the educational and vocational planning of a growing number of people throughout the world today.

Chapter II of this proposal provides a more complete examination of the major components of Holland's theory of vocational personalities and work environments. This chapter will also include the basic theoretical framework for the study herein proposed.

Definition of Terms

For the purposes of this proposal and study, the following terms and their definitions are provided:

Career. The totality of work one does in his/her lifetime.³⁰

Career Development. The total constellation of psychological, sociological, educational, physical, economic, and chance factors that combine to shape the career of any given individual over the life span.³¹

Congruence. The occurrence of an environment which provides opportunities and rewards compatible with a person's preferences and abilities.³²

Consistency. The condition "within a person or an environment where some pairs of types are more closely

related than others."³³

Differentiation. "The degree to which a person or an environment is well defined" (i.e., how closely a person or an environment resembles a single type).³⁴

Environmental identity. The characterization of an environment or organization which "has clear, integrated goals, tasks, and rewards that are stable over long time intervals."³⁵

Personal Identity. "The possession of a clear and stable picture of one's goals, interests, and talents."³⁶

Personality Types. Models for assessing people that have a characteristic repertoire of attitudes and skills for coping with environmental problems and tasks.³⁷ The six Holland types are described as follows:

Realistic. These people prefer to deal more with things than with ideas or people, are more oriented to the present than to the past or future, and have structured patterns of thought. They perceive themselves as having mechanical and athletic ability. They are apt to value concrete things or tangible personal characteristics like money, power, status; they will try to avoid goals, values, and tasks which require subjectivity, intellectualism, or social skills.³⁸

Investigative. These individuals are analytical, abstract, and cope with life and

its problems by use of intelligence. They perceive themselves as scholarly, intellectually self-confident, having mathematical and scientific ability. They hold less-conventional attitudes and values, tend to avoid interpersonal relationships with groups or new individuals, and achieve primarily in academic and scientific areas.³⁹

Artistic. This type tends to rely more on feelings and imagination. These individuals perceive themselves as expressive, original, intuitive, nonconforming, introspective, independent, having artistic ability (acting, writing, speaking, etc.). They value aesthetic qualities and tend to place less importance on political or material matters.⁴⁰

Social. These individuals have high interest in other people and are sensitive to the needs of others. They perceive themselves as liking to help others, understanding others, having teaching abilities and lacking mechanical and scientific abilities. They value social activities, social problems, interpersonal relations. They use their verbal and social skills to change other people's behavior.⁴¹

Enterprising. These individuals are adventurous, dominant, and persuasive. They place high value on political and economic matters and are drawn to power and leadership roles. They perceive themselves as aggressive, popular, self-confident, social, possessing leadership skills and speaking abilities, and lacking scientific ability.⁴²

Conventional. This type tends to be practical, neat, and organized, and to work well in structured situations. These individuals feel most comfortable with precise language and situations where accurate accounting is valued.⁴³

Subtype. A name for a particular personality pattern. The personality pattern is the person's profile of resemblances to the personality types.⁴⁴

Type. A theoretical model against which the real person can be measured.⁴⁵

Work Environment. A construct for a work situation that is based on the idea that as people congregate, they create an environment in which individuals of a certain type dominate, and the environment thus created can be identified in the same manner as the individuals dominating it. According to Holland's theory there are six kinds of environments—realistic, investigative, artistic, social,

enterprising, and conventional—which, like personalities, can be described according to certain attributes or characteristics. Work environments are characterized by the people who occupy them.⁴⁶

Self-Directed Search. A self-administered, self-scored, career guidance instrument developed by John L. Holland and derived from his theory of vocational personalities and work environments that provides a useful way to determine a person's resemblances to Holland's personality types. The SDS uses a broad range of content—activities, competencies, occupations, and self-ratings—to assess the person's resemblance to each type.⁴⁷

Job Descriptive Index (JDI). An instrument developed by Patricia C. Smith and her associates which measures certain facets of job satisfaction (pay, promotion, co-workers, supervision, and work). Each of these five subscales is composed of a check-list of adjectives and short statements with which the respondent describes his feelings of satisfaction about his job.⁴⁸

Job-in-General Scale (JIG). An eighteen-item global scale developed by Patricia C. Smith and her associates to accompany the Job Descriptive Index. Like the five subscales of the JDI, the JIG is composed of a check-list of adjectives and short statements with which the respondent describes his feelings of satisfaction about his job. Unlike the facet scales of the JDI which are designed to measure

specific dimensions of job satisfaction, the JIG is a general scale that provides a global measure of job satisfaction.⁴⁹

Limitations of the Study

Any conclusions or implications drawn from this study are subject to the following considerations. The proposed sample for this study consists of people who attended the 1979 summer orientation experience for freshmen students at the host university. The following limitations of this study derive from the sample itself. Not all entering freshmen students attended the university's Orientation and not all who attended Orientation took the Self-Directed Search and not all of the Self-Directed Searches that were returned were usable. However, a sizable sample composed of the majority of entering freshmen students was used. Generalizing the findings of this study to other similar groups, both at the host institution and at other similar universities, is a definite possibility if proper care is taken.

Finally, the total amount of data collected and the extent of the findings derived from it was determined by the availability of the subjects and their willingness to provide the information requested by the data collection instrument.

Summary

This chapter has served as an introduction to a study that proposes to conduct new research on John L. Holland's theory of vocational personalities and work environments: the validation of Holland's Self-Directed Search as a means of determining congruence between personality type and (1) career goal, (2) choice of college major, (3) persistence to graduation, (4) present occupation, and (5) current job satisfaction. In the sections above, a case has been presented for the study's importance, justification, and viability. Chapter II will present the theoretical framework which provides the foundation and background for this study.

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CHAPTER II

REVIEW OF RELATED RESEARCH

The first two sections of this chapter include a review of the literature that addresses the relationship between personality and career choice. The first section examines John L. Holland's theory of vocational personalities and work environments since it provides the theoretical foundation for the proposed study. The second section relates the findings of extensive library research relevant to the hypotheses of this study. The third section of the chapter presents a statement of the research hypotheses.

Theoretical Foundation

The theoretical base for this study is furnished by John L. Holland's theory of vocational personalities and work environments. His theory is generally grouped with theories of occupational choice and is described as a structural-interactive or a typological-interactive theory. This theory is classified (1) "structural or typological" because it attempts to organize vast amounts of information about people and jobs, and (2) "interactive because it

assumes that many career and social behaviors are the outcome of people and environments acting on one another."¹

Holland's perspective is recognized as a fulfillment model of the personality approach to the study of career development "for it assumes that all people look for employment and seek to reach goals that actualize talents, skills, and interests."² Holland's theory is based on the premise that vocational interests are an aspect of personality and that the description of a person's vocational interests also describes that person's personality.³

The Hexagonal Model

A critical component of Holland's theory is a hexagonal model developed by Holland for representing the relationships among the constructs in the theory. The model's use is essential to understanding the theory, instruments, and classification system. Each of the six types appears on one point of the hexagon. This model is used to show the psychological similarities across types. According to Holland "the relationships within and between types or environments can be ordered according to a hexagonal model in which the distances between the types or environments are inversely proportional to the theoretical relationships between them."⁴ The model serves three purposes for Holland's theory: "(1) It defines the degree of consistency in a person's personality pattern...(2) [it]

defines the consistency of an environment in the same way...and (3) [it] ...defines degrees of congruence between person and environment."⁵ A representation of the hexagonal model showing the relations among types is found in Appendix A.

Personality Characteristics and Occupation

A key aspect to Holland's theory is the link between various personality characteristics and corresponding job titles. In discussing this linkage, Holland describes the commonalties between the two:

- (1) The choice of an occupation is an expression of personality and not a random event, although chance plays a role.
- (2) The members of an occupational group have similar personalities and similar histories of personal development.
- (3) Because people in an occupational group have similar personalities, they will respond to many situations and problems in similar ways.
- (4) Occupational achievement, stability, and satisfaction depend on congruence between one's personality and the job environment.⁶

The Personality Types

Holland's theory depends heavily on the use of personality types. Holland maintains that each person--to some degree--resembles one of the six basic personality types he has identified. He further contends that the more an individual resembles any particular type, the more likely that person is to manifest the characteristics of that type.⁷

The Environment Types

Holland has also identified six types of environments, which, like personalities can be described by distinguishing characteristics. He asserts that the environments are characterized by the people who occupy them as well as the duties and rewards offered.⁸

Basic Assumptions of Holland's Theory

Holland's theory is supported by the following four major assumptions:⁹

1. In our culture, most persons can be categorized as one of six types: realistic, artistic, investigative, social, enterprising, or conventional. These types represent an ideal against which each person can be compared. The way in which a person chooses to relate to the environment determines type.

2. There are six kinds of environments: realistic, artistic, investigative, social, enterprising, or conventional. Generally, each environment is populated by persons having the corresponding personality type. As people congregate, they create an environment in which persons of a specific type dominate, and the resulting environment can be identified in the same way as the persons dominating it.

3. People search for environments that will let them exercise their skills and abilities, express their attitudes and values, and take on agreeable problems and roles. This

assumption asserts that the various environments attract individuals with matching personality types.

4. A person's behavior is determined by an interaction between his personality and the characteristics of his environment. The identification of an individual's personality type and present work environment yields data about the nature of the pairing quality of fit.

Holland's theory¹⁰ states that while one type usually predominates, within an individual, a person's coping strategies usually causes them to fall within the boundaries of other types. Holland recognizes that heredity and a variety of internal and external forces help shape the primary personality type, which describes the way persons cope with their environment.¹¹ The individual's resemblance to each of the six types forms a personality pattern of similarity and dissimilarity. Most individuals, he maintains, will be characterized by one type and the more they resemble that type, the more they will likely display the traits and behaviors associated with that type.¹² This phenomenon is referred to as differentiation or homogeneity.¹³ However, individuals will typically display the influences of other types which also contribute to their general way of coping with their work environment.

Holland goes on to say that individuals' personality type determines the primary direction of their vocational choice.¹⁴ He holds that the differentiation of the

personality (i.e., how clearly the individual resembles a given type) increases the possibility that the hypothesized behavior will occur.¹⁵ In addition, the differentiation of a personality pattern affects the stability of the individual's vocational choice.¹⁶ Persons with highly differentiated patterns are more likely to resist external influence than persons with undifferentiated patterns.¹⁷

The Self-Directed Search

First published in 1970 and revised in 1977 and 1985, the Self-Directed Search (SDS) embodies Holland's theory and is used in many parts of the world with various populations and socioeconomic levels. The SDS has become an extremely popular instrument and has gained wide acceptance. The instrument is part of a packet that consists of a consumable self-assessment workbook and a booklet entitled The Occupations Finder which includes a list of the 1,156 most common occupations in the United States. The Workbook includes sections on occupational daydreams (vocational goals), attitudes toward vocational activities and competencies, attitudes toward various occupations, and self-estimates of various occupational skills.

Compiled raw scores are converted into a three-letter summary code which represents a preferred vocational personality style. The order of these three letters is hierarchical with the first letter indicating the primary

personality type. The summary code links the SDS with The Occupations Finder which organizes the included occupations by the same three-letter codes based on either research results or analysis of the job responsibilities in the occupation. These materials provide an individual with a straightforward, self-administered, self-scoring procedure for exploring occupations that are similar to the individual's personality type.

While Holland's theory and instruments (i.e., the Vocational Preference Inventory and the Self-Directed Search) have met with some criticism,¹⁸ Holland and others have gone to great lengths to continue improving his work through research, revision, and refinement¹⁹ while at the same time offering clarification, explanation, and justification to those who raise questions.²⁰

Research Related to Holland's Theory

Considerable research has been conducted on Holland's theory during the last thirty years. Reports of studies on person-environment congruence that have appeared in various research journals over the years now number in the thousands. Those significant studies which are directly related to the hypotheses of this dissertation are cited and reviewed in the following sections.

Persistence in College

According to Holland, students achieve better outcomes when they choose educational majors that are compatible with their personality orientations.²¹ He postulates that congruence between personality type and college major should result in more persistence, more satisfaction, and better achievement.²² This assertion about the educational outcome of persistence in college has received some empirical support. Following are reviews of key studies relating to persistence.

The Holland and Nichols²³ one-year longitudinal study reported in 1964 tested the hypothesis that subjects would remain in a college major field of study when they possess attributes (in terms of aptitudes, achievements, and personality) similar to the typical student in that field. The sample study consisted of National Merit Finalists (332 males and 181 females). Two types of instruments were used to gather data: (1) a questionnaire about the personal history, choice of college major, and desired vocation and (2) a battery of seventeen personality, interest, self-ratings, originality, achievement, and aptitude measures. The students were assessed at the end of their senior year in high school and again at the end of their first year of college. In general the results indicated that students who persisted in various college major fields

had Holland codes more similar to those of graduating seniors than did those who did not persist.²⁴

Elton and Rose conducted several studies of the differences in career and academic development of decided and undecided students. In one study²⁵ they tested the notion that immigrants to a major field and persisters in that field would show similar characteristics at the time of graduation. The sample consisted of 530 University of Kentucky graduating male students for whom freshmen test data (Omnibus Personality Inventory and the American College Testing Program Battery) were available. The findings showed that (1) "occupational constancy and change are related, in part, to Holland's occupational categories [types] as measured by the OPI," that (2) "Holland's theory is an effective framework for research in occupational choice and change, since outcomes can be predicted on the basis of the theory," that (3) "persistence throughout college in the Holland occupational categories is more frequent than change," and that (4) "the personality characteristics of an occupational group are more a function of the persisters in that group than of the immigrants into that group."²⁶

Southworth and Morningstar²⁷ conducted a study to examine the relationship between interest patterns and persistence in choice of college major. Holland's Vocational Preference Inventory was used with a sample of

102 freshmen engineering students at the University of Massachusetts to determine persistence in the major field. The sample was divided into three groups according to their status during the junior year: (1) those still majoring in engineering (N=43), (2) those who had left engineering studies but were still enrolled in the university (N=33), and (3) those who had left the university (N=26). The results indicated that the students who persisted in engineering were those who displayed interest patterns more nearly like upperclassmen who had continued in engineering as their college major. Students who changed majors were found to be higher on the Social and Artistic scales than the students who persisted in engineering. Students who left the university appeared to have lower scores on the Investigative scale than those students who persisted to their junior year. The findings of this study seemed to indicate that the freshman engineering student who had high "Investigative" interest was more likely to persist in engineering than his cohort who had high "Social" interests.²⁸

Posthuma and Navran²⁹ hypothesized that success at Royal Roads Military College, as measured by academic achievement, was positively related to the congruence of the cadets' interests and personality traits with those of their instructors. The sample used to test this hypothesis included 110 cadets who entered the college as freshmen in

the fall of 1968 and twenty-two members of their faculty. Holland's Vocational Preference Inventory (VPI), the Strong Vocational Interest Blank (SVPI), the Edwards Personal Preference Schedule (EPPS), and the Otis Higher Examination (OHE) were employed to collect data for the study. Discriminant analysis and analysis of variance yielding statistically significant results revealed strong support for the congruency hypothesis on the EPPS and the personality-type code profiles on the VPI.³⁰

Elton³¹ conducted a study to determine if students leaving engineering had a personality change different from that found among those who remain in engineering. The study involved three samples of fifty males who were randomly selected from students at the University of Kentucky and Ashland Community College. Data were obtained from subjects through the Omnibus Personality Inventory. Results of discriminant analysis and Chi-square provided support for Holland's assumption that personality type interacts with environment. The findings also indicated that congruent person-environment interactions tended to be conducive to self-reported vocational stability.³²

Walsh³³ conducted a study to identify the relationship differences between personality variables and congruent and incongruent groups in the choice of college major. To test his hypotheses, he selected a sample of two groups of male and female students (mostly upperclassmen). Holland's

Self-Directed Search (SDS) and the California Psychology Inventory were administered to the first group (composed of twenty-five congruent and thirty-four incongruent subjects). The SDS and the Omnibus Personality Inventory were taken by the second group (composed of twenty-two congruent and thirty-one incongruent subjects). Analysis of variance with least-square solution for unequal numbers produced results indicating that for congruent males, congruent person-environment relations are conducive to better maintenance of personal and vocational stability.³⁴

Yonge and Regan³⁵ conducted a longitudinal study in which certain of Holland's concepts were investigated. Among them was the contention that students entering a particular major field of study will differ less in personality characteristics from persisters in that category than students who transfer out of that category. To test this notion, a total of 833 males from freshman classes of the University of California (Davis campus) were chosen to form the sample. This group was administered the Omnibus Personality Inventory when they were freshmen and again four years later when most of them were seniors. Data from the Scholastic Aptitude Test for the subjects in the sample were also available. Results produced some evidence that persisters did show greater stability in personality test scores than those who changed majors.³⁶

Walsh and Hanle³⁷ examined the differences among students who made congruent, incongruent, and undecided occupational choices on vocational maturity, vocational competence, academic achievement, and academic aptitude variables. A sample of fifty-three female undergraduates from Ohio State University provided data for the study. The instruments used to collect the data included Holland's Self-Directed Search, Crites' Career Maturity Inventory, the American College Test Battery, and a self-report questionnaire. The results of the analysis of variance indicated that congruent students seemed to be more vocationally mature than students who were incongruent or undecided.³⁸ Additionally, congruent females tended to be more successful in their academic achievement than incongruent or undecided females.³⁹

Walsh, Spokane, and Mitchell⁴⁰ explored the differences in academic adjustment between students who had made congruent, incongruent, and undecided college major choices. The congruent females and males tend to report more clearly defined educational and vocational goals, higher levels of aspiration, and greater satisfaction with their choice of college major than the undecided and incongruent group.⁴¹

Spokane, Malett, and Vance⁴² examined the relationship between congruence of initial curricular choices and the congruence of subsequent choices. The sample for this study

included 481 liberal arts students (324 males and 157 females) from a larger population of students at the University of Rochester who took the Strong-Campbell Interest Inventory during their freshman orientation. All the subjects belonged either to the Investigative or the Artistic categories of Holland's classification scheme. As predicted, a two-way analysis of variance with repeated measures and the post hoc Scheffe test showed that, in general, fewer curricular changes occurred among congruent students than among incongruent students.⁴³ Congruent students tended to be more stable, more differentiated, and more academically oriented than incongruent students.

A study conducted by Spokane and Derby⁴⁴ investigated differences between congruent and incongruent college women on a number of variables including satisfaction with college major. The 132 subjects were from undergraduate programs at the University of Maryland and at SUNY Brockport and Genesee. Among the instruments used to collect data were the Vocational Preference Inventory and a Biodata Questionnaire which included a modified version of the Hoppock Job Satisfaction Blank. Cross tabulations and multivariate analysis of variance were used to analyze the data measured/collected by these instruments. Congruent subjects were found to be more consistent, more certain, and to score higher on perceived congruence than incongruent subjects. The results seemed to indicate that subjects who

scored higher on perceived congruence were more consistent and were more certain of their choices about self-direction and academics when they made those choices on the basis of their interests.⁴⁵

Reuterfors, Schneider, and Overton⁴⁶ investigated the relation of congruence, consistency, and differentiation to academic performance. In doing so, they selected a sample of 816 freshmen at a large southwestern university (392 males and 424 females) who voluntarily completed the Strong Campbell Interest Inventory. Unweighted means analyses of variance were used to test the study's hypotheses. Results indicated that students whose personality types were congruent with their college majors experienced greater academic success than incongruent and undecided students.⁴⁷

Bruch and Krieschok⁴⁸ hypothesized that congruent engineering students would show greater persistence than would those who were incongruent. The sample was composed of 158 male students majoring in engineering who were selected from freshmen entering Bradley University between 1975 and 1977. Subjects were assigned to either I or R Holland types based on scores obtained from the Vocational reference Inventory that had been administered during freshmen orientation. The differences in persistence were assessed using Chi-square tests. The results showed that the I-types as opposed to R-types and tied RI's, persisted

with significantly greater frequency in two of the three classes.⁴⁹

College Major

Astin and Panos⁵⁰ reported that 75% of the college students they surveyed changed majors during college. They found that initial choice was the best predictor of a student's final choice, a finding supported by other thirty-six researchers.⁵¹

From their investigations, Osipow, Ashby, and Wall assert that Holland's theory of vocational choice engenders prediction about the kinds of college majors that students in various personality type categories tend to select.⁵²

In a study conducted in the early 1960s, Holland⁵³ polled a sample of high school graduates just before they entered college to test some general hypotheses related to vocational choice. The sample was composed of 360 males and 278 females drawn from a pool of 7,000 high aptitude students who were National Merit Finalists and Commended students. The subjects completed the Vocational Preference Inventory and a questionnaire which included questions about their vocational choices. Among the results was the significant finding that the students in this study made vocational choices (including choice of college major) related to perception they had of themselves.⁵⁴

The Holland and Nichols study⁵⁵ previously referred to also tested the hypothesis that students who leave a field

of study for another will be unlike the typical student in the field of their first choice. The findings showed that students who left the college major field they first chose lacked the personal attributes associated with the typical student in that field.⁵⁶ These students generally cited "lack of interest in course content" and "appeal of future occupational duties" as the two main reasons for changing their college majors.⁵⁷

Osipow, Ashby, and Wall⁵⁸ hypothesized that students will choose college majors in categories that are consistent with their self-identified personality type. They tested this hypothesis with a sample of 228 subjects selected from the 1964 freshman class of Pennsylvania State University. Subjects belonged to one of three groups depending on their commitment to a college major: Decided (eighty-one males and twenty-seven females), Tentative (seventy-nine males and twelve females), and Undecided (twenty-six males and three females). Results from Chi-square analysis, analysis of variance, and discriminant analysis showed that in general, subjects chose college majors consistent with their personality type although not yet uniformly so.⁵⁹

In an extensive longitudinal study (eight to twelve months) where choice stability was defined in terms of college major, Holland⁶⁰ tested a number of hypotheses one of which was based on the assumption that the pairing of persons and environments leads to a number of outcomes

(i.e., vocational choice, stability and achievement) that can be predicted. To test this notion, initial and final mean satisfaction scores for students of different types were correlated with the ranks of the environmental models of a college. The sample consisted of nearly 2,347 freshmen and sophomore college students in twenty-seven institutions who were polled in the fall of 1964 and again in the spring of 1965. Data for the analyses were obtained from a number of instruments including the Vocational Preference Inventory, the Preconscious Activity Scale, the Range of Competencies Scale, the Interpersonal Competency Scale, the Student Orientation Survey, and a descriptive information questionnaire. Spearman's rank-difference correlations and Pearson's product-moment correlations were used to perform the analyses.

From the results of the analyses, Holland found that students generally made vocational choices (i.e., selection of college major) compatible with their personality types and that the stability of those choices was closely associated with the congruency of their vocational choice and the corresponding Environmental Assessment Technique variable.⁶¹ That is, students tended to maintain their vocational choices when their educational environment was dominated by students whose choices belonged to the same general class.⁶²

One of the purposes for a study conducted by Walsh and Russell⁶³ was to determine whether subjects with a congruent college major choice report fewer personal adjustment problems. A random sample of fifty-nine male (twenty congruent and thirty-nine incongruent) and sixty-five female (thirty congruent and thirty-five incongruent) resident freshmen at Ohio State University provided data by responding to the Vocational Preference Inventory and the Mooney Problem Checklist. Results of the analysis of variance for unequal numbers and student's t-test procedures appeared to provide concurrent validation for the personal stability aspect of Holland's theory in that subjects who made a congruent college major choice reported fewer personal adjustment problems than subjects who made an incongruent college major choice.⁶⁴

Walsh and Lacey⁶⁵ conducted a study to determine whether students perceived themselves as having changed in their personality type (i.e., personal orientation) in a direction consistent with the profile of that type during their years in college. The sample consisted of 151 male senior year students from one mid-western university. Subjects included students from all six personal orientations according to Holland's classification scheme. A locally designed personal survey was used to assess any self-perceived change on selected personality attributes as expressed via their choice of college major. Results from

the analysis of variance for unequal numbers performed on the data suggested that for three of the six groups (Realistic, Investigative, Artistic) perceived change was associated with their personality type.⁶⁶

In a related study⁶⁷ of the same general nature and design involving 157 female college seniors, Walsh and Lacey found that subjects in two groups (Artistic, Investigative) perceived themselves to have changed in a direction consistent with their personality type.⁶⁸ In general, the findings of these two studies indicated that students tended "to report change in a direction consistent with their dominant personality orientation" as expressed through their college major choice.⁶⁹

Elton and Rose⁷⁰ investigated the relation of personality and ability to vocational choice in order to determine whether personality measures are associated with student occupational choices in the manner proposed by Holland. Factor scores from the Omnibus Personality Inventory, composite scores of the American College Testing Program, and occupational choices classified according to Holland's scheme were obtained for the analyses. The study's sample consisted of 530 graduating males of the University of Kentucky whose occupational patterns of change and stability had been predicted by their scores as freshmen. The results indicated that personality patterns of occupational groups were more a function of those who

entered and persisted in the group than of those who transferred into it.⁷¹

Walsh and Barrow⁷² explored the differences on personality variables between students who made congruent and incongruent college major choices. They used a sample of 120 male and female resident freshmen at Ohio State University. All the subjects responded to the Vocational Preference Inventory and the California Psychological Inventory. Analysis of variance for equal numbers was used to test the hypotheses. While the results did not identify any significant differences between congruent and incongruent major choice groups, the findings did seem to suggest that females in a congruent person-environment had a stronger commitment to their college major choice than did males.⁷³

In another longitudinal study of male vocational choice and stability, Elton and Rose⁷⁴ investigated the vocational development of students who were undecided about their major field when they entered college but who persisted to graduation. They contended that senior students who were vocationally undecided as freshmen would not differ in personality or ability measures from the seniors who persisted in or immigrated to majors as identified by Holland's classification scheme. The sample was composed of 137 University of Kentucky male students who entered college in 1965. The instruments used to collect

data for the study included the Omnibus Personality Inventory and the Student Profile Section of the American College Test.

The results showed that for the specific occupational categories reported in the study, there was no statistically significant difference in measures of personality among the three groups of students (the originally undecided student who later chose a major in that category, the student whose original choice was elsewhere but who migrated to that category, and the student who entered and persisted in that category).⁷⁵ This finding supported the Holland premise that students tend to choose occupations (i.e., college majors) that are congruent with their personality orientation.⁷⁶ In their previous study Elton and Rose (1970) had reported that there was no significant differences in measurement of personality between persisters in and immigrants to each of the Holland categories.⁷⁷

Walsh and Lewis⁷⁸ explored the differences between freshmen students at Ohio State University who made congruent, incongruent, and undecided college choices. The Omnibus Personality Inventory and the Vocational Preference Inventory were used to collect data from a sample of 214 male and female undergraduates. Findings from analysis of variance for unequal numbers suggested that subjects in the congruent male group tended to have more stable college major choices and better maintenance of personal stability

than subjects in the undecided and incongruent male groups.⁷⁹

DeVogé⁸⁰ studied 132 college males at the University of North Carolina during their freshmen and senior years to test for consistency of scores regarding college majors. The Cattell Sixteen Personality Factor was administered to all subjects during the freshman and senior years. A locally prepared questionnaire was administered to subjects after graduation to ascertain their occupation. Discriminant analysis was used to assess the relationship between the sets of data. While the relationship between personality type and college major was not significant when students were freshmen, this relationship was significant by the time the students became seniors.⁸¹ In general, the findings of this longitudinal study supported the importance of personality variables in vocational choice.⁸²

Yonge and Regan⁸³ in a previously cited study reported findings that were somewhat less supportive of Holland's theory with regard to choice of college major field than the findings of DeVogé's study. The evidence these two researchers found indicated that personality characteristics and choice of college major were only moderately related.⁸⁴

In an attempt to test Holland's premise that people search out environments that are compatible with their personalities, Andrews⁸⁵ hypothesized that there was no difference in the adult part-time students' personality

pattern and their present job environment as compared with the personality pattern and future job environment for which these students were preparing. To test this premise, Andrews had a sample of college students complete the Vocational Preference Inventory and a locally designed questionnaire describing their present job and future vocational interest. The sample was composed of eighty-nine male adults at Kellogg Community College in Battle Creek, Michigan whose goals were self-improvement and getting a better job.

The results from a Wilcoxon matched-pairs signed-ranks test supported Holland's theory in that they showed a significant movement on the part of the subjects toward future work environments that were more compatible with their personality than their work environments at the time of the study.⁸⁶ The results also showed that a more refined and/or subtle difference can be shown in the personality-job relationships when two-letter high point codes (instead of only one-letter) are used.⁸⁷

Villwock, Schnitzen, and Carbonari⁸⁸ conducted a study based on Holland's assumption that vocational and educational behavior can be predicted from a knowledge of the interaction between a person's personality and environment. Included in the notions they tested were: (1) the stability of a student's choice of a college major is directly related to the degree of congruence of that major

with their personality and (2) the most important predictor of the level of stability of student's choice of college major is the degree to which the student's choice is congruent with his or her personality. The sample consisted of 167 students (eighty-four male and eighty-three female) enrolled at the University of Houston. Data were obtained through the administration of Holland's Self-Directed Search and a local questionnaire. The Zener and Schnuelle method was used to measure congruence. The findings yielded by stepwise multiple regression indicated that for both sexes and various age levels (1) the stability of a student's choice of college major was directly related to the degree of congruence between personality type and college major, and (2) the most important predictor of the level of stability of a student's choice of college major is the degree to which the student's choice is congruent with his or her personality.⁸⁹

O'Neil, Magoon, and Tracey⁹⁰ conducted a long-term study where they investigated the predictability of one-, two-, and three-letter codes of Holland's Self-Directed Search (SDS). Their sample was composed of ninety-five male Investigative-type subjects who completed Holland's SDS as freshmen in 1970. Seven years later these subjects provided additional data on a locally prepared follow-up questionnaire about their educational and occupational experiences, status, and plans. The findings of Cohen's

kappa tests and Chi-square tests for two independent samples showed that for freshmen male Investigative types, the SDS code has moderately high efficiency in predicting graduate major.⁹¹ Additionally, one-letter codes were found to be more predictive in this study than two- or three-letter codes.⁹²

Spokane, Malett, and Vance⁹³ examined the relationship between congruence of initial choices and the congruence of subsequent choices. The hypothesis was that initially congruent subjects would change majors less frequently than incongruent subjects. The sample was composed of 481 liberal arts students (324 males and 157 females) who took the Strong-Campbell Interest Inventory during freshman orientation in 1974 at the University of Rochester. The subjects selected for the study were either an Artistic or Investigative type according to Holland's classification scheme. Using two-way analysis of variance with repeated measures procedures, the researchers found that congruent subjects tended to be more stable, more differentiated, and more academically oriented than incongruent subjects."⁹⁴

In 1985 Kahn, Alvi, Shaukat, Hussain, and Baig⁹⁵ conducted a study in which they investigated whether there was person-environment congruence between personality type and choice of academic program for 376 college and university students (243 males and 133 females) in Pakistan. The subjects responded to Holland's Self-Directed Search and

a locally prepared questionnaire. Data were analyzed using multivariate and univariate analysis of variance, Scheffe multiple comparisons, and hit-rate frequency. The results provided some support for the notion that congruent students tend to choose a field of study that is compatible with their personality orientation.⁹⁶

Satisfaction with College Major

Holland contends that "vocational satisfaction, stability and achievement depend on the congruence between one's personality and the environment in which one works."⁹⁷ Among other things, this implies that student satisfaction is the outcome of the congruency between a student's personality type and his or her college environment. This implication extends to the student's major field which is "a relatively well-defined immediate subenvironment in the more diffuse total college environment."⁹⁸ Of particular interest to this study is the contention that college students having a congruent association between personality and college major are more likely to be satisfied with their college major than students whose personality and college major are incongruent. Helping to provide some basis for this notion is the finding in a 1961 study by French that 25% of the students sampled were dissatisfied with their college major, citing changing interests and the desire for better alignment with career plans among the reasons for their negative assessment.⁹⁹

In the study just cited, French¹⁰⁰ used a locally prepared questionnaire to gather attitude and interest data from college seniors about the level of satisfaction they had with their major field of study. The sample was composed of students from three eastern colleges who had taken a battery of aptitude tests and interests measures during the first week of their freshman year. Results from Chi-square analysis showed that generally the interest scale patterns made in the freshman year had some relationship to satisfaction with major field in the senior year.¹⁰¹

In an extensive longitudinal study where choice stability was defined in terms of college major, Holland¹⁰² tested the hypothesis that a student's satisfaction with his college will be greater if his personality type is congruent with his college environment. To do this, initial and final mean satisfaction scores for students of different types were correlated with the ranks of the environmental models of a college. The sample consisted of nearly 16,000 freshmen college students (7,326 males and 8,466 females) in twenty-eight institutions who were polled in the fall of 1964 and again in the spring of 1965. Data for the analyses were obtained from a number of instruments including the Vocational Preference Inventory, the Preconscious Activity Scale, the Range of Competencies Scale, the Interpersonal Competency Scale, the Student Orientation Survey, and a descriptive information questionnaire. Spearman's rank-

difference correlations and Pearson's product-moment correlations were used to perform the analyses. From the results of the analyses, Holland found that for male students, satisfaction with one's college was associated as much with incongruency of personality types and college environment as it was with congruency.¹⁰³ The findings for female students appeared to show that satisfaction with one's college increased when the subject's personality type was congruent with the more popular areas of study at the college.¹⁰⁴

In 1969 Walsh and Russell¹⁰⁵ published findings on their study of the differences in reported personal adjustment problems between freshmen students who made a congruent college major choice and students who made an incongruent choice. They used the Mooney Problem Checklist to define operationally personal adjustment. Congruent and incongruent college major choices were defined operationally by the Vocational Preference Inventory (VPI). A random sample of male (N=59) and female (N=65) undergraduates living in the residence halls at Ohio State University participated in the study. Cross tabulations, analysis of variance, and the Student's t-test were used to analyze the data. A congruent choice of college major occurred when students' high point VPI code and the high point code of their major field matched. The results showed that students who had made a congruent choice of college major reported

fewer personal adjustment problems than students who had made incongruent choices.¹⁰⁶ This finding is consistent with the hypothesis that congruence promotes personal stability and offers concurrent validation for Holland's theory of vocational choice.¹⁰⁷

In a study involving upperclassmen majoring in mathematics and sociology at the University of North Carolina in the spring of 1970, Morrow¹⁰⁸ sought to determine if Holland's theory could predict students' expressed satisfaction with their college major choices. Morrow hypothesized that students who had made congruent choices would express significantly greater satisfaction than students who had made incongruent choices. On the basis of VPI scores, Morrow assigned personality high-point codes to the mathematics majors (eighty-six males and sixty-one females) and sociology majors (fifty-four males and 122 females). He also administered a locally adapted questionnaire (similar to an instrument used by Brophy) to ascertain level of satisfaction with college major. Cross tabulations, analysis of variance, and Duncan's multiple range test were used to analyze the data. The findings yielded mixed results. Satisfaction with major was significantly related to personality type for the mathematics students but not for the sociology students.¹⁰⁹

Schmidt and Sedlacek¹¹⁰ conducted a study that was designed to explore the relation of certain factors to

students' satisfaction in college. They chose a random sample of 540 subjects from the 13,700 undergraduates at the University of Maryland who took the University Student Census (USC) in 1969. Results from the analysis of variance technique that was used to analyze data from the USC showed that students' personal orientation (i.e., interests, feelings, expectations, ego identity, academic and social adjustment) definitely related to their general satisfaction in college.¹¹¹ Also of interest was the finding that the most dissatisfied students were those who indicated difficulty in choosing a major field of study and/or career goal.¹¹²

In previously-cited studies by Walsh and Lewis¹¹³ and Walsh¹¹⁴, person-environment congruence was found to be conducive not only to more stable vocational choices (i.e., college major choices) and better maintenance of personal stability, but also to greater satisfaction with academic programs (i.e., college major).¹¹⁵

Using data obtained from two assessment instruments (the Self-Directed Search and the Inventory of Educational Experience and Opinion), Nafzinger, Holland, and Gottfredson¹¹⁶ classified 1,878 students from two different institutions into three levels of congruence using Holland's hexagon scheme in a large-scale study of satisfaction. This study reported in 1975 sought to investigate whether (1) students in congruent college environments were more

satisfied than students in incongruent college environments, and whether (2) different degrees of congruency result in different levels of student satisfaction. Computations were performed using the Miami multiple analysis of variance program. Standardized discriminant function coefficients and univariate F ratios were also calculated.

The researchers found small but significant differences consistent with theoretical predictions: students with college major codes that matched their types indicated the greatest satisfaction and students whose types were least like Holland's codes of their majors indicated the least satisfaction.¹¹⁷ The findings also suggested that congruency with a subject's major field was a good predictor of satisfaction with that environmental choice.¹¹⁸ The positive results of this study were observed (predicted) over an extended period of time ranging from ten months to three years.

A study conducted by Spokane and Derby¹¹⁹ investigated differences between congruent and incongruent college women on a number of variables including satisfaction with college major. The 132 subjects were from undergraduate programs at the University of Maryland and at SUNY Brockport and Genesee. Among the instruments used to collect data were the Vocational Preference Inventory and a Biodata Questionnaire which included a modified version of the Hoppock Job Satisfaction Blank. Cross tabulations and

multivariate analysis of variance were used to analyze the data measured/collected by these instruments. Although congruent subjects were found to be more consistent, more certain, and to score higher on perceived congruence than incongruent subjects, they were not found to be more satisfied with their college major than incongruent subjects.¹²⁰ Spokane and Derby suggested that their failure to find satisfaction differences in this study may have been due to the generally high levels of satisfaction that tend to occur among college students.¹²¹

In a study designed to re-examine the concurrent and predictive validity of the Holland categories for women and men across all types, Spokane¹²² also investigated the differences between congruent and incongruent students on several independent variables including satisfaction. Initially data were collected from 1,007 prospective members of the 1974 freshman class of Rochester University who took the Strong-Campbell Interest Inventory (SCII) during summer orientation. Follow-up data were obtained from 623 respondents (232 females, 386 males) in their senior year. The instruments used in the follow-up included the SCII (Form T325) and Hoppock's Job Satisfaction Questionnaire. Holland scales constructed for the SCII were used to define all types. Subjects were classified congruent if there was an identical match between the high-point code of the stated preference and the high point code from the SCII. All

others were classified as incongruent. Multivariate analysis of variance was used to analyze differences between subjects in the congruent and incongruent categories. Results indicated that congruent students were more satisfied than incongruent students.¹²³

Occupation

Holland's theory leads to the prediction that individuals will select occupations that are most congruent (compatible) with their personal orientations (personality types).¹²⁴

In a study comparing high point code and category of first career choice, Holland¹²⁵ found that the majority of Realistic, Investigative, and Social subjects chose careers in fields that suited their personality type. This pattern did not hold true for the Artistic and Conventional groups.¹²⁶ While the Artistic subjects chose more Investigative occupations than any other type (which is consistent with the findings of similarity between Artistic and Investigative subjects), they also chose Realistic and Social fields more frequently than Artistic careers, and Enterprising occupations as often as Artistic ones. The Conventional group chose Investigative, Realistic, Enterprising, and Social careers before Conventional.

Osipow, Ashby, and Wall¹²⁷ conducted a study to test the adequacy of Holland's theory of vocational choice using a broad sample of entering college students at Pennsylvania

State University in 1964. The sample for the study consisted of three general types of students with regard to selecting a particular field of study: (1) those who were decided (eighty-one males and twenty-seven females), (2) those who were tentative (seventy-nine males and twelve females), and (3) those who were undecided (twenty-six males and three females). Students first provided a list of self-rated personality descriptions which they ranked in the order which they felt best described them. Each of the students next provided a list of ranked career preferences (top choice first in order) to which Holland classifications were assigned. Based on these rankings specific predictions were tested concerning the relationship between personality type and occupational choices. From this data the category of the student's first personality type ranking was compared with the category of the student's first occupational preference. The researchers sought to test the prediction that students would choose occupations that were in categories which were consistent with their personality type. Discriminant analysis, analysis of variance and Chi-square analysis showed that although there was not uniform support for the prediction, large proportions of the subjects did make their choices in a manner consistent with Holland's theory.¹²⁸ This general support seems to indicate that the theory has definite value in predicting vocational behavior.

A follow-up study by Holland and Whitney¹²⁹ that checked students' vocational choices eight months after they reported them showed that predictions based on the original choices were correct in 63% to 71% of the cases. On the basis of these findings, Holland and Whitney asserted that there is a good accuracy rate in predicting that a student's choice would remain unchanged.¹³⁰

In light of Holland's postulation that a consistent code (i.e., related elements have common characteristics) indicates personality integration, Huges¹³¹ sought to probe the assertion that expressions of vocational choice, higher work satisfaction, and greater job stability are associated with consistent rather than inconsistent codes. A sample of 400 employed males selected from the State of New York Army National Guard were used as subjects for this study. Data were collected from the sample using a battery of six measures of interest and personality that included the Vocational Preference Inventory, the Strong Vocational Interest Blank, and the Cattell Sixteen Personality Factor. Chi-square computations were used to test for significance levels. In general, Huges found a low level of support for the hypothesis that people work at jobs appropriate to their personality orientation.¹³² No support in this study was found for the notion that employed people with consistent personality patterns express greater satisfaction with their jobs than do those with inconsistent patterns.¹³³

Gaffey and Walsh¹³⁴ studied the concurrent validity of Holland's theory for employed men using four different vocational inventories (i.e., four operational definitions of vocational interest). They also sought to determine the relationships among all possible combinations of the scales of these instruments. The sample of 153 male workers was drawn from Ohio, Pennsylvania, Maryland, and Massachusetts. The subjects were assigned to one of Holland's six vocational categories. The inventories used in this study included the Vocational Preference Inventory, the Self-Directed Search, and the Holland scales, Set I and Set II. The results of the analyses of variance of the scale scores tended to support the concurrent validity of Holland's theory for male workers in the eight different occupations studied.¹³⁵ The findings also supported Holland's assumption that person-environment types can be effectively assessed by any of the instruments used in this study with about equal results.¹³⁶

Lucy¹³⁷ examined the continuity of Holland's classification system for employed adults in his longitudinal study by relating college major categories at graduation to current occupation categories ten to thirty-five years later. The 884 male and female subjects for this study were drawn from a sample of 2,737 University of Maine alumni with work experience of ten to thirty-five years. The Vocational Preference Inventory (VPI) was used to gather

data in 1970. The relationships between personality types (derived from the major field of study) and the VPI high-point codes were measured by contingency coefficient C analysis. The results of this analysis revealed that (1) "the interests and attributes characterizing each personality type were fairly constant over long periods of time" (ten- to thirty-five-year intervals), and (2) "male and female participants were generally found to possess substantial personality type stability."¹³⁸ These findings provide important support for the contention that personality types (including career interests) have continuity.

Using a sample of 1,219 male freshmen at Virginia Polytechnic Institute, Smart¹³⁹ tested the assumption that people prefer distinctive occupational environments that are consistent with their dominant personal orientations. The appropriate Holland personality type was identified for each subject in the sample. Data for the study was obtained from the Cooperative Institutional Research Program (CIRP) questionnaire. Stepwise multiple discriminant analysis was used to analyze the data. The results suggested that the college students in this sample were likely to seek careers in occupations that would be compatible with their personality orientations.¹⁴⁰

Horton and Walsh¹⁴¹ conducted a study in which they sought to test the concurrent validity of Holland's theory

for employed college degreed women using the Vocational Preference Inventory (VPI) and the Self-Directed Search (SDS) to operationally define their vocation orientation. The sample for the study consisted of 179 female workers employed in occupations consistent with Holland's six vocational environments. The two hypotheses were tested using multivariate analysis of variance and the Pearson product-moment correlation coefficient. Results indicated that the VPI and SDS scales tended to effectively discriminate among the occupational groups in accord with Holland's theory.¹⁴² Both of the instruments identified occupational groups consistent with Holland's theoretical framework.¹⁴³ This finding suggests that subjects scoring the highest on a particular vocational scale tended to be working in a corresponding occupation.

In a related study conducted by Fishburne and Walsh¹⁴⁴, 126 male non-college-degreed workers from six occupations corresponding to Holland environmental classifications were tested to study the concurrent validity of Holland's theory using two different operational definitions of vocational orientation. Subjects for the study were drawn from work environments in and around Columbus, Ohio. All the subjects responded to the Vocational Preference Inventory (VPI) and the Self-Directed Search (SDS). One-way analysis of variance and the Pearson product-moment correlation coefficient were employed to test

the two hypotheses of this study. In general, the findings provided mixed support for the concurrent validity of Holland's theory for male non-college-degreed workers.¹⁴⁵ Results indicated that four of the SDS scales and two of the VPI scales accurately predicted the work environment of the sample's subjects.¹⁴⁶

In a study investigating the concurrent validity of Holland's theory, Fabry¹⁴⁷ sought to test the degree of agreement across and within selected occupational groups. The testing procedure determined the degree of agreement for each group between the obtained ordering of types (i.e., a ranking derived from each individual's raw scores on the six type scales for each of the four occupational groups) and the theoretical ordering (the a priori ordering postulated Holland). The sample of 120 male workers was drawn from four occupational groups (Policemen, Clergymen, Life insurance salesmen, and Gas station managers) representing three distinctly different Holland codes. The sample was drawn from the cities of Lawrence and Kansas City, Missouri. Data were collected from subjects using Holland's Vocational Preference Inventory (VPI). Kendall's coefficient of concordance was used to determine the degree of agreement between the rank-orders of each individual in the four groups for the six type scales on the VPI. Chi-square was used to determine statistical significance. Page's L statistic was then employed to determine the degree of

statistical significance between the theoretical ordering and the observed ordering of the six types. Results of the analysis revealed that there was a significant degree of agreement in the ordering of the VPI occupational types within each of the four groups tested thus supporting, in general, the theoretical classification types proposed by Holland.¹⁴⁸

Wiggins and Weslander¹⁴⁹ conducted a study to ascertain if efficient medium to long range predictions could be made from expressed vocational choices and/or vocational preference inventories. Four hundred subjects (200 males and 200 females) who had taken the Kuder Preference Record-Vocational, Holland's Vocational Preference Inventory, and Wiggins's Career Survey were randomly selected from students who had graduated from a high school in a small, rural school district between 1966-69. Only first letter codes of the VPI were used to determine frequency of congruence. Results showed that prediction of future occupation was significantly higher for males than for females.¹⁵⁰ The findings also revealed that prediction from expressed choice was notably higher (74% males, 55% females) than prediction from VPI scores (65% males, 57% females) and Kuder scores (44% males, 41% females).¹⁵¹

In a study testing the concurrent validity of Holland's hexagonal model, Mount and Muchinsky¹⁵² sought to

assess the degree of person-environment congruence in a sample of salaried employees from a diverse set of occupations and jobs. To do this, they administered Holland's Self-Directed Search (SDS) to workers in fields representing five types of occupational environments. Of the 548 questionnaires mailed out, 362 were returned in usable form. Chi-square analysis was used to test for significance. The findings showed that people generally worked in environments congruent with their type.¹⁵³

In a previously cited study, O'Neil, Magoon, and Tracey¹⁵⁴ found that the Self-Directed Search was predictive over a seven-year period of the actual field of job entry, graduate major, and preferred and projected career plans.¹⁵⁵

Walsh and Huston¹⁵⁶ conducted a study to investigate the differences among women and men employed in traditional female occupations. The sample of 151 male and female workers who were employed in three Social occupations provided information about their vocational interests by responding to the Vocational Preference Inventory (VPI). Results of multivariate analysis of variance showed that only the Realistic scale of the VPI differentiated gender in the occupational groups studied.¹⁵⁷ As predicted, the Social scale did not differentiate among males and females in the same work environment.¹⁵⁸ In general, the findings of this study indicated that for all of the VPI scales except Realistic, women and men tended to choose

occupational environments that were congruent with their personality type.¹⁵⁹

Greenlee, Damarin, and Walsh¹⁶⁰ investigated the notion that the interest profiles of Black workers would be less congruent, less consistent, and less differentiated in their vocational environments than would be the profiles of White workers in similar work environments. The assumption here is that prejudice against Blacks creates employment barriers that causes them more often than Whites to settle for jobs that are not compatible with their personality orientations. The sample included forty Black and forty White male workers in Ohio who were employed in one Social (hospital aides) or one Enterprising occupation (restaurant proprietors). Half of each racial group was employed in each of the two work environments. All the subjects completed Holland's Self-Directed Search (SDS) and a fifteen-item biographical inventory. Iachan's Index was used to determine congruence. Multivariate analysis of variance was used to examine racial differences in SDS profiles and t-tests were used to make a separate comparison for congruence within each occupation. The results indicated that Black restaurant proprietors were less congruent than White proprietors and that the Black hospital aides were less differentiated than the white aides.¹⁶¹ As expected, these differences were more prominent in the

Social occupation than in the Enterprising work environment.¹⁶²

Satisfaction with Occupation

A great deal of research has been conducted on occupational/job satisfaction during the last forty years. In 1959 Herzberg, Mausner, and Synderman¹⁶³ analyzed the feelings and experiences about their jobs expressed by two hundred engineers and accountants in nine different companies. The researchers found that of the various categories examined, those related to job content were the ones associated with positive attitudes.¹⁶⁴ Nearly twenty years later Beatty and Schneier reported on fifty studies of job satisfaction they had surveyed and concluded that a high percentage of workers were generally dissatisfied.¹⁶⁵

Scarpello and Campbell¹⁶⁶ studied the concept of worker-job congruence and its impact on job satisfaction in four companies employing 185 workers. The researchers concluded that satisfaction with one's job may be contingent upon the worker's feeling that the work situation will allow him to assume the kind of role that is perceived as congenial and appropriate according to previous growth experiences.¹⁶⁷

During this period, the construct of congruence is found in the research literature as having an important association with job satisfaction. Frequently this association takes the form of occupational interest as

related to vocational, job, or career satisfaction. Until recently, most of these studies have examined the relationship between job satisfaction and variables such as age, education, job level, absenteeism rate, and productivity.¹⁶⁸

However, during the past decade researchers have had an increasing interest in determining the causal antecedents of job satisfaction.¹⁶⁹ Some of the theorists in the field of vocational psychology contend that when a person's "abilities, interests, and personal traits match the requirements, rewards, and interpersonal relations in a given work environment, the person will be satisfied and successful."¹⁷⁰

Nearly twenty years ago, John L. Holland hypothesized that congruence between workers' personality type code and occupational/job type code is positively correlated with job satisfaction.¹⁷¹ Holland contends that "vocational satisfaction, stability, and achievement depend on the congruence between one's personality and the environment (composed largely of other people) in which one works."¹⁷² The preceding assertion is a corollary to the assumption that job satisfaction is a function of the characteristics of the person (i.e., vocational interests and personality variables), and characteristics of the environment (i.e., the situation or atmosphere created by the people who dominate a given environment).¹⁷³ Mount and Muchinsky argue

that "the implication of Holland's theory for understanding job satisfaction is evident. People in environments congruent with their personality/interest type should be more satisfied with their jobs than people in incongruent pairings."¹⁷⁴ Crucial to Holland's theory is the concept of congruence. According to Holland, vocational choice, satisfaction, achievement, competence, and social behavior should be predictable from person-environment congruence.¹⁷⁵ A more recent edition of Holland's theory maintains that vocational satisfaction and achievement depend on congruence between personality and work: congruence results in more satisfaction and effectiveness; incongruence results in less satisfaction and effectiveness.¹⁷⁶

A basic premise derived from the Holland theory is that job/occupational satisfaction is enhanced when the personality of the worker is congruent with his or her work environment, that is, when both person and environment fall within the same Holland type.

Lawler was among the first to suggest that job satisfaction is "both a function of the person and the environment."¹⁷⁷ Specific person-environment characteristics that lead to job satisfaction still remain unclear and often contradictory. Further, when a person is allowed to practice preferred methods of dealing with one's environment, a congruent situation exists and satisfaction generally exists. Conversely, incongruence and

dissatisfaction may result when one cannot use favorite methods of interacting on the job. Congruence is now generally accepted as an important global construct in studying job satisfaction.

Studies on Job Satisfaction

Schletzer¹⁷⁸ conducted a study of 185 male graduates of various professional schools and curricula of the University of Minnesota between 1957 and 1959 to test whether job satisfaction in a certain work environment is related to congruent interests in that environment. Subjects completed three job satisfaction inventories (Hoppock's Job Satisfaction Blank, the Brayfield-Rothe Job Satisfaction Blank, and the Job Dimension Inventory), a personal data questionnaire, and the Strong Vocational Interest Blank. Cross tabulations, Pearson's product-moment correlations and phi coefficients were used to analyze the data. The results failed to show any significant relationship between job satisfaction and personal interests.¹⁷⁹

In a previously cited study Huges¹⁸⁰ also tested the assertion that higher work satisfaction is associated with consistent (i.e., "congruent" according to Holland's usage) rather than inconsistent (i.e., "incongruent" according to Holland) codes. No support in this study was found for the notion that employed people with personality type codes consistent (congruent) with their work environment type codes express greater satisfaction with their jobs than do

those with personality type and occupational codes that are inconsistent (incongruent).¹⁸¹

Walsh, Howard, O'Brien, Santa-Maria, and Edmondson¹⁸² conducted research to explore the differences on variables of satisfaction, self-concept, self-acceptance, and vocational maturity between a group of students who reported a congruent occupational choice and those who reported an incongruent choice. The researchers were also interested in identifying gender differences on these variables. Both groups (congruent and incongruent) were composed of thirty-five males and thirty-five females who were freshmen at Ohio State University. Among the instruments used to gather data were the Self-Directed Search, the College Student Satisfaction Questionnaire, and the Vocation Maturity Scale of the Vocational Development Inventory.

While the initial analysis of identical one-letter codes indicated that person-environment congruence was not associated with job satisfaction, further analysis using a more stringent definition of congruent (the match of identical two-letter codes) found that person-environment relationships did tend to be associated with satisfaction. Analysis of variance and Tukey b test were employed to analyze the data. Results of the analysis showed that the congruent male group tended to report a higher degree of overall personal satisfaction more often than the other three groups (incongruent males, congruent females, and

incongruent females). The congruent female group generally was more satisfied than the incongruent female group.¹⁸³

Werner¹⁸⁴ investigated the relationship between a students' vocational role choice and their satisfaction with their vocational training program. He hypothesized that if there was congruence between students' expressed vocational role choice and their training program, there would be greater satisfaction than if there was incongruence between the two. The sample was composed of 594 randomly selected eleventh and twelfth grade high school students in vocational training programs. The Vocational Preference Inventory and personal data questionnaire which included a satisfaction rating sheet were used to collect data. Analysis of variance and Chi-square were used to analyze the data and test for significance. The results seemed to indicate that students who had selected a definite role preference had a greater likelihood of being satisfied with their training program than did the incongruent students.¹⁸⁵

McDonald and Gunderson¹⁸⁶ sought to determine some of the important correlates of job satisfaction for Navy enlisted men in operational settings. Personal history, military status, and job satisfaction information was collected from the sample (N=5,851) using a locally prepared questionnaire. The results showed that of the seventeen variables derived from the questionnaire, health-related

concerns, type of job, and seniority were most highly correlated with satisfaction.¹⁸⁷

Smart¹⁸⁸ examined the degree to which a number of specific sources of job satisfaction were related to (and predictive of) overall job satisfaction of department chairmen at a number of public universities. The sample consisted of 1,198 subjects from thirty-two mid-sized institutions located in all regions of the country who were assigned to the six model environments postulated by Holland. Data were analyzed using Pearson product-moment correlation, Spearman's rank order correlation, and incremental step-wise multiple regression. The findings led Smart to conclude that overall job satisfaction in the work environments of his study resulted from a unique combination of satisfaction with different aspects of one's job.¹⁸⁹

Wiggins¹⁹⁰ sought to clarify the relation of job satisfaction to vocational interests using a sample of 115 female teachers of the educable mentally retarded in the public school systems of Delaware. Data were collected using Hoppock's Job Satisfaction Blank, Holland's Vocational Preference Inventory, and a locally designed teacher questionnaire. A multivariate analysis of variance (MANOVA) design was used in this study. The results indicated that job satisfaction of the subjects in this study was directly related to tested congruence, with other tested variables

(i.e., age, years of experience, and educational level) not statistically significant.¹⁹¹

Peiser and Meir¹⁹² administered the Ramak Interest Inventory to a sample of Israeli workers (158 males and 202 females) who had taken the Ramak Inventory seven years earlier as high school seniors. The subjects in this sample also responded to a one-item inventory on satisfaction with occupational choice. Statistical analysis was performed using Pearson product-moment correlations. The results of the study revealed a positive correlation between congruence and occupational choice satisfaction for both males and females.¹⁹³ The findings also seemed to show that higher occupational choice satisfaction for both male and female subjects was predictable when their occupational field was congruent with their vocational interests and those interests were consistent and differentiated.¹⁹⁴

Wiener and Klein¹⁹⁵ hypothesized that congruence of vocational interests with present occupation would be positively correlated with job satisfaction for long-tenured employees, and would be unrelated to satisfaction for short-tenured employees. They tested this hypothesis with 101 middle managers from a variety of managerial positions in Cleveland, Ohio who were participating in a two-year professional management program sponsored by Cleveland State University. The Strong Vocational Interest Blank was used to derive scores on personal interest-present job

congruence, while job satisfaction was measured by the Job Descriptive Index (JDI). Pearson's product-moment correlations were used to analyze the data with the difference between correlations tested using Fisher's Z transformation test for significance. Results showed that while the effect of job tenure on the relationship between interest congruency and job satisfaction was supported for the work and supervision scales of the JDI for long-tenured managers, interest congruency was not related to job satisfaction for short-tenured managers.¹⁹⁶ In general, the finding of this study did not support an overall interest-congruency relationship with job satisfaction.¹⁹⁷

In a comprehensive study of the relation of Holland's construct of congruence to job satisfaction, Mount and Muchinsky¹⁹⁸ asserted that congruent employees would be significantly more satisfied with their jobs than incongruent employees. The sample for this study was composed of 362 employees attending conferences and conventions at a large midwestern university and contained subjects from five of Holland's six environmental typologies. The Artistic category was excluded due to insufficient representation. Data were obtained through the administration of the Self-Directed Search (SDS) and the Job Descriptive Index (JDI). Using analysis of variance (ANOVA) with scores from the SDS and JDI, Mount and Muchinsky found higher job satisfaction among congruent workers in

Investigative, Conventional, and Enterprising environments than among workers in Social and Artistic environments. The findings showed that employees working in a congruent occupation had significantly higher satisfaction scores on all the sub-scales of the Job Descriptive Index (i.e., work, pay, promotions, supervision, co-workers, and overall satisfaction) than employees working in incongruent environments.¹⁹⁹

Hener and Meir²⁰⁰ used congruency to predict job satisfaction within a single occupation (nursing) to test Holland's theory. The sample consisted of 126 female registered nurses. A specially designed List of Courses in Nursing Inventory was used to collect data from the subjects. A Smallest Space Analysis was performed to determine interrelationships of the variables with the coefficient of alienation utilized to assess the nature of the correlations. The results supported the hypothesis that there would be a positive correlation between congruence and job satisfaction.²⁰¹ In fact, the findings showed that as the congruence level got higher, there was also a commensurate rise in the job satisfaction level.²⁰² Hener and Meir also found that congruence, consistency, and differentiation had an accumulative effect on job satisfaction.²⁰³

Ananya, Barak, and Amernic²⁰⁴ were also interested in the relation of congruency to job satisfaction within one

occupation. Their study investigated the Self-Directed Search pattern in a broad sample of Certified Public Accountants. The sample was comprised of 1,338 Canadian Chartered Accountants and 810 California Certified Public Accountants all of whom were randomly selected. The instruments used in this study included Holland's Self-Directed Search, some scales of organizational and professional commitment, a vocational satisfaction measure, and a social desirability index. Correlation analysis was utilized in this study. The results showed that congruent subjects had higher correlations with vocational satisfaction than did incongruent subjects.²⁰⁵

Wiggins, Lederer, Salkowe, and Rys²⁰⁶ tested the hypothesis that overall job satisfaction would be highest for persons in congruent environments with a sample of 247 teachers representing diverse Holland types and subtypes. The subjects of the study group came from public school districts in Delaware, Maryland, New Jersey, and Pennsylvania. Hoppock's Job Satisfaction Blank and Holland's Vocational Preference Inventory (VPI) were used. Congruence was calculated using the Compatibility Index developed by Wiggins and Moody. Cross tabulations, correlation analysis, and ordinary least squares regression were used to analyze the data. As expected, the results showed that job satisfaction correlated positively with scores on the Investigative and Social scales of the VPI and

negatively with scores on the Realistic scale. Least squares regression analysis revealed that job-person compatibility was the single best predictor of job satisfaction.²⁰⁷

In a somewhat similar study, Wiggins²⁰⁸ investigated the relationship of personality and demographic variables to the job satisfaction of school counselors. The final sample of the study involved 123 participants out of an initial group of 200 randomly selected public school counselors from Delaware, Maryland, New Jersey, and Pennsylvania. The instruments used to collect data included the Task-Hygiene Job Satisfaction Blank, the Vocational Preference Inventory, and a general information questionnaire. Congruence was calculated using the Compatibility Index. Results from cross tabulations and correlation analysis indicated that congruence was significantly correlated with job satisfaction.²⁰⁹

In an extensive review of research related to Holland's theory of careers, Spokane²¹⁰ reported on a number of correlational studies investigating the relationship between person-environment congruence and job satisfaction. Most of the studies examined in this review reported findings that showed a significant, positive relationship between congruence and job satisfaction prompting Spokane to conclude that higher congruence appeared to be related to greater job satisfaction.²¹¹

Smart, Elton, and McLaughlin²¹² also found support for the premise that job satisfaction is positively related to congruence between personality type and work environment. Data for this study was obtained from respondents to the 1971 and 1980 Cooperative Institutional Research Program (CIRP) surveys. The sample of 1,014 individuals (540 males and 474 females) was randomly selected from a thirty-six-cell sampling design so that the end result was thirty subjects in each cell. The data were analyzed using multivariate analysis of covariance (MANCOVA) procedures. There were several important findings of the study: (1) intrinsic job satisfaction is significantly and positively related to person-environment congruence for both genders, and (2) the relationship between congruence and job satisfaction is consistent across gender and personality type.²¹³ This latter finding is in contrast to earlier findings by Mount and Muchinsky²¹⁴ and Wiggins, Lederer, Salkowe, and Rys.²¹⁵ Both of these studies reported significant variability among the personality types and degree of job satisfaction in the various work environments.²¹⁶

Elton and Smart²¹⁷ conducted a longitudinal study in which they investigated the relationship of person-environment congruence to job satisfaction for men and women using data from the same CIRP surveys used in the Smart, Elton, and McLaughlin study (1986) referenced above. This

study was based on responses of subjects (792 men and 1,077 women) who had obtained at least a bachelor's degree and who were employed full-time in 1980. Median polishing was chosen as the method of analysis. The results of this study indicate that those at the highest level of congruence tended to be less dissatisfied with their job than those at the lowest level of congruence.²¹⁸ Elton and Smart found only moderate support for a positive relation between person-environment congruence and job satisfaction.²¹⁹

Using a sample of sewing machine operators (N=318) in three clothing factories located in rural southern Alabama, Heesacker, Elliott, and Howe²²⁰ did not find support for the hypothesis that environment-personality congruence in the workplace should result in increased satisfaction. The Self-Directed Search was used to classify subjects by Holland code and a locally designed questionnaire was employed to assess global satisfaction. Analysis of variance (ANOVA) was used to analyze the data with Scheffe tests on least square means performed where ANOVAs were statistically significant. Contrary to expectation, subjects having person-environment congruence did not manifest a higher level of job satisfaction than subjects having incongruence between their personality type and work environment.²²¹

Meir and Yaari²²² examined the hypothesis that the relationship between congruent specialty choice within

occupations on the one hand and satisfaction on the other exceeds the relationship between congruent occupational choice and satisfaction. The sample consisted of 324 subjects from a variety of occupations. The instruments used included a biographical inventory, a within-occupation interest inventory (resembled the item-form of the Self-Directed Search), the Courses Interest Inventory, and a satisfaction inventory (similar in part to the Job Descriptive Index). Derived congruence and occupational scores, Small Space Analysis (SSA), ADDTREE analysis, and Pearson product-moment correlations were used to analyze the data. Results indicated that satisfaction with specialty choice increased with the level of specialty congruence (i.e., higher specialty congruence levels yielded higher satisfaction levels).²²³

Recently Gottfredson and Holland²²⁴ tested the hypothesis that interest congruence is more closely associated with job satisfaction for workers with clearly defined interests than it is for workers with poorly defined interests. The sample they originally selected for this four-month longitudinal study consisted of 345 newly hired bank tellers. The instruments used to collect data included Hoppock's Job Descriptive Index, and additional scales designed to measure tolerance, competency utilization, role ambiguity, role conflict, job change, job involvement, and counterproductive behavior. Person-environment congruence

was determined using the Iachan Index. Canonical correlation was performed to identify the canonical factors relating the predictor and criterion sets. Results showed that the strongest canonical factors relating to job satisfaction were expected satisfaction and person-job congruence.²²⁵ According to Gottfredson and Holland, the most important outcome of this study was that "person-job congruence did have substantial correlations with job satisfaction in a well-defined, homogeneous sample."²²⁶

Research Hypothesis

The following research hypotheses will be investigated in this study:

1. Congruence between a student's personality type code and occupational aspiration code (as measured by Holland's Self-Directed Search) is related to persistence to graduation from college.
2. Students' personality type code (as measured by Holland's Self-Directed Search) is a predictor of their choice of college major code (as listed and defined in "The College Majors Finder").
3. There is a higher frequency of positive satisfaction with college major for subjects with high-moderate congruence between personality type and college major chosen than there is for students with a weak-poor congruence between them.

4. Students' personality type code (as measured by Holland's Self-Directed Search) is a predictor of their present occupation code (as listed and defined in the Dictionary of Holland Occupational Codes).

5. Congruence between personality type code (as measured and defined in the summer of 1979 by Holland's "Self-Directed Search") and present occupation code (as reported in the winter of 1989-90 on the Data Collection Instrument and defined in Holland's "The Occupations Finder") has a strong predictive relationship with job satisfaction (as measured by the Job-in-General Scale of the Job Descriptive Index).

Summary

Chapter II has presented a discussion of the pertinent aspects of Holland's theory, an analysis of the research literature related to Holland's theory that has bearing on the proposed study, and a statement of this study's research hypotheses. Chapter III will provide a detailed discussion of the research methodology planned for the study.

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CHAPTER III

RESEARCH METHODOLOGY

In this chapter attention will be given to specific aspects of this study's research methodology: research design, sample, types of data collected, instrumentation, data collection procedures, and analysis of data.

Research Design

This study employed a follow-up survey design that was used to examine certain relationships (changes or time-ordered associations) between certain predetermined variables.¹ The investigation was a cohort study since a specific population was followed over a ten-year period of time.²

The Sample

The population for this study consisted of all the in-coming freshmen of the host university who took John Holland's Self-Directed Search during the time they attended freshman orientation in the summer of 1979. This population was chosen because the specific context and variables discussed earlier had not been studied to date with a mid-size urban university population.

In order to derive an appropriate and manageable sample for this study, stratified random sampling was used.³ The population was separated into groups according to the six personality types used by Holland's Self-Directed Search. The number of subjects randomly selected from each group was based on the size of the group in the population. A table for determining needed sample size of a randomly selected sample from a given finite population of cases was used so that the sample proportion would be within $\pm .05$ of the population proportion with a 95% level of confidence.⁴

Tables 1 and 2 present demographic descriptions of the sample used for this study. Table 1 shows that 52% of the subjects were females, 63% were eighteen years old (31% were seventeen), 92% were Caucasian, 73% were residents of Hampton Roads Virginia (17% from another part of the State), and 86% indicated they lived in an urban area. The mean age for the total sample was 17.77. The typical subject in this study was an eighteen year-old Caucasian from the Hampton Roads Area.

Table 2 presents the same data for each of the six sub-groups of the total sample. There are some notable differences and contrasts among the groups.

1. While the range for females for five of the six groups is from a low of 53% to a high of 70%, the gender composition of the sixth group (R) is only 3% female.

2. One group (A) had double the number of black subjects (7%) that were in the other five groups, while another group (R) was the only one that had no other minority subjects represented besides its black subjects.

3. The distribution by age ranged from a low of 53% of those who were eighteen in one group (I) to a high of 70% in two of the other groups (R,S). In one group (R), 17% were nineteen years old, while two other groups (E,I) had no one at that age. These two groups also had no subject who was sixteen. In one group (C), 3% were above nineteen.

4. The mean age of the subjects in the sample at the time the Self-Directed Search was taken (1979) ranged from a low of 17.70 years (Group S) to a high of 17.83 years (Group C).

5. Distribution of home residence for subjects from the Hampton Roads Area ranged from a low of 67% (Group R) to a high of 80% (Group S). Home residence in the rest of Virginia ranged from 13% (Group E) to 23% (Group R). Home residence outside of Virginia ranged from 3% (Groups C and S) to 17% (Groups A and E). Urban home residence ranged from 80% (Groups E and R) to 93% (Group C).

Sets of Data Collected

Three sets of data were collected from all the subjects of this study. The first type of data gathered was related to John Holland's theory of vocational choice. This set was comprised of subjects' responses to Holland's Self-

TABLE 1

Demographic Descriptions of the Total Sample
(Showing Number of Subjects and Percent
for Each Category)

Distribution by Gender		
Gender	Number of Subjects	Percent of Total
Males	85	47.22%
Females	95	52.28%
Distribution by Age When SDS Was Administered (8/1/79)		
Age Group	Number of Subjects	Percent of Total
16 years	2	1.11%
17 years	55	30.56%
18 years	113	62.78%
19 years	9	5.00%
20 years	0	0.00%
21 years	0	0.00%
22 years	1	0.55%
Distribution by Mean Age When SDS Was Administered (8/1/79)		
Number of Subjects		Mean Age
180		17.77

Table 1-Continued

Distribution by Race		
Race	Number of Subjects	Percent of Total
Black	7	3.89%
White	166	92.22%
Other	7	3.89%

Distribution by Home Residence	
Home Residence	Number and Percent
Hampton Roads Region	132 (73.33%)
Out of Region in State	30 (20%)
Out of State in USA	18 (10%)
Urban	155 (86.11%)
Rural	25 (13.89%)

Directed Search. The intention here was to determine the personality type and top occupational aspirations for each subject. These data were collected in the summer of 1979.

The second set of data collected was general demographic information. The objective for this set was to gain specific information about subjects' educational and occupational experiences since 1979. These data were

TABLE 2

Demographic Descriptions of the Sample's Six Groups
(Showing Number of Subjects and Their Percent
of Each Group/Category)

	Group R	Group I	Group A	Group S	Group E	Group C
Distribution of Subjects in Sample						
Number	30	30	30	30	30	30
(%)	(16.67%)	(16.67%)	(16.67%)	(16.67%)	(16.67%)	(16.67%)
Distribution by Gender						
Male	29 (97%)	12 (40%)	9 (30%)	11 (37%)	14 (47%)	10 (33%)
Female	1 (3%)	18 (60%)	21 (70%)	19 (63%)	16 (53%)	20 (67%)
Distribution by Race						
Black	1 (3%)	1 (3%)	2 (6.5%)	1 (3%)	1 (3%)	1 (3%)
White	29 (97%)	28 (93%)	26 (87%)	28 (93%)	28 (93%)	27 (90.5%)
Other	0 (0%)	1 (4%)	2 (6.5%)	1 (4%)	1 (4%)	2 (6.5%)
Distribution by Age When SDS Was Administered (8/1/79)						
16 yrs	0 (0%)	0 (0%)	0 (0%)	1 (3%)	0 (0%)	1 (3%)
17 yrs	9 (30%)	6 (20%)	8 (27%)	12 (40%)	11 (37%)	9 (30%)

Table 2-Continued

18 yrs	16 (53%)	24 (80%)	21 (70%)	16 (53%)	19 (53%)	17 (57%)
19 yrs	5 (17%)	0 (0%)	1 (3%)	1 (3%)	0 (0%)	2 (7%)
22 yrs	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (3%)

Distribution by Mean Age When SDS
Was Taken (8/79)

Mean Age by Years	17.80	17.80	17.77	17.70	17.73	17.83
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Distribution by Home Residence

HOME ADDRESS	Group R	Group I	Group A	Group S	Group E	Group C
In-HR Region	20 (67%)	22 (73%)	22 (73%)	24 (80%)	21 (70%)	23 (77%)
Out of Region	7 (23%)	5 (17%)	3 (10%)	5 (17%)	4 (13%)	6 (20%)
Out of State	3 (10%)	3 (10%)	5 (17%)	1 (3%)	5 (17%)	1 (3%)
Rural	6 (20%)	3 (10%)	3 (10%)	5 (17%)	6 (20%)	2 (7%)
Urban	24 (80%)	27 (90%)	27 (90%)	25 (83%)	24 (80%)	28 (93%)

obtained by telephone interview during the winter of 1989-90 in order to test the first four hypotheses of this follow-up study.

The third set of data collected was concerned with job satisfaction. The intention for this data set was to measure the extent of job satisfaction of participants in the study. The Job Descriptive Index and its companion the Job in General were the instruments used to obtain the measure of job satisfaction. These data were gathered by phone interview during the winter of 1989-90 to test the fifth hypothesis of this follow-up study at the same time the above referenced demographic information was collected.

Instrumentation

Two instruments were used in the collection of data for this study. As noted above, The Self-Directed Search (SDS) was used initially (in the summer of 1979) to collect data from the subjects in the study's population. In the winter of 1989-90, the Data Collection Instrument (DCI) was employed to obtain follow-up data relevant to that which was collected by the SDS. The major components of the DCI were the Job Descriptive Index (JDI) and its notable companion, the Job-in-General scale (JIG).

The Self-Directed Search

The SDS is a career guidance tool that grew directly from Holland's theory of vocational choice (1959, 1966,

1973, 1985). This instrument has gained widespread use as an economical, self-administered, self-scored, and self-interpreted vocational counseling tool that provides the test-taker with certain occupational information that can be useful in making career choice decisions.⁵ The SDS has been defined as a "comprehensive inventory of vocational interests, values, competencies, avocational interests, and personality."⁶ The SDS offers a useful way to determine a person's resemblance to the six personality types. This resemblance to the types is likely to be defined by vocational interest as manifested in vocational and educational preferences, current employment, or scores on certain interest scales.⁷ The SDS was first published in 1970, revised in 1977 and again in 1985. In 1990, the Career Planning Form (Form CP) of the SDS was published. This most recent development of the SDS was designed to be used primarily in career planning activities. All the forms of the SDS have featured a workbook format that encourages write-in responses.

The 1977 form used by the subjects in this study opens with a section on occupational daydreams or aspirations that is followed by sections dealing with self-assessed activities, competencies, attitudes toward specific occupations, and estimates of abilities. The raw scores of the occupational daydreams and summary code sections are converted into three-letter summary codes. The order of the

letters in the summary code is hierarchical with the first letter indicating the primary personality type. In the present study, the entire three-letter code was used to describe each person's resemblance to a personality pattern or subtype.

The entire SDS has been shaped by Holland's theory of vocational personalities and work environment models. Both the personal assessment and the occupational classification sections of the SDS use the six major type concepts in the theory and the hexagonal arrangement of those concepts. The relationships among the six typologies can be seen in Appendix A (Hexagonal Model). This spatial arrangement facilitates the interpretation of the degrees of similarity among the categories. The results of extensive research on the test-retest reliability indicate that "the reliability of the SDS Summary scales averages about .90," and that reliability "calculated by any technique, increases slightly with age."⁸ Holland reports that the corrected split-half reliability coefficients for the summary scales of the 1977 revision range from .83 to .95, thus indicating a high degree of internal consistency.⁹

Although the argument has been made by some that evidence for the construct validity of the SDS is somewhat weak¹⁰, the findings are still more positive than negative.¹¹ In the opinion of some researchers, studies of the predictive validity of the SDS are still somewhat

uncommon and limited in scope.¹² However, Holland counters with some substantial evidence that the SDS has a high degree of internal consistency within the six Summary scales, an average to high concurrent and predictive efficiency, and a moderate to high convergent and discriminant validity of its different sections.¹³ In general, the concurrent or predictive validity of the SDS Summary scales are comparable with, and sometimes exceed, the concurrent or predictive validity of other instruments used to assess vocational interests.¹⁴

All the items and scales in the SDS appear to have clear content validity since items are stated positively and in direct ways so that little or no interpretation is necessary.¹⁵ Holland also developed The Occupations Finder to use with the SDS to find accordant occupations.

The Data Collection Instrument

A composite Data Collection Instrument (DCI) based on the research literature was used to obtain additional data for the study. The major parts of the DCI were two instruments used to measure job satisfaction—The Job Descriptive Index (JDI) and its Job-in-General scale (JIG).

The Job Descriptive Index

The JDI is composed of five sub-scales designed to measure specific facets of job satisfaction. The JIG is a supplemental sub-scale of the JDI that measures global job

satisfaction. These instruments are reported to be the most frequently used measures of job satisfaction.¹⁶ They are regarded by many workers and researchers as the most carefully developed instruments for measuring job satisfaction.¹⁷ Schriesheim and Kinicki conclude that "the JDI is a high-quality measuring instrument, and that there is no existing measure of job satisfaction with as much positive evidence concerning its validity and reliability."¹⁸ The JDI (including the JIG) was selected to measure job satisfaction for this study because of its (1) appropriate content, (2) suitable format, and (3) strong reliability (alpha coefficient of internal reliability ranges from 0.69 to 0.93) and validity ratings reported in the research literature.¹⁹

The JDI asks respondents to rate, on a three-point scale, sixty-two statements about the work they do. These adjectives or descriptive phrases come from five basic areas: work, pay, opportunity for promotion, supervision, and co-workers. The internal consistency of the JDI was tested by Smith et al., using the Spearman-Brown Formula, and yielded these values for each of the five subscales ranging from .80 to .88.²⁰ Smith et al. also found that the JDI scales show consistent discriminant and convergent validity.²¹ Schneider and Dachler found that the JDI retained rather high reliability over an extended period of

time.²² Their obtained reliability coefficient was .57, suggesting that the five scales of the JDI retain their independence over time, thereby making them useful for longitudinal studies.²³

The Job-in-General Scale

Using the same instruction and item format as the JDI, the JIG is composed of eighteen related phrases of a more general nature that are designed to measure global job satisfaction. The response format is the same as the JDI and is easily included in the administration of the JDI. Analysis of the JIG indicates excellent discriminant and predictive validity (established by intercorrelational analyses using the set of five facet scales of the JDI, a composite scale underlying the JDI, and the global scale of the JIG), strong convergent validity (established by correlation analysis with four other general scales of job satisfaction in which the correlations ranged from .67 to .80), and good internal consistency reliability (coefficient alpha ranged from .91 to .95 in two separate large studies (N=3,566)).²⁴

Muchinsky gives the JDI (including the JIG scale) a strong endorsement stating that the instrument "seems to deserve its reputation as the best measure of satisfaction presently available."²⁵ Copies of the JDI and JIG are found in Appendix B.

The other section of the composite instrument is self-designed and was used to collect demographic and follow-up data. This section was pilot-tested (using a random sample of the population) in order to establish its reliability. A copy of this section of the data collection instrument is found in Appendix C.

Method of Collecting Data

Part of the data for this study was collected by administering The Self-Directed Search (SDS) at freshmen orientation during the summer of 1979. The composite data collection instrument described above was used to collect additional data. All the subjects in the study were interviewed by phone using the same instructions and instrument.

Pilot Study

A pilot study was conducted to determine whether a sufficient response rate (of those randomly selected from the original population for each personality type group) could be obtained in order to allow the formation of a sample of adequate size for each of the six groups in the study. A structured format was used for the phone interview so that the same procedure would be consistently followed. A copy of the interview format and procedure is found in Appendix D. This format was pilot-tested—at the same time and with the same sample as the pilot study for the

composite data collection instrument—to insure its reliability.

An introductory letter was sent to half the subjects in the pilot study explaining the nature and purpose of the study and asking for their cooperation when contacted by telephone. Care was taken to prepare the letter following the guidelines offered for preletters by Berdie, Anderson, and Niebuhr.²⁶ A copy of the letter is found in Appendix E. The other half of the pilot study sample had no advance notice that they would be asked to participate in the study by responding to the DCI. In order to assess the value of the letter, the decision was made that it would be used with only half of the pilot study's sample. Responses to the items of the Data Collection Instrument were recorded and organized for analysis. The findings showed that (1) the introductory letter made no difference in the willingness of subjects to complete the DCI, (2) the format and content of the phone interview was acceptable, and (3) there was a high probability that a sufficient number of responses for each of the six groups in the sample could be obtained.

Procedure for Analyzing Data

Due to the somewhat unusual type of data collected by the Self-Directed Search and the Data Collection Instrument (including the JDI and the JIG), a thorough study was made to determine the appropriate type of analysis to be used. The Iachan Index²⁷ was found to be the best existing

statistical technique for analyzing the data for all five hypotheses where the need was to determine the various degrees of congruence (i.e., similarity) between any two variables with three letter codes. The Index has proven to be the most accurate technique for assessing the degree of agreement between any pair of Holland codes.²⁸ The degree of congruence can be easily and quickly calculated using this Index.

The Chi-square test and/or Fisher's exact probability test were used to determine the association and/or independence of variables for all five hypotheses. In the cases where relatively small cell sizes and the resultant low average expected frequencies (five or less) occurred, Fisher's test with Tocher's modification was used as an alternative to the Chi-square test.²⁹ The Fisher's exact test for a 2 x 2 contingency table uses the exact probability distribution of the observed frequencies. For fixed marginal totals the required distribution is easily shown to be that associated with sampling without replacement from a finite population. Fisher's test employs a formula to find the probability of the arrangement of frequencies actually obtained, and that of every other arrangement giving as much or more evidence for association, always keeping in mind that marginal totals are to be regarded as fixed. The sum of these probabilities is then compared with the chosen significance level (.05); if this

sum is greater than .05 there is no evidence of any association between the variables. On the other hand, if the sum is less than .05, the hypothesis of independence should be rejected and a significant association between them should be recognized.³⁰ The basis of Fisher's test is to consider the more extreme configurations of the data that might have occurred and to compute the value of P for each of these. The exact probability of the observed configuration or a more extreme one occurring by chance is the sum of these P values. If this sum turns out to be a very small probability, the small value yielded is unlikely to have occurred by chance thus allowing the hypothesis of independence to be rejected.³¹

A significant result from a Chi-square test or Fisher's test indicates support for the hypothesis in a specific direction. Since the calculated p for each of the tests was one-tailed, the probability obtained from each calculation was doubled to obtain the equivalent of a two-tailed test.

In several instances Cohen's Weighted Kappa was used to test for agreement between two variables. Cohen's Weighted Kappa is "a measure of agreement, corrected for chance, between the classifications of a group of objects by two judges."³² This test provides coefficients of agreement between two raters for nominal scales.³³ The Weighted Kappa provides for the incorporation of ratio-scaled degrees of

agreement (or disagreement) to each of the cells in a contingency table of joint nominal scale assignments such that agreements of varying degree (or disagreements of varying gravity) are weighted accordingly.³⁴ Although the Kappa scale of agreement was originally developed as a measure of reliability, the use of unequal weights for symmetrical cells makes the Weighted Kappa suitable as a measure of validity.³⁵

Simple regression analyses were used to determine the subset (both for the total sample and also for each individual group of the sample) of independent variables having the highest correlation with the dependent variable (job satisfaction score).

Multiple regression analyses were used to determine the ability of subsets of independent variables to predict changes in the dependent (criterion) variable of job satisfaction (Hypothesis 5). This type of analysis uses the method of least squares to minimize the differences between actual and predicted values of the dependent variable. Criteria for significance for all multiple regressions in this study include F values with a probability of significance of .05 or less. All multiple regressions utilized a stepwise entry pattern for predicting variables, which allows the contributions of each variable to be examined at every step of the equation. This procedure permits the rejection of variables entered in earlier stages

when their information becomes redundant by the addition of new variables. The stepwise method thus provides a most efficient selection of discriminating variables.³⁶

The independent (predictor) variables in this study were: (1) congruence level between personality type code and the present occupation code, (2) congruence level between personality type code and top aspiration code, (3) congruence level between personality type code and composite aspiration code, (4) congruence level between personality type code and college major code, (5) satisfaction with college major, (6) graduation status, (7) congruence level between top aspiration code and college major code, (8) congruence level between composite aspiration code and college major code, (9) congruence level between present occupation code and college major code, (10) congruence level between top aspiration code and present occupation code, (11) congruence level between composite aspiration code and present occupation code, and (12) gender. The dependent (criterion) variable was the subject's job satisfaction score on the JDI/JIG.

A calculated score was obtained for each subject and each of the six groups of subjects for the variables named above. This calculated score was obtained by performing a stepwise multiple regression test using the job satisfaction score from the JDI/JIG and the previously determined scores from the twelve predictor variables.

Most of the analysis of the data were processed using the Statistical Analysis System available through the computer center of the host university.

Summary

Chapter III has presented a discussion of the research methodology for the proposed study that included a description of the research design that was used, the sample population involved, the types of data collected, the instruments and methods utilized for collecting the data, and the procedures employed for analyzing the data. The methodology described above tested the study's hypotheses to determine whether each was supported or rejected.

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CHAPTER IV

FINDINGS OF THE STUDY

The present study has focused on the person-environment congruence model of John L. Holland's theory of vocational personalities and work environments. Of particular interest is the relation of Holland's six personality types to decisions of vocational choice such as those pertaining to occupational aspirations, college goals, and job satisfaction. The purpose for this study emerges from some pertinent questions concerning Holland's theory and its practical application. First, can data obtained from subjects who previously took Holland's Self-Directed Search in the summer of 1979 (when they were entering college freshmen) be used to show predictive associations between those subjects' personality types and certain vocational choice decisions they made at a later time? A second question evolves from the first: Does the degree of congruence-level of agreement-between the predictor variables of this study make any difference in their predictive function? One other closely related question follows: Are the relationships observed in the above two questions the same for the total sample ($N = 180$) as they are for each of its six groups ($N = 30$)? For the most part,

this study's research questions and hypotheses are based upon these three questions.

The general supposition addressed is that for subjects in all six groups in the present study, the higher the frequency and degree of person-environment congruence, the greater the likelihood that this relationship will have a predictive association with (1) persistence to graduation, (2) choice of college major, (3) satisfaction with college major, (4) choice of occupation, and (5) satisfaction with occupation. Findings for each of the specific hypotheses will be summarized in the following sections.

The Iachan Index was used in this study for all the calculations of congruence. A number of such indices have been used in related research studies for the purpose of determining the agreement (congruence) between pairs of numerical values. The Iachan Index was chosen for use in this study because it is considered to be the most precise technique for determining congruence between any pair of three-letter codes with numerical values.¹ This index always takes into account three code letters and their relative elevation or importance in each pair of codes.²

Since a comparison is being made at many points in this study between subjects with high-moderate congruence and those with weak-poor congruence, a slight modification of Holland's classification of congruence scores will be

consistently followed. Holland identifies four levels of scores--summed values derived from the Iachan Index:

(1) Very Close Matches: 26-28, (2) Reasonably Close Matches: 20-25, (3) Not Close Matches: 14-19, and (4) Poor Matches: 13 and below.³ For the purposes of this study, Holland's four levels have been compressed into two levels: (1) High-Moderate Congruence: 20-28, and (2) Weak-Poor Congruence: 19 and below.

Since no assumptions could be made about the population distribution from which the sample for this study was taken, nonparametric statistics were used at certain points to test for significance. In the instances involving categorical data (frequency distributions), either the Chi-square test of independence or the Fisher's exact probability test was used to test for significance depending on total group and cell size requirements. The Chi-square test was used only for calculations involving the total sample group ($N = 180$). This statistic assumes that the expected cell frequencies will be of sufficient size (more than five) to allow an accurate and reliable approximation of the Chi-square distribution.⁴

The Fisher's exact probability test was selected for use in all the other cases requiring the application of a nonparametric statistic because it is a more useful technique for analyzing all types of dichotomous data when the two independent samples are small in size.⁵ The

Fisher's test with Tocher's modification provides an appropriate alternative for cases where the sample size is small and expected cell frequencies are five or less. This statistic provides the basis for considering the more extreme configurations of the data that might occur by chance.⁶ Results of calculations using Fisher's test provide the most powerful one-tailed test for data in a 2 X 2 contingency table.⁷

Discussion of the special statistical requirements for analyzing the data collected to test Hypothesis 5 occurs later in this chapter under the heading "Prediction of Job Satisfaction."

Persistence to Graduation

Hypothesis 1: Congruence between a student's Personality Type code and Occupational Aspiration code (as measured by Holland's Self-Directed Search) is related to persistence to graduation from college.

This hypothesis supposes that subjects in the study with high-moderate congruence—in contrast to those with weak-poor congruence—between Personality Type code and Occupational Aspiration code are more likely to persist to graduation. For this study, "persist to graduation" is defined as obtaining a bachelor's degree or the completion of an equivalent undergraduate program from any post-secondary institution.

Keeping in mind that all six of Holland's primary types (R,I,A,S,E,C) are represented by one of the six groups in this study, this hypothesis states that subjects in all six groups—regardless of Personality Type Holland code—are more likely to persist to graduation when there is a high-moderate congruence between subjects' Personality Type Holland code and Occupational Aspiration Holland code. In the sections that follow, an analysis of this supposed relationship is presented first for the total sample and then for each of the six groups in the sample.

Analysis for Total Sample

Hypothesis 1 was first tested to determine persistence to graduation for the total sample using Iachan's Index to calculate for congruence and the Chi-square test for independence to test for significance. Table 3 shows the findings of the Iachan Index for congruence and the subsequent frequency distribution for the total sample. The percentages included in the table are based on a ratio of the frequency in the "Graduated" category to the frequency in the "Non-graduated" category at each of the two levels (High-Moderate Congruence, Weak-Poor Congruence).

Table 3 shows the frequency distribution of congruence scores for the total sample (N = 180) to be as follows: at the High-Moderate Congruence level, ninety-seven "Graduated," and twenty-two "Non-Graduated;" and at the Weak-Poor level, forty-four "Graduated," and seventeen

"Non-Graduated." The highest frequency of congruence occurs for the "Graduated" category (ninety-seven) at the High-Moderate level.

Table 3 further shows that the highest percent in the frequency distribution of congruence scores also occurs for the "Graduated" category at the High-Moderate Congruence level. The ratio of this frequency distribution and its percent at this level and category for the total sample is 97:22 (81.51%). By comparison, the ratio and percent for the "Number Graduated" category at the Weak-Poor Congruence level is 44:17 (72.13%).

TABLE 3

FREQUENCY DISTRIBUTION AND PERCENTAGE OF CONGRUENCE BY LEVELS SHOWING RELATION OF PERSONALITY TYPE CODE TO OCCUPATIONAL ASPIRATION CODE FOR SUBJECTS IN THE TOTAL SAMPLE ACCORDING TO GRADUATION STATUS

Levels of Congruence Between Personality Type Code and Occupational Aspiration Code with Frequency (#) and Percent (%) for Persistence to Graduation				
Group	HIGH-MODERATE LEVEL		WEAK-POOR LEVEL	
	Graduated # (%)	Non-graduated # (%)	Graduated # (%)	Non-graduated # (%)
Total Sample	97 (81.51)	22 (18.49)	44 (72.13)	17 (27.87)

Total Sample: N = 180

Since the number of subjects (N = 180) and the size of the expected cell frequencies were large enough, the

Chi-square test of independence was used to determine whether the frequency distributions of the congruence results for the total sample would meet the .05 level of statistical significance established for this study. As Table 4 shows, an analysis for independence yielded a Chi-square value of 2.09130 (df = 1) that is not significant ($p = .14810$). Although the raw numbers suggest the existence of some positive support for Hypothesis 1, the analysis employed indicates that there is no significant statistical difference in frequency of occurrence in the "Graduated" versus "Non-Graduated" categories of subjects with high-moderate congruence and the "Graduated" versus "Non-Graduated" categories of subjects with weak-poor congruence.

TABLE 4
SIGNIFICANCE LEVEL FOR PERSISTENCE TO GRADUATION
FOR THE TOTAL SAMPLE USING THE CHI-SQUARE TEST
OF INDEPENDENCE

Subjects	χ^2	One-tail p Value	Phi Coefficient
Total Sample	2.09130	.14810	.10717

Total Group: N = 180

In view of the findings presented in Tables 3 and 4, the supposition posed initially that subjects "with high-moderate congruence—in contrast to those with weak-poor

congruence-between personality type code and Occupational Aspiration Code are more likely to persist to graduation" cannot be confirmed because the result of the Chi-square test does not meet the .05 level of significance established for this study. Therefore, Hypothesis 1 which proposes that "congruence between a student's personality type code and occupational aspiration code (as measured by Holland's Self-Directed Search) is related to persistence to graduation from college" fails to gain the level of support needed in order to be accepted when tested with the total sample.

Analysis for the Six Groups of the Total Sample

Using Iachan's Index to calculate for congruence and Fisher's exact probability test with Tocher's modification to test for significance, Hypothesis 1 was tested with each of the sample's six groups (R,I,A,S,E,C) to determine persistence to graduation. This analysis was performed not only to see whether Hypothesis 1 would be accepted for any of the six groups of the sample, but also to allow a comparison of the findings for these groups on the effect of congruence on persistence to graduation.

Table 5 shows the findings of the Iachan Index test for congruence and the subsequent frequency distribution of those findings for each of the groups. The percentages included in the table are based on a ratio of the frequency in the "Graduated" category to the frequency in the "Non-graduated" category at each level.

As Table 5 shows, four groups (R, I, S, and C) have their highest percent in the "Number Graduated" category at the High-Moderate Congruence level. The ratio of the frequency distribution and its percent at this level and category for these groups is: Group R, 16:6 (72.73%); Group I, 23:2 (92.00%); Group S, 20:1 (95.24%); and Group C, 12:1 (92.31%). The other two groups had their highest percent in the "Number Graduated" category at the Weak-Poor Congruence

TABLE 5

FREQUENCY DISTRIBUTION AND PERCENTAGE OF CONGRUENCE
BY LEVELS SHOWING RELATION OF PERSONALITY TYPE
CODE TO OCCUPATIONAL ASPIRATION CODE FOR ALL
SIX GROUPS OF THE TOTAL SAMPLE ACCORDING
TO GRADUATION STATUS

Levels of Congruence Between Personality Type Code and Occupational Aspiration Code with Frequency (#) and Percent (%) for Persistence to Graduation				
Group	HIGH-MODERATE LEVEL		WEAK-POOR LEVEL	
	Graduated # (%)	Non-graduated # (%)	Graduated # (%)	Non-graduated # (%)
R	16 (72.73)	9 (39.13)	2 (25.00)	6 (75.00)
I	23 (92.00)	2 (8.00)	2 (40.00)	3 (60.00)
A	14 (66.67)	7 (33.33)	8 (88.89)	1 (11.11)
S	20 (95.24)	1 (4.76)	5 (55.56)	4 (44.44)
E	12 (70.59)	5 (29.41)	13 (100.00)	0 (0.00)
C	12 (92.31)	1 (7.69)	14 (82.36)	3 (17.64)

Each Group: N = 30

level. The ratio and its percent for these groups is:
Group A, 8:1 (88.89%) and Group E, 13:0 (100.00%).

Fisher's exact probability test with Tocher's modification was used to determine whether the frequency distributions of the congruence results for each of the six groups would meet the .05 level of statistical significance for this study. As Table 6 shows, the findings of these calculations indicate that the congruence results are significant for four of the six groups: Group R ($p = .02667$), Group I ($p = .02194$), Group S ($p = .01945$), and Group E ($p = .04342$). The congruence results are not significant for Group A ($p = .21357$) and Group C ($p = .40941$).

TABLE 6

SIGNIFICANCE LEVELS FOR PERSISTENCE TO GRADUATION FOR
ALL SIX GROUPS (R,I,A,S,E,C) USING FISHER'S
EXACT PROBABILITY TEST

Sample Group	One-tail p Value
Group R	.02667
Group I	.02194
Group A	.21357
Group S	.01945
Group E	.04342
Group C	.40941

Each Group: N = 30

According to the above findings, there was some support for the supposition that "subjects in the study with high-moderate congruence—in contrast to those with weak-poor congruence—between personality type code and occupational aspiration code are more likely to persist to graduation." Therefore, Hypothesis 1—"Congruence between a student's Personality Type code and Occupational Aspiration code (as measured by Holland's Self-Directed Search) is related to persistence to graduation from college"—is accepted for Groups R, I, and S. This means that the subjects in Groups R, I, and S with a high-moderate congruence between Personality Type code and Occupational Aspiration code are more likely to persist to college graduation than subjects in these three groups with weak-poor congruence between the two codes.

On the contrary, the findings for Groups A, E, and C fail to support Hypothesis 1. Based on the ratio of graduates to non-graduates at the two congruence levels established for this study, there was a lower percent of those who graduated (67% for Group A and 71% for Group E) at the High-Moderate Congruence level than there was at the Weak-Poor level (89% for Group A and 100% for Group E). This occurrence is antithetical to the supposition that "subjects in the study with high-moderate congruence—in contrast to those with weak-poor congruence—between

Personality Type code and Occupational Aspiration code are more likely to persist to graduation."

The congruence results for Groups A and C cannot be given any weight because the frequency distribution for these groups did not meet the test for statistical significance (Group A: $p = .21357$; Group C: $p = .40941$) at the .05 level. However, the ratio of graduates to non-graduates at the two congruence levels established for this study resulted in a higher percent of those who graduated in Group C at the High-Moderate Congruence level (92%) than there was for those who graduated at the Weak-Poor level (82%). In view of the above reported findings and preceding discussion, Hypothesis 1 is rejected for Groups A, E, and C.

Prediction of College Major

Hypothesis 2: Students' Personality Type code (as measured by Holland's Self-Directed Search) is a predictor of their choice of College Major code (as listed and defined in "The College Majors Finder").

This hypothesis supposes that agreement between the Personality Type code of subjects in this study (as measured in the summer of 1979 by Holland's SDS) and the College Major code later chosen by those subjects (as reported in the winter of 1989-90 on the Data Collection Instrument) indicates the former code has a predictive relation with the latter code.

In this study, agreement between the two codes just named is defined as an exact match between first letters (high points) of these codes and also high-moderate congruence between any two three-letter codes. The college major reported by respondents is that major field of study at the post-secondary undergraduate level entered/completed by the subject. These data were obtained from the 180 subjects in the sample by the researcher during telephone interviews in the winter of 1989-90. Each respondent's major was then assigned a Holland code using "The College Major Finder."⁸ This recorded information was later used in testing the above hypothesis and two others (#3 and #5) of this study.

Analysis for Total Sample

Hypothesis 2 was tested with the total sample to determine if there was support for this supposition at the broadest level possible for this study. This determination was made by using Cohen's Weighted Kappa for measuring agreement at the .05 level of significance.

The utilization of the Cohen's Kappa measurement in this instance necessitated the establishment of agreement frequencies (or hit rates) that showed the number of times agreement occurred between the first letters of the Personality Type code and the selected College Major code for all the subjects in the total sample. The results of these tabulations appear in Table 7. Of particular interest

to this hypothesis is the finding that seventy-eight of the 180 subjects (43%) had first letter agreement between these two codes. The lower percent of agreement here (43%) than that (63%) reported by O'Neil and Magoon⁹ (in their study of the predictive power of Holland's personality types) may be due to their decision to assess only male Investigative types whereas the percent reported above for the present study represents an assessment of the predictiveness of the SDS Summary Code for a sample comprised of males and females for all six Holland types. The assessed percent of agreement between pairs of first letter codes for males in the Investigative group in this study ten years later (67%) compares favorably with that found by O'Neil and Magoon.¹⁰

TABLE 7

FREQUENCY AND PERCENTAGE OF AGREEMENT BETWEEN THE FIRST LETTERS OF PERSONALITY TYPE CODE AND SELECTED COLLEGE MAJOR CODE FOR SUBJECTS OF THE TOTAL SAMPLE

Group	R	I	A	S	E	C	TOTAL
Freq.	16	18	9	17	10	8	78
Per Cent	53.33	60.00	30.00	56.67	33.33	26.67	43.33

Total Group: N = 180

Since the Iachan Index is considered the most analytic and accurate technique for assessing the degree of agreement

between any pair of three-letter codes,¹¹ it was employed to assess the extent of agreement between the three-letter codes of Personality Type and College Major type for all the subjects in the total sample ($N = 180$). The findings reported in Table 8 show that 50.50% of the subjects in the total sample had a close enough match between these three-letter codes to warrant a designation of high-moderate congruence.

TABLE 8
FREQUENCY AND PERCENTAGE OF AGREEMENT BETWEEN THE
FIRST THREE LETTERS OF THE PERSONALITY TYPE
CODE AND THE SELECTED COLLEGE MAJOR CODE
FOR SUBJECTS OF THE TOTAL SAMPLE

Group	R	I	A	S	E	C	TOTAL
Freq.	20	20	11	21	11	8	91
Per Cent	66.67	66.67	36.67	70.00	36.67	26.67	50.50

Total Group: $N = 180$

The findings reported in Table 7 indicate that the first letter of the SDS code predicted College Major type for 43% of the subjects in the total sample. Results of the Weighted Kappa test reported in Table 9 show that one-letter exact agreement between the SDS code and selected College Major code ($k = .36$) was significant ($p < .001$).

The findings reported in Table 8 show that the 1979 SDS three-letter code predicted college major type for 50.50% of the subjects in the total sample. Results of the Weighted Kappa test reported in Table 9 show that three-letter agreement (high-moderate congruence) between the SDS code and selected college major code ($k = .42$) was significant ($p < .001$).

TABLE 9

VALIDITY OF THE 1979 SDS SUMMARY CODE FOR PREDICTING
COLLEGE MAJOR CODE (REPORTED 10 YEARS LATER) FOR
TOTAL SAMPLE

Group	Agreement Between 1st Letter of Codes			Agreement Between 1st Three Letters of Codes		
	# Exact Matches	% Exact Matches	k	# Close Matches	% Close Matches	k
R	16	53.33	----	20	66.67	----
I	18	60.00	----	20	66.67	----
A	9	30.00	----	11	36.67	----
S	17	56.67	----	21	70.00	----
E	10	33.33	----	11	36.67	----
C	8	26.67	----	8	26.67	----
Totals	78	43.33	.3571	91	50.56	.4167

Total Group: N = 180

The collective evidence from the analysis reported above appears to indicate that the 1979 SDS Summary Code had moderate efficiency in predicting the college major type selected (as reported in 1989-90) by the subjects in this study. Thus, support has been found at the total sample

level for the supposition that close agreement between subjects' Personality Type code and the code of the College Major they later chose indicates the former code has a predictive association with the latter code. Therefore, the hypothesis that students' Personality Type code—as measured by Holland's Self-Directed Search—is a predictor of their choice of College Major code is accepted for the total sample.

Analysis for the Six Groups of the Total Sample

The results obtained from the calculation of Iachan's Index and Cohen's Weighted Kappa using the data of the total sample were essential in determining for each of the six groups (R,I,A,S,E,C) whether students' Personality Type code (as measured by Holland's Self-Directed Search) is a predictor of their choice of College Major code.

Table 7 shows the findings of the frequency (number of exact matches) and percentage of agreement between the first letters of subjects' Personality Type code and their selected College Major code for each of the six groups in the total sample.

The findings reported in Table 7 indicate that three of the six groups (R, I, and S) have a moderately high percent of agreement. The ratio of the frequency distribution and its percent for these groups was as follows: Group R, 16:14 (53%); Group I, 18:12 (60%); and Group S, 17:13 (57%). The ratio and percent for the other

three groups was: Group A, 9:21 (30%); Group E, 10:20 (33%); and Group C, 8:22 (27%). Groups R, I, and S showed the strongest percent of first-letter agreement between the two measured codes.

Table 8 shows the findings of the Iachan Index test for congruence and the subsequent frequency distribution for each of the six groups. The percentages included in the table are based on a ratio of the number of subjects with high-moderate congruence to the total number of students in the sub-group (thirty).

As Table 8 shows, three of the six groups (R, I and S) have a moderately high percent of agreement. The ratio of the frequency distribution and its percent for Groups R and I was 20:30 (67.67%). For Group S the ratio was 21:30 (70%). The ratio of the frequency distribution and its percent for the other three groups was: Groups A and E, 11:19 (36.67%); and Group C, 8:22 (26.67%). Groups R, I, and S showed the strongest three-letter agreement between the two measured codes.

Although a suitable and reliable test was not found to check the validity of the findings for the six sub-groups reported in Tables 7 and 8 to see if they met the .05 significance level, the findings from Groups R, I, and S may well support Hypothesis 2.

The findings presented in Tables 7, 8, and 9 seem to indicate that the SDS Summary Code may be a moderately

efficient predictor of College Major type selected for subjects in three groups of the total sample, Groups R, I, and S. Thus, moderate support may have been found for the supposition that close agreement between subjects' Personality Type code and the code of the college major they later chose indicates the former code may have a predictive association with the latter code. Therefore, the hypothesis that students' Personality Type code (as measured by Holland's Self-Directed Search) is a predictor of their choice of College Major code appears to have some support from Groups R, I, and S of the total sample.

Satisfaction with College Major

Hypothesis 3: There is a higher frequency of positive satisfaction with college major for subjects with high-moderate congruence between personality type and college major chosen than there is for students with a weak-poor congruence between them.

This hypothesis supposes that the subjects in this study who have a high-moderate congruence between their Personality Type code and their College Major code (as reported in the winter of 1989-90 on the Data Collection Instrument and defined by "The College Majors Finder") are more likely to be satisfied with their college major than those subjects who had a weak-poor congruence between the two codes. In the sections that follow, an analysis of this supposed relationship is presented first for the total

sample and then for each of the six groups in the sample. For the purpose of this study, satisfaction with college major refers to the overall disposition toward the chosen major field of study as measured by the Iachan Index for congruence and a Chi-square test for independence (for the total sample) and Fisher's exact probability test with Tocher's modification (for the six sub-groups: R,I,A,S,E,C) to test for significance.

Analysis for Total Sample

Hypothesis 3 was first tested to determine satisfaction with college major for the total sample using Iachan's Index to calculate for congruence and the Chi-square test for independence to test for significance. Table 10 shows the findings of the Iachan Index for congruence and the subsequent frequency distribution for the total sample. The percentages included in the table are based on a ratio of the frequency in the "Satisfied" category to the frequency in the "Dissatisfied" category at each of the two levels.

Table 10 shows the frequency distribution of congruence scores for the total sample (N = 180) to be as follows: at the High-Moderate Congruence level, eighty-four "Satisfied" and one "Dissatisfied;" and at the Weak-Poor level, seventy-one "Satisfied," and twenty-four "Dissatisfied." The highest frequency of congruence occurs

for the "Satisfied" category (eighty-four) at the High-Moderate level.

Table 10 further shows that the highest percent in the frequency distribution of congruence scores occurs for the "Satisfied" category at the High-Moderate Congruence level. The ratio of this frequency distribution and its percent at this level and category for the total sample is 84:1 (98.82%). By comparison, the ratio and percent for the "Satisfied" category at the Weak-Poor Congruence level is 71:24 (74.74%). These findings clearly show that there is a higher percent of subjects (or frequency of congruence scores) for the "Satisfied" category at the High-Moderate Congruence level than there is for the "Satisfied" category at the Weak-Poor level.

TABLE 10

FREQUENCY DISTRIBUTION AND PERCENTAGE FOR LEVELS
OF CONGRUENCE (PERSONALITY TYPE CODE WITH
COLLEGE MAJOR CODE) FOR THE TOTAL SAMPLE
ACCORDING TO SATISFACTION WITH
COLLEGE MAJOR CODE

Levels of Congruence Between Personality Type Code and College Major Code with Frequency (#) and Percent (%) for Satisfaction and Dissatisfaction with College Major				
Group	HIGH-MODERATE LEVEL		WEAK-POOR LEVEL	
	Satisfied (# & %)	Dissatisfied (# & %)	Satisfied (# & %)	Dissatisfied (# & %)
Total Sample	84 (98.82)	1 (1.18)	71 (74.74)	24 (25.26)

Total Sample: N = 180

In view of the number of subjects ($N = 180$) and the size of the expected cell frequencies, a Chi-square test for independence was used determine whether the frequency distributions of the congruence results for the total sample would meet the .05 level of statistical significance established for this study. As Table 11 shows, an analysis for independence yielded a Chi-square value of 21.7619 ($df = 1$) that is significant ($p < .0001$).

TABLE 11

SIGNIFICANCE LEVEL FOR SATISFACTION WITH
COLLEGE MAJOR FOR THE TOTAL SAMPLE USING
THE CHI-SQUARE TEST FOR INDEPENDENCE

Subjects	χ^2	One-tail p Value	Phi Coefficient
Total Sample	21.7619	.00001	.34771

Total Sample: $N = 180$

The findings presented in Tables 10 and 11 seem to indicate that high-moderate congruence between Personality Type code and College Major code has a predictive association with satisfaction with college major. Thus, support appears to be established for the supposition posed earlier that the subjects in this study who have a high-moderate congruence between their Personality Type code and their College Major code (as reported in the winter of 1989-

90 on the Data Collection Instrument and defined by "The College Majors Finder") are more likely to be satisfied with their college major than those subjects who had a weak-poor congruence between the two codes. Therefore, Hypothesis 3--there is a higher frequency of positive satisfaction with college major for subjects with high-moderate congruence between personality type and college major chosen than there is for students with a weak-poor congruence between them--is accepted for the total sample.

Analysis for the Six Groups of the Total Sample

Using Iachan's Index to calculate for congruence and Fisher's exact probability test with Tocher's modification to test for significance, Hypothesis 3 was tested with each of the six groups (R,I,A,S,E,C) to determine satisfaction with college major. These tests were conducted not only to see whether Hypothesis 3 would be accepted for any of the six groups of the sample, but also to allow a comparison of the findings for those groups on the effect of congruence on satisfaction with college major.

Table 12 shows the findings of the Iachan Index test for congruence and the subsequent frequency distribution of those findings for each of the groups. The percentages included in the table are based on a ratio of the frequency in the "Satisfied" category to the frequency in the "Dissatisfied" category at each level.

As Table 12 shows, all six groups (R,I,A,S,E,C) have their highest percent in the "Satisfied" category at the High-Moderate Congruence level. The ratio of the frequency distribution and its percent at this level and category for these groups is: Group R, 20:0 (100%); Group I, 19:1 (95%); Group A, 9:0 (100%); Group S, 17:0 (100%); Group E, 11:0 (100%), and Group C, 8:0 (100%).

TABLE 12

FREQUENCY DISTRIBUTION AND PERCENTAGE FOR LEVELS OF CONGRUENCE (PERSONALITY TYPE CODE WITH COLLEGE MAJOR CODE) FOR ALL SIX GROUPS OF THE TOTAL SAMPLE WITH REGARD TO SATISFACTION WITH COLLEGE MAJOR

Levels of Congruence Between Personality Type Code and College Major Code with Frequency (#) and Percent (%) for Satisfaction and Dissatisfaction with College Major					
Group	HIGH-MODERATE LEVEL		WEAK-POOR LEVEL		
	Satisfied # (%)	Dissatisfied # (%)	Satisfied # (%)	Dissatisfied # (%)	
R	20 (100.00)	0 (0.00)	6 (60.00)	4 (40.00)	
I	19 (95.00)	1 (5.00)	6 (60.00)	4 (40.00)	
A	9 (100.00)	0 (0.00)	13 (61.91)	8 (38.09)	
S	17 (100.00)	0 (0.00)	9 (69.23)	4 (30.77)	
E	11 (100.00)	0 (0.00)	18 (94.74)	1 (5.26)	
C	8 (100.00)	0 (0.00)	19 (86.36)	3 (13.64)	

Each Group: N = 30

Fisher's exact probability test with Tocher's modification was used to determine whether the frequency distributions of the congruence results for each of the six groups would meet the .05 level of statistical significance for this study. As Table 13 shows, the findings of these calculations indicate that the frequency of congruence distribution results are significant for Group R ($p = .00766$), Group I ($p = .03124$), Group A ($p = .03477$), and Group S ($p = .02609$). The distribution results are not significant for Group E ($p = .63333$) and Group C ($p = .37931$).

TABLE 13
SIGNIFICANCE LEVELS FOR SATISFACTION WITH COLLEGE
MAJOR FOR ALL SIX GROUPS OF THE TOTAL SAMPLE
USING FISHER'S EXACT PROBABILITY TEST

Subjects by Group	One-tail p Value
Group R	.00766
Group I	.03124
Group A	.03477
Group S	.02609
Group E	.63333
Group C	.37931

Each Group: N = 30

In view of these findings, high-moderate congruence between subjects' Personality Type code and College Major code appears to have a predictive relation to satisfaction with their college major. Thus, the supposition—that the subjects in this study who have a high-moderate congruence between their Personality Type code (as assessed and defined in the summer of 1979 by Holland's "Self-Directed Search") and their College Major code (as reported in the winter of 1989-90 on the Data Collection Instrument and defined by "The College Majors Finder") are more likely to be satisfied with their college major (as reported in the winter of 1989 on the Data Collection Instrument) than those subjects who had a weak-poor congruence between the two codes—is supported for Groups R, I, A, and S. Therefore, Hypothesis 3 (which proposes that there is a higher frequency of satisfaction with college major for subjects with high-moderate congruence between Personality Type and College Major chosen than there is for students with a weak-poor congruence between them) is accepted for Groups R, I, A, and S.

However, analysis performed on the data referenced above for Groups E and C produced results that cannot be given any weight because they are not significant at the .05 level. Therefore, the above supposition is not supported and Hypothesis 3 is rejected for Groups E and C. However, the distribution result for both of these groups deserves

some attention. As with Groups R, I, A, and S, there is a higher percentage of "Satisfied" subjects at the High-Moderate Congruence level for Groups E (100%) and C (100%) than there is at the Weak-Poor level (Group E: 95%; Group C: 86%). The failure of the distribution results to meet the .05 significance level was due in part to a high percentage of "Satisfied" subjects at the Weak-Poor level rather than a low percentage of "Satisfied" subjects at the High-Moderate level.

Prediction of Occupation

Hypothesis 4: Students' Personality Type code (as measured by Holland's Self-Directed Search) is a predictor of their Present Occupation code (as listed and defined in The Dictionary of Holland Occupational Codes).

This hypothesis supposes that close agreement between the Personality Type code of subjects in this study (as measured in the summer of 1979 by Holland's SDS) and the Present Occupation code representing the occupation later chosen by those subjects (as reported in the winter of 1989-90 on the Data Collection Instrument) shows the former code has a predictive relation with the latter code.

In this study, agreement between any two codes refers to an exact match between first letters (high points) of those codes and also high-moderate congruence between any two three-letter codes. The "present occupation" reported by respondents was their general field of work at the time

of their interview. These data were obtained from the 180 subjects in the sample by the researcher during telephone interviews in the winter of 1989-90. Subsequently each respondent's present occupation was assigned a Holland code using "The Occupations Finder."¹² This recorded information was later used in testing the above hypothesis and one other (#5) of this study.

Analysis for Total Sample

Hypothesis 4 was tested with the total sample to determine if there was support for its supposition at the broadest level possible for this study. This determination was made by using Cohen's Weighted Kappa for measuring agreement at the .05 level of significance.

The utilization of the Cohen's Kappa measurement in this case calls for the establishment of agreement frequencies (or hit rates) that show the number of times agreement occurred between the first letters of the Personality Type code and the Present Occupation code for all the subjects in the total sample. The results of these tabulations appear in Table 14. Of particular interest to Hypothesis 4 is the finding that sixty-two of the 180 subjects (34%) had first letter agreement between these two codes.

While the percent of agreement in this case (34%) is lower than that (51%) reported by O'Neil, Magoon, and Tracey¹³ in their study of the predictive power of Holland's

SDS, these researchers assessed only male Investigative types whereas the percent reported above for the present study represents an assessment of the predictiveness of the SDS Summary Code for a sample comprised of males and females for all six Holland types. The assessed percent of agreement between pairs of first letter codes for males in the Investigative group in this study ten years later was 33%, notably lower than that found by O'Neil, Magoon, and Tracey.

TABLE 14

FREQUENCY AND PERCENTAGE OF AGREEMENT BETWEEN
THE FIRST LETTERS OF PERSONALITY TYPE CODE
AND PRESENT OCCUPATION CODE FOR SUBJECTS
OF THE TOTAL SAMPLE

Group	R	I	A	S	E	C	TOTAL
Freq.	10	8	6	14	15	9	62
Per Cent	33.33	26.67	20.00	46.67	50.00	30.00	34.44

Total Group: N = 180

Since the Iachan Index is considered the most accurate technique for assessing the degree of agreement between any pair of three-letter codes,¹⁴ it was employed to assess the extent of agreement between the three-letter codes of personality type and occupation type for all the subjects in the total sample (N = 180). The findings reported in Table 15 show that 42% of the subjects in the total sample had a

close enough match between these three-letter codes to warrant a designation of high-moderate congruence.

TABLE 15
FREQUENCY AND PERCENTAGE OF AGREEMENT BETWEEN
THE FIRST THREE LETTERS OF THE PERSONALITY
TYPE CODE AND THE PRESENT OCCUPATION CODE
FOR SUBJECTS OF THE TOTAL SAMPLE

Group	R	I	A	S	E	C	TOTAL
Freq.	17	10	8	17	15	9	76
Per Cent	56.67	33.33	26.67	56.67	50.00	30.00	42.22

Total Group: N = 180

The findings reported in Table 14 indicate that the first letter of the SDS Personality Type (Summary) code predicted present occupation for 34% of the subjects in the total sample. Results of the Weighted Kappa test reported in Table 16 show that one-letter exact agreement between the SDS Summary code and Present Occupation code ($k = .23$) was significant ($p < .001$).

The findings reported in Table 15 show that the 1979 SDS three-letter Summary code predicted Present Occupation type for 42% of the subjects in the total sample. Results of the Weighted Kappa test reported in Table 16 show that three-letter agreement (high-moderate congruence) between

the SDS Summary code and Present Occupation code ($k = .29$) was significant ($p < .001$).

TABLE 16
VALIDITY OF THE 1979 SDS SUMMARY CODE FOR
PREDICTING PRESENT OCCUPATION CODE
(REPORTED 10 YEARS LATER) FOR
TOTAL SAMPLE

Group	Agreement Between 1st Letter of Codes			Agreement Between 1st Three Letters of Codes		
	# Exact Matches	% Exact Matches	k	# Close Matches	% Close Matches	k
R	10	33.33	----	17	56.67	----
I	8	26.67	----	10	33.33	----
A	6	20.00	----	8	26.67	----
S	14	46.67	----	17	56.67	----
E	15	50.00	----	15	50.00	----
C	9	30.00	----	9	30.00	----
Totals	62	34.44	.2310	76	42.22	.2905

Total Group: N = 180

The collective evidence from the analyses reported above appears to indicate that the 1979 SDS Summary Code had moderate efficiency in predicting Present Occupation type (as reported in 1989-90) by the subjects in this study. Thus, support has been found at the total sample level for the supposition that close agreement between subjects' Personality Type code (as measured in the summer of 1979 by Holland's SDS) and the code of their Present Occupation representing the occupation later chosen by those subjects

(as reported in the winter of 1989-90 on the Data Collection Instrument) indicates the former code does have a predictive association with the latter code. Therefore, Hypothesis 4—students' Personality Type code (as measured by Holland's Self-Directed Search) is a predictor of their Present Occupation code (as listed and defined in The Dictionary of Holland Occupational Codes)—is accepted for the total sample.

Analysis for the Six Groups of the Total Sample

The results obtained from the calculation of Iachan's Index and Cohen's Weighted Kappa using the data of the total sample were essential in determining for each of the six groups (R,I,A,S,E,C) whether students' Personality Type code (as measured by Holland's Self-Directed Search) is a predictor of their choice of Present Occupation type.

Table 14 shows the findings of the frequency (number of exact matches) and percentage of agreement between the first letters of subjects' Personality Type code and their Present Occupation code for each of the six groups in the total sample.

The findings reported in Table 14 indicate that two of the six groups (S and E) have a moderate percent of agreement. The ratio of the frequency distribution and its percent for these groups was as follows: Group S, 14:16 (47%); and Group E, 15:15 (50%). The ratio and percent for the other four groups was: Group R, 10:20 (33%); Group I,

8:22 (27%); Group A, 6:24 (20%); and Group C, 9:21 (34%). Groups S and E showed the strongest percent of first-letter agreement between the two measured codes.

Table 15 shows the findings of the Iachan Index test for congruence and the subsequent frequency distribution for each of the six groups. The percentages included in the table are based on a ratio of the number of subjects with high-moderate congruence to the total number of students in the sub-group (thirty).

As Table 15 shows, three of the six groups (R, S, and E) have a moderately high percent of agreement. The ratio of the frequency distribution and its percent for these groups is as follows: Groups R and S, 17:13 (57%); and Group E, 15:15 (50%). The ratio of the frequency distribution and its percent for the other three groups was: Group I, 10:20 (33%); Group A, 8:22 (27%); and Group C, 9:21 (30%). Groups R, S, and E showed the strongest three-letter agreement between the two measured codes.

Although a suitable and reliable test was not found to check the validity of the findings for the six sub-groups reported in Tables 14 and 15 to see if they met the .05 significance level, the findings from Groups R and S, and possibly E, may well support Hypothesis 4.

The findings presented in Tables 14, 15, and 16 seem to indicate that the SDS Summary Code may be a moderately efficient predictor of present occupation type selected for

subjects in three groups of the total sample, Groups R, S, and E. Thus, moderate support may have been found for the supposition that close agreement between subjects' Personality Type code and the code of their Present Occupation indicates the former code may have a predictive association with the latter code. Therefore, the hypothesis that students' Personality Type code (as measured by Holland's Self-Directed Search) is a predictor of their Present Occupation type appears to have some support from Groups R, S, and E of the total sample.

Prediction of Job Satisfaction

Hypothesis 5: Congruence between Personality Type code (as measured and defined in the summer of 1979 by Holland's "Self-Directed Search") and Present Occupation code (as reported in the winter of 1989-90 on the Data Collection Instrument and defined in Holland's The Occupations Finder) has a strong predictive relationship with job satisfaction (as measured by the Job-in-General Scale of the Job Descriptive Index).

Several assumptions important to the following discussion need to be stated at this point. Hypothesis 5 supposes that subjects in this study who have a high-moderate congruence between Personality Type code and Present Occupation code are more likely to be satisfied with their present occupation than those subjects who had a weak-poor congruence between these two codes. This hypothesis

further supposes that congruence between Personality Type code and Present Occupation code has a closer association with the criterion variable—job satisfaction score on the Job-in-General scale of the Job Descriptive Index—than the other variables chosen for inclusion in the set of predictors that was tested.

The measure of job satisfaction with a valid and reliable instrument (such as the Job Descriptive Index and its Job-in-General sub-scale) was performed to assess global satisfaction with occupation. In the confines of this study, the definition of job satisfaction posed by Smith, Kendall, and Hulin is used. They define general job satisfaction as the overall feelings one has about his work.¹⁵

As was the case in testing the previous hypotheses, calculations were first performed to test Hypothesis 5 with the total sample. Once the results from these computations were obtained, calculations were then performed to test Hypothesis 5 with the each of the six groups of the total sample.

Hypothesis 5 was first tested to determine satisfaction with present occupation for the total sample. Congruence between Personality Type code and Present Occupation code did not have to be calculated since these results had already been obtained in testing Hypothesis 4. The Chi-square test of independence was used to test for

significance. Following this analysis, Hypothesis 5 was then tested with each of the six groups (R,I,A,S,E,C) to determine satisfaction with present occupation. Since the congruence results for the total sample and the each of the six groups had already been computed to test Hypothesis 4, these calculations for congruence did not have to be repeated. However, since frequency distributions for each of the six groups involving satisfaction with present occupation did not exist, they were tabulated. Fisher's exact probability test with Tocher's modification was used with these distributions to test for significance at the group level because the small frequency counts ruled out the use of the Chi-square statistic.

Initial Analysis for Total Sample

Hypothesis 5 was first tested to determine satisfaction with present occupation for the total sample using Iachan's Index to calculate for congruence and the Chi-square test for independence to test for significance. Table 17 shows the findings of the Iachan Index for congruence and the subsequent frequency distribution for the total sample. The percentages included in the table are based on a ratio of the frequency in the "Satisfied" category to the frequency in the "Dissatisfied" category at each of the two levels.

Table 17 shows the frequency distribution of congruence scores for the total sample (N = 180) to be as

follows: at the High-Moderate Congruence level, fifty-three "Satisfied," and twenty "Dissatisfied;" and at the Weak-Poor level, thirty-seven "Satisfied," and seventy "Dissatisfied." The highest frequency occurs for the "Dissatisfied" category (seventy) at the Weak-Poor level.

Table 17 further shows that the highest percent in the frequency distribution of congruence scores occurs for the "Satisfied" category at the High-Moderate Congruence level. The ratio of this frequency distribution and its percent at this level and category for the total sample is 53:20 (72.60%). By comparison, the ratio and percent for the "Satisfied" category at the Weak-Poor congruence level is 37:70 (34.58%). These findings clearly show that there is a higher percent of subjects (or frequency of congruence scores) for the "Satisfied" category at the High-Moderate congruence level than there is for the "Satisfied" category at the Weak-Poor level.

In view of the number of subjects ($N = 180$) and the size of the expected cell frequencies, a Chi-square test for independence was used to determine whether the frequency distributions of the congruence results for the total sample would meet the .05 level of statistical significance established for this study. As Table 18 shows, an analysis for independence yielded a Chi-square value of 25.09540 ($df = 1$) that is highly significant ($p < .0001$).

TABLE 17

FREQUENCY DISTRIBUTION AND PERCENTAGE FOR LEVELS
OF CONGRUENCE (PERSONALITY TYPE CODE WITH
PRESENT OCCUPATION CODE) FOR THE TOTAL
SAMPLE WITH REGARD TO SATISFACTION
WITH PRESENT OCCUPATION

Levels of Congruence Between Personality Type Code and Present Occupation Code with Frequency (#) and Percent (%) for Satisfaction and Dissatisfaction with Present Occupation				
Group	HIGH-MODERATE LEVEL		WEAK-POOR LEVEL	
	Satisfied (# & %)	Dissatisfied (# & %)	Satisfied (# & %)	Dissatisfied (# & %)
Total				
Sample	53 (72.60)	20 (27.40)	37 (34.58)	70 (65.42)

Total Sample: N = 180

The findings presented in Tables 17 and 18 seem to indicate that high-moderate congruence between Personality Type code and Present Occupation code does have a predictive association with satisfaction with present occupation. Thus, support appears to be established for the supposition posed earlier that subjects in this study who have a high-moderate congruence between Personality Type code (as assessed and defined in the summer of 1979 by Holland's "Self-Directed Search") and Present Occupation code (as reported in the winter of 1989-90 on the Data Collection Instrument and defined by "The Occupations Finder") are more likely to be satisfied with their present occupation than

TABLE 18
SIGNIFICANCE LEVEL FOR SATISFACTION WITH PRESENT
OCCUPATION FOR THE TOTAL SAMPLE USING THE
CHI-SQUARE TEST FOR INDEPENDENCE

Subjects	χ^2	One-tail p Value	Phi Coefficient
Total Sample	25.09540	.00001	.37339

Total Sample: N = 180

those subjects who had a weak-poor congruence between these two codes. Therefore, Hypothesis 5—Congruence between Personality Type code (as measured and defined in the summer of 1979 by Holland's "Self-Directed Search") and Present Occupation code (as reported in the winter of 1989-90 on the Data Collection Instrument and defined in Holland's The Occupations Finder) has a strong predictive relationship with job satisfaction (as measured by the Job-in-General Scale of the Job Descriptive Index)—is accepted when tested with the total sample.

Initial Analysis for the Six Groups of the Total Sample

Using Iachan's Index to calculate for congruence and Fisher's exact probability test with Tocher's modification to test for significance, Hypothesis 5 was tested with each of the six groups (R,I,A,S,E,C) to determine satisfaction with present occupation. These tests were conducted not

only to see whether Hypothesis 5 would be accepted for any of the six groups of the sample, but also to allow a comparison of the findings for those groups on the effect of congruence on satisfaction with present occupation.

Table 19 shows the findings of the Iachan Index test for congruence and the subsequent frequency distribution of those findings for each of the groups. The percentages included in the table are based on a ratio of the frequency in the "Satisfied" category to the frequency in the "Dissatisfied" category at each level.

As Table 19 further shows, five groups (R, I, A, E, and C) have their highest frequency of scores in the "Satisfied" category at the High-Moderate Congruence level. The ratio of the frequency distribution and its percent at this level and category for these groups is: Group R, 12:3 (80.00); Group I, 8:2 (80.00); Group A, 8:0 (100.00); Group E, 11:3 (78.57); and Group C, 5:4 (55.56). Group S has its highest percent in the "Dissatisfied" category at the Weak-Poor Congruence level. The ratio and percent for this group is: 9:8 (54.94).

Fisher's exact probability test with Tocher's modification was used to determine whether the frequency distributions of the congruence results for each of the six groups would meet the .05 level of statistical significance for this study. As Table 20 shows, the findings of these calculations indicate that the frequency distribution of the

TABLE 19

FREQUENCY DISTRIBUTION AND PERCENTAGE FOR LEVELS
OF CONGRUENCE (PERSONALITY TYPE CODE WITH
PRESENT OCCUPATION CODE) FOR ALL SIX
GROUPS OF THE TOTAL SAMPLE WITH
REGARD TO SATISFACTION WITH
PRESENT OCCUPATION

Levels of Congruence Between Personality Type Code and Present Occupation Code with Frequency (#) and Percent (%) for Satisfaction and Dissatisfaction with Present Occupation				
Group	HIGH-MODERATE LEVEL		WEAK-POOR LEVEL	
	Satisfied # (%)	Dissatisfied # (%)	Satisfied # (%)	Dissatisfied # (%)
R	12 (80.00)	3 (20.00)	6 (40.00)	9 (60.00)
I	8 (80.00)	2 (20.00)	6 (30.00)	14 (70.00)
A	8 (100.00)	0 (0.00)	4 (18.18)	18 (81.82)
S	9 (52.94)	8 (47.06)	4 (30.77)	9 (69.23)
E	11 (78.57)	3 (21.43)	6 (37.50)	10 (62.50)
C	5 (55.56)	4 (44.44)	11 (52.38)	10 (47.62)

Each Group: N = 30

congruence results are significant for Group R ($p = .03022$), Group I ($p = .01309$), Group A ($p = .00008$), and Group E ($p = .02788$). The distribution results are not significant for Group S ($p = .200033$) or Group C ($p = .59550$).

For Groups R, I, A, and E, the preceding findings appear to indicate that high-moderate congruence between subjects' Personality Type code and Present Occupation code

TABLE 20
SIGNIFICANCE LEVELS FOR SATISFACTION WITH PRESENT
OCCUPATION FOR ALL SIX GROUPS OF THE TOTAL SAMPLE
USING FISHER'S EXACT PROBABILITY TEST

Subjects by Group	One-tail p Value
Group R	.03022
Group I	.01309
Group A	.00008
Group S	.20033
Group E	.02788
Group C	.59550

Each Group: N = 30

has a predictive relation to satisfaction with their present occupation. Thus, the supposition—that the subjects in this study who have a high-moderate congruence between their Personality Type code and their Present Occupation code are more likely to be satisfied with their occupation than those subjects who had a weak-poor congruence between the two codes—has some support at the individual group level. Therefore, Hypothesis 5 which posits that—Congruence between Personality Type code (as measured and defined in the summer of 1979 by Holland's "Self-Directed Search") and Present Occupation code (as reported in the winter of 1989-90 on the Data Collection Instrument and defined in Holland's The

Occupations Finder) has a strong predictive relationship with job satisfaction (as measured by the Job-in-General Scale of the Job Descriptive Index)—is accepted for Groups R, I, A, and E.

However, the findings reported above for Groups S and C cannot be given any weight because they are not significant at the .05 level. For both of these groups the distribution results are marginal at best. Therefore, Hypothesis 5 is rejected for Groups S and C. However, worth noting is the finding that there is a higher percentage of students who are "Satisfied" at the High-Moderate Congruence level for Groups S (53%) and C (56%) than there is at the Weak-Poor level (Group S: 31%; Group C: 52%). This finding occurs even though the distribution result for both groups reflects a lower percentage of "Satisfied" rates and a higher percentage of "Dissatisfied" rates at both congruence levels.

Rationale for Using Regression to Perform Additional Analyses

As explained more fully in Chapter III, a number of factors uniquely related to Hypothesis 5 dictate that the data collected to test it needed to be analyzed in additional and different ways than the data collected for the other hypotheses. One factor pertains to the nature of the scores of the Job-in-General scale of the Job Descriptive Index. These scores are continuous scores—in

contrast to the categorical scores obtained to test the previous hypotheses—and thus a different kind of statistical test is needed to determine the relation of these scores to the scores resulting from the assessment of congruence. While categories can be established for the Job-in-General scores, the best use of these continuous scores is with a statistical analysis that maximizes their original form. Simple and multiple regression were determined to be the most appropriate tests for this kind of analysis.

Simple regression is appropriate when the scores on one variable are to be used to predict the scores on another variable.¹⁶ In this case, simple regression was used to identify those variables having the strongest relationship with subjects' job satisfaction scores that should be used in a multiple regression.

Multiple regression is appropriate when there is a need to determine the weights which will give the highest possible correlation between the predicted and observed values of a criterion variable.¹⁷ In view of this, stepwise multiple regression was used with the values of the variables identified by simple regression to determine which predictors would have the highest possible correlation with the values of the criterion variable (job satisfaction). Stepwise multiple regression allows the selection of a smaller set of predictor variables from among a larger set.¹⁸

To best meet the requirements for testing this hypothesis, a forward stepwise (or step-up) multiple regression was used. This procedure commences by entering the predictor variable that accounts for the greatest variance in the criterion variable, and proceeds to determine most of the remaining variance by adding the other variables one at a time until the amount of variance obtained is insignificant.¹⁹ This stepwise procedure allows the identification of a regression equation which is based on relatively few predictor variables and yet accounts for virtually all the variance that could be explained if the entire set of predictors was used.²⁰

Regression analysis is used to produce an equation that describes the nature of the relationship between two variables. Additionally, regression analysis supplies measures of variance which allow an assessment of the accuracy with which the regression equation can predict values on a criterion variable. In brief, this type of analysis is used to describe the relationship between correlated random variables.

To prevent the multiple regression equation from yielding spurious predictions, caution must be taken to see that there is a proper balance between the number of predictor variables and the sample size. In this study, the size of the total sample ($N = 180$) permits the use of as many as fifteen predictors in the regression equation

whereas no more than three predictors should be used with each of the six groups ($N = 30$).

A second important factor is the general perception in the research literature that there are many contributing influences to job satisfaction. The third important factor is the special interest of this dissertation project (discussed more fully in Chapters I and II) in the relation of certain phenomena measured by Holland's "Self-Directed Search" to that obtained from the same subjects ten years later by the researcher-constructed Data Collection Instrument.

In view of these three factors, a set of relevant variables was identified for inclusion in the regression analyses. All of these variables are thought to be associated to some degree with job satisfaction. The use of regression analyses would not only determine the relation between subjects' Personality Type code and Present Occupation code (which is the primary interest of this hypothesis 5), but also allow the inclusion of other selected variables perceived to have influence on job satisfaction.

As in other cases in this study, Iachan's Index was used to calculate congruence scores for a set of selected predictor variables. Using these scores first for the total sample and then for each of the six groups, a series of simple and multiple regression analyses were performed to

assess the relation between subject scores on the Job-in-General scale of the Job Descriptive Index and subject scores on the predictor variables. Simple regression analysis was utilized for each of the six personality type groups using the Job-in-General score as the criterion variable and a set of twelve predictor variables. Simple regression was used in order to find the predictor variable(s) with the strongest relation to the criterion variable.

A number of the tables in this section report the results of regression analyses that were performed in connection with Hypothesis 5 using letter codes to designate the variables. For all these tables, Table 21 provides an explanation for each of the variable codes.

Simple Regression Analysis for Total Sample

First, the results (obtained from the calculations from testing Hypothesis 4) for congruence between Personality Type and Present Occupation codes were used with a selected set of predictor variables in a simple regression analysis to determine which of these variables most strongly influences the criterion variable (Job satisfaction score) at the .05 significance level.

As Table 22 shows, five variables emerged as significant at the .05 level: variable #1 (Congruence between Personality Type Code and Present Occupation Code),

TABLE 21
EXPLANATION OF VARIABLE CODES USED IN TABLES
REPORTING RESULTS OF SIMPLE AND MULTIPLE
REGRESSION ANALYSES

Code	Explanation
C/PT-POC	Congruence between Holland's SDS Personality Type (Summary) Code and Present Occupation Code
C/PT-TAC	Congruence between Holland's SDS Personality Type (Summary) Code and SDS Top Vocational Aspiration (Daydream) Code
C/PT-CAC	Congruence between Holland's SDS Personality Type (Summary) Code and SDS Composite Vocational Aspiration (Daydream) Code
C/PT-CM	Congruence between Holland's SDS Personality Type (Summary) Code and College Major Code
SATIS/CM	Satisfaction with College Major
GRADSTAT	Graduation Status (Graduated vs. Not Graduated)
C/TAC-CM	Congruence between Holland's SDS Top Vocational Aspiration (Daydream) Code and College Major Code
C/CAC-CM	Congruence between Holland's SDS Composite Vocational Aspiration (Daydream) Code and College Major Code
C/POC-CM	Congruence between Present Occupation Code and College Major Code
C/TAC-PO	Congruence between Holland's SDS Top Vocational Aspiration (Daydream) Code and Present Occupation Code
C/CAC-PO	Congruence between Holland's SDS Composite Vocational Aspiration (Daydream) Code and Present Occupation Code

variable #5 (Satisfaction with College Major), variable #11 (Congruence between Composite Aspiration Code and Present Occupation Code), variable #10 (Congruence between Top Aspiration Code and Present Occupation Code), and variable #6 (Graduation Status). Variable #1 has a correlation of .385 and accounts for 15% of the total variance. The correlation and proportion of variance for the others is: variable #5 (.336 and 11%), variable #11 (.254 and 6%), variable #10 (.245 and 6%), and #6 (.221 and 5%).

Multiple Regression Analysis with Total Sample

Once the simple regression analysis identified the most influential variables that also met the .05 criterion for significance, a multiple regression was performed in order to determine the strength of relation between the values of the set of derived predictor variables and the values of the criterion variable.

As Table 23 indicates, Variable #1 (Congruence between Personality Type Code and Present Occupation Code) has the strongest association with job satisfaction for the total sample. This variable's multiple R score (multiple correlation coefficient) of .386 explains 15% of the variance in job satisfaction scores. Variable #5, Satisfaction with College Major, shows the next most influential association. The variable's multiple R of .271 explains an additional 7% of the variance. Variable #4, Congruence between Personality Type Code and College Major

TABLE 22
SIMPLE REGRESSION ANALYSIS FOR THE TOTAL SAMPLE
IDENTIFYING THE VARIABLES HAVING THE HIGHEST
CORRELATION WITH THE VALUES OF JOB
SATISFACTION (OBTAINED FROM THE
JIG SCALE OF THE JDI)

Variable	Correlation Coefficient (r)	Amount of Variance (r-squared)	T Value: Parameter=0	Prob. Level (p>)
# 1 C/PT-POC	.38547	.14859	5.57	.0001
# 5 SATIS/CM	.33602	.11291	4.76	.0001
#11 C/CAC-PO	.25401	.06452	3.50	.0006
#10 C/TAC-PO	.24535	.06020	3.38	.0009
# 6 GRADSTAT	.22075	.04873	3.02	.0029
# 9 C/POC-CM	.12494	.01561	1.68	.0947
#12 GENDER	.09596	.00921	1.29	.2000
# 4 C/PT-CM	-.07520	.00566	-1.01	.3157
# 2 C/PT-TAC	.0345	.00120	0.46	.6449
# 3 C/PT-CAC	.02451	.00060	0.33	.7440
# 7 C/TAC-CM	-.00983	.00010	-0.13	.8958
# 8 C/CAC-CM	.00476	.00002	0.06	.9494

Total Sample: N = 180

Code, shows the third most influential relation. This variable's multiple R of .192 explains an additional 4% of the variance. Graduation Status (Variable #6) not only appears to have minor influence (R-squared increment = .01),

but this variable also has at best only marginal significance ($p = .0681$) and so its contribution to the predicted variance in job satisfaction is minimal. These findings clearly show that of the predictors tested, Variable #1—Congruence between Personality Type Code and Present Occupation Code—has by far the strongest relationship with job satisfaction for subjects in the total sample.

TABLE 23
MULTIPLE REGRESSION ANALYSIS FOR THE TOTAL GROUP
USING THE WEIGHTED FORWARD STEPWISE PROCEDURE
FOR THE CRITERION VARIABLE (JOB SATISFACTION
SCORE OF THE JIG SCALE OF THE JDI)

#	Variable	Beta	Stepwise		R2 Increment	F Value	p>
			Corr. (R)	Stepwise R2			
# 1	C/PT-POC	.39	.3855	.1486	.15	31.06	.0001
# 5	SATIS/CM	.28	.2711	.0735	.07	16.73	.0001
# 4	C/PT-CM	-.20	.1918	.0368	.04	8.74	.0035
# 6	GRADSTAT	.12	.1183	.0140	.01	3.37	.0681

N = 180

The findings of these calculations indicate that for the total sample there clearly is a significant relationship between Variable #1 (Congruence between Personality Type Code and Present Occupation Code) and job satisfaction.

Thus, support is found for the supposition that Congruence between Personality Type code (as assessed and defined in the summer of 1979 by Holland's "Self-Directed Search") and Present Occupation code (as reported in the winter of 1989-90 on the Data Collection Instrument and defined by "The Occupations Finder") is a better predictor of job satisfaction than the other variables chosen for inclusion in the set of predictors that was tested. Therefore, Hypothesis 5--Congruence between Personality Type code (as measured and defined in the summer of 1979 by Holland's "Self-Directed Search") and Present Occupation code (as reported in the winter of 1989-90 on the Data Collection Instrument and defined in Holland's The Occupations Finder) has a strong predictive relationship with job satisfaction (as measured by the Job-in-General Scale of the Job Descriptive Index)--is accepted for the total sample.

Simple Regression Analysis with the Six Groups

Having tested Hypothesis 5 with the total sample to determine whether congruence between Personality Type code and Present Occupation code is the strongest predictor of job satisfaction, testing each of the six groups to make the same determination at the group level was also deemed essential in order to fully test this hypothesis. These tests would also allow for useful comparisons among the groups. As described above for the total sample, here also for each of the six groups, the results (of the calculations

used in testing Hypothesis 4) for congruence between Personality Type code and Present Occupation code were used with a selected set of predictor variables in a simple regression to determine which of these variables shows the highest correlation with the criterion variable (Job satisfaction score) at the .05 significance level. The results of the simple regressions are reported in Tables 24 through 29.

As Table 24 shows for Group R, four of the variables are significant at the .05 level. The findings did show that variable #1 (Congruence between Personality Type Code and Present Occupation Type Code) has the highest correlation (.540) and accounts for the greatest variance (29%) in the criterion variable. The three other significant variables are: #10 (Congruence between Top Aspiration Code and Present Occupation Code), #11 (Congruence between Composite Aspiration Code and Present Occupation Code), and #6 (Graduation Status). Variable #12 (Gender) shows enough strength to warrant mention here and inclusion in later multiple regression analyses. Variable #10 has a correlation of .518 and accounts for 27% of the total variance, variable #11 has a correlation of .472 and accounts for 22% of the variance, and variable #6 has a correlation of .373 and accounts for 14%. Variable #12 (Gender) has enough strength to warrant

TABLE 24

SIMPLE REGRESSION ANALYSIS FOR GROUP R IDENTIFYING THE
VARIABLES HAVING THE HIGHEST CORRELATION WITH
THE VALUES OF JOB SATISFACTION (OBTAINED
FROM THE JIG SCALE OF THE JDI)

Variable	Correlation Coefficient (r)	Amount of Variance (r-squared)	T Value: Parameter=0	Prob. Level (p>)
# 1 C/PT-POC	.54011	.29172	3.40	0.0021
#10 C/TAC-PO	.51815	.26848	3.21	0.0034
#11 C/CAC-PO	.47201	.22278	2.83	0.0085
# 6 GRADSTAT	.37331	.13936	2.13	0.0422
#12 GENDER	.33628	.11308	1.89	0.0692
# 5 SATIS/CM	.27763	.07708	1.53	0.1374
# 9 C/POC-CM	.24843	.06172	1.36	0.1856
# 2 C/PT-TAC	.17862	.03190	0.96	0.3450
# 3 C/PT-CAC	.17061	.02911	0.92	0.3674
# 4 C/PT-CM	-.07163	.00513	-0.38	0.7068
# 8 C/CAC-CM	.06619	.00438	0.35	0.7282
# 7 C/TAC-CM	.02256	.00051	0.12	0.9058

N = 30

being mentioned here and being included in the multiple regression analyses.

As Table 25 shows for Group A, only Variable #1 (Congruence between Personality Type Code and Present Occupation Code) emerged as significant the .05 level of

significance. Variable #1 has a correlation of .627 and accounts for 39% of the variance in the criterion variable. Other predictor variables showing enough strength to warrant mention here and inclusion in multiple regression analyses are #12 (Gender) and #5 (Satisfaction with College Major).

TABLE 25

SIMPLE REGRESSION ANALYSIS FOR GROUP A IDENTIFYING THE
VARIABLES HAVING THE HIGHEST CORRELATION WITH
THE VALUES OF JOB SATISFACTION (OBTAINED
FROM THE JIG SCALE OF THE JDI)

Variable	Correlation Coefficient (r)	Amount of Variance (r-squared)	T Value: Parameter=0	Prob. Level (p>)
# 1 C/PT-POC	.62736	.39357	4.26	0.0002
# 3 C/PT-CAC	.24064	.05791	1.31	0.2002
# 5 SATIS/CM	.21011	.04414	1.14	0.2651
# 2 C/PT-TAC	.16667	.02778	0.89	0.3787
# 8 C/CAC-CM	-.15109	.02283	-0.81	0.4254
# 6 GRADSTAT	.07341	.00539	0.39	0.6998
# 9 C/POC-CM	-.07271	.00529	-0.39	0.7026
# 7 C/TAC-CM	-.07212	.00520	-0.38	0.7049
#11 C/CAC-PO	.05123	.00262	0.27	0.7882
#10 C/TAC-PO	-.04270	.00182	-0.23	0.8227
#12 GENDER	.02825	.00080	0.15	0.8822
# 4 C/PT-CM	.00288	.00001	0.02	0.9880

N = 30

As Table 26 shows for Group E, variable #1 (Congruence between Personality Type Code and Present Occupation Type Code), variable #11 (Congruence between Composite Aspiration Code and Present Occupation), and variable #6 (Graduation Status) emerge as significant at the .05 level. Variable #1

TABLE 26

SIMPLE REGRESSION ANALYSIS FOR GROUP E IDENTIFYING THE VARIABLES HAVING THE HIGHEST CORRELATION WITH THE VALUES OF JOB SATISFACTION (OBTAINED FROM THE JIG SCALE OF THE JDI)

Variable	Correlation Coefficient (r)	Amount of Variance (r-squared)	T Value: Parameter=0	Prob. Level (p>)
# 1 C/PT-POC	.48305	.23334	2.92	0.0069
#11 C/CAC-PO	.44956	.20210	2.66	0.0127
# 6 GRADSTAT	.39519	.15618	2.28	0.0307
# 5 SATIS/CM	.33989	.11553	1.91	0.0661
#10 C/TAC-PO	.31417	.09870	1.75	0.0909
# 2 C/PT-TAC	-.30310	.09185	-1.68	0.1035
# 9 C/POC-CM	.27154	.07374	1.49	0.1466
# 2 C/TAC-CM	.22558	.05089	1.23	0.2307
# 8 C/CAC-CM	.12805	.01640	0.68	0.5001
# 4 C/PT-CM	.07668	.00588	0.41	0.6871
# 3 C/PT-CAC	-.07070	.00500	-0.38	0.7103
#12 GENDER	-.01889	.00036	-0.10	0.9211

N = 30

has a correlation of .483 and it accounts for 23% of the total variance while variable #11 has a correlation of .450 and accounts for 20% of the variance. Variable #6 has a correlation coefficient of .395 and accounts for 16% of the variance in the criterion variable. Predictor variable #5 (Satisfaction with College Major) shows enough strength to warrant mention here and inclusion in multiple regression analyses.

Simple regression analyses for Groups I, S, and C produced some rather different results than those stated above for Groups R,A, and E. As Table 27 shows for Group I, three variables significant at the .05 level are among those having the highest correlation with job satisfaction: Variables #10 (Congruence between Top Aspiration Code and Present Occupation Code), #1 (Congruence between Personality Type Code), and #6 (Graduation Status). The strongest of these, Variable #10, has a correlation of .419 and accounts for 18% of the total variance in the criterion variable. Variable #1 has a correlation of .374 and it accounts for 14% of the variance while Variable #6 has a correlation of .373 and a variance of 13%. Variables #11 (Congruence between Composite Aspiration Code and Present Occupation Code), #9 (Congruence between Present Occupation Type Code and College Major), and #5 (Satisfaction with College Major) show a high enough correlation and variance to warrant being

TABLE 27

SIMPLE REGRESSION ANALYSIS FOR GROUP I IDENTIFYING THE
VARIABLES HAVING THE HIGHEST CORRELATION WITH
THE VALUES OF JOB SATISFACTION (OBTAINED
FROM THE JIG SCALE OF THE JDI)

Variable	Correlation Coefficient (r)	Amount of Variance (r-squared)	T Value: Parameter=0	Prob. Level (p>)
#10 C/TAC-PO	.41915	.17568	2.44	0.0211
# 1 C/PT-POC	.37437	.14016	2.14	0.0415
# 6 GRADSTAT	.37337	.13041	2.13	0.0421
#11 C/CAC-PO	.33901	.11492	1.91	0.0669
# 9 C/POC-CM	.33781	.11412	1.90	0.0679
# 5 SATIS/CM	.33053	.10925	1.85	0.0744
# 4 C/PT-CM	-.25862	.06688	-1.42	0.1676
# 7 C/TAC-CM	-.12808	.01640	-0.68	0.5000
#12 GENDER	.09525	.00907	0.51	0.6166
# 3 C/PT-CAC	.07642	.00584	0.41	0.6881
# 8 C/CAC-CM	.01883	.00035	0.10	0.9213
# 2 C/PT-TAC	.00103	.00001	0.01	0.9957

N = 30

mentioned here and being included in a multiple regression analysis.

As Table 28 shows for Group S, variable #5 (Satisfaction with College Major) is the only predictor variable found to be significant at the .05 level. Variable

TABLE 28

SIMPLE REGRESSION ANALYSIS FOR GROUP S IDENTIFYING THE
VARIABLES HAVING THE HIGHEST CORRELATION WITH THE
VALUES OF JOB SATISFACTION (OBTAINED FROM THE
JIG SCALE OF THE JDI)

Variable	Correlation Coefficient (r)	Amount of Variance (r-squared)	T Value: Parameter=0	Prob. Level (p>)
# 5 SATIS/CM	.45281	.20504	2.69	0.0120
# 3 C/PT-CAC	.27376	.07495	1.51	0.1432
#12 GENDER	-.24636	.06069	-1.35	0.1894
# 9 C/POC-CM	-.14770	.02180	-0.79	0.4362
#10 C/TAC-PO	.10703	.01151	0.57	0.5725
# 6 GRADSTAT	.10677	.01139	0.57	0.5744
# 7 C/TAC-CM	.09640	.00929	0.51	0.6123
# 4 C/PT-CM	-.08617	.00743	-0.46	0.6507
# 2 C/PT-TAC	.08610	.00741	0.46	0.6511
# 1 C/PT-POC	-.04104	.00168	-0.22	0.8295
# 8 C/CAC-CM	.02718	.00074	0.14	0.8866
#11 C/CAC-PO	-.02449	.00060	-0.13	0.8983

N = 30

#5 has a correlation of .453 and it accounts for 21% of the variance in the criterion variable. Other variables showing enough strength to be mentioned here and included in a multiple regression analysis are #3 (Congruence between

Personality Type Code and Composite Aspiration Code) and #12 (Gender).

As Table 29 shows for Group C, only variables #8 (Congruence between Composite Aspiration Code and College Major Code) is significant at the .05 level. Variable #8

TABLE 29

SIMPLE REGRESSION ANALYSIS FOR GROUP C IDENTIFYING THE VARIABLES HAVING THE HIGHEST CORRELATION WITH THE VALUES OF JOB SATISFACTION (OBTAINED FROM THE JIG SCALE OF THE JDI)

Variable	Correlation Coefficient (r)	Amount of Variance (r-squared)	T Value: Parameter=0	Prob. Level (p>)
# 8 C/CAC-CM	.35944	.12919	2.04	0.0511
#12 GENDER	.34770	.12090	1.96	0.0597
#11 C/CAC-PO	.33263	.11064	1.87	0.0725
# 5 SATIS/CM	.30966	.09589	1.72	0.0959
#10 C/TAC-PO	.26428	.06984	1.45	0.1582
# 3 C/PT-CAC	-.21039	.04426	-1.14	0.2645
# 7 C/TAC-CM	.15238	.02322	0.82	0.4215
# 1 C/PT-POC	.11147	.01243	0.59	0.5576
# 2 C/PT-TAC	.10043	.01009	0.53	0.5957
# 9 C/POC-CM	.08557	.00732	0.45	0.6530
# 6 GRADSTAT	.02337	.00054	0.12	0.9024
# 4 C/PT-CM	.02338	.00055	0.12	0.9025

N = 30

has a correlation of .359 and it accounts for 13% of the variance in the criterion variable. Variable #12 (Gender), #11 (Congruence between Composite Aspiration Code and Present Occupation), and #5 (Satisfaction with College Major) show enough strength to warrant mention here and inclusion in a multiple regression analysis.

Multiple Regression Analysis with the Six Groups

Once all of the simple regression analyses were done, a stepwise multiple regression was calculated for each of the six groups using the Job-in-General score (which measures job satisfaction) as the criterion variable and the set of predictor variables selected from the simple regression analyses that showed the strongest relationships. Forward stepwise multiple regressions were performed to determine which predictors (chosen from the set of variables identified by the simple regression analyses discussed above) have the highest correlation with the criterion variable. The results of the multiple regressions are listed in Tables 30 through 35.

As Table 30 shows for Group R, Variable #1 (Congruence between Personality Type Code and Present Occupation Code) has the strongest association with the criterion variable (Job Satisfaction score on the JIG scale of the JDI). This variable's multiple R score of .540 accounts for 29% of the variance in the criterion variable. Although Graduation Status (variable #6) is the next most influential predictor

with a multiple R score of .580 that explains an additional 5% of the variance, its p value of .1864 makes it insignificant. Only Variable #1 (Congruence between Personality Type Code and Present Occupation Code) meets the .05 significance level standard. Based on the findings of both simple and multiple regression analyses, Variable #1 clearly has the strongest association with the criterion variable for subjects in Group R.

TABLE 30

MULTIPLE REGRESSION ANALYSIS FOR GROUP R USING
THE WEIGHTED FORWARD STEPWISE PROCEDURE FOR
THE CRITERION VARIABLE (JOB SATISFACTION
SCORE ON THE JIG SCALE OF THE JDI)

(#)	Variable	Stepwise Mult. Corr. (R)	Stepwise R ²	R ² Increment	F Value	Prob. Level (p>)
# 1	C/PT-POC	.5401	.2917	.29	11.53	.0021
# 6	GRADSTAT	.5804	.3369	.05	1.84	.1864

N = 30

As Table 31 shows for Group I, Variable #10 (Congruence between Top Aspiration Code and Present Occupation Type Code) has the strongest relation to the criterion variable. This variable's multiple R score of .419 explains 18% of the variance in the criterion variable. The second most influential predictor variable is Variable #6

TABLE 31

MULTIPLE REGRESSION ANALYSIS FOR GROUP I USING THE
WEIGHTED FORWARD STEPWISE PROCEDURE FOR THE
CRITERION VARIABLE (JOB SATISFACTION
SCORE ON THE JIG SCALE OF THE JDI)

(#)	Variable	Stepwise Mult. Corr. (R)	Stepwise R ²	R ² Increment	F Value	Prob. Level (p>)
#10	C/TAC-PO	.4192	.1757	.18	5.97	.0211
# 6	GRADSTAT	.5545	.3075	.13	5.14	.0316
# 4	C/PT-CM	.6353	.4036	.10	4.19	.0509
# 5	SATIS/CM	.7211	.5200	.12	6.06	.0211

N = 30

(Graduation Status). This variable's multiple R score of .555 explains another 13% of the variance. Variable #4 (Congruence between Personality Type Code and College Major Code) is the third most influential predictor. The multiple R score of .635 for Variable #4 explains an additional 10% of the variance. Satisfaction with College Major (Variable #5) is the fourth most influential predictor for this group. This variable's multiple R score of .721 explains an additional 12% of the variance. All of the variables met the .05 standard for significance. While the analyses show that none of these variables is a real powerful predictor, the findings do indicate that of those variables considered,

Variable #10 (Congruence between Top Aspiration Code and Present Occupation Code) has the strongest relation to the criterion variable for subjects in Group I.

As Table 32 shows for Group A, Variable #1 (Congruence between Personality Type Code and Present Occupation Code) has the strongest association with the criterion variable. This variable's multiple R score (multiple correlation coefficient) of .627 explains 39% of the variance in job satisfaction scores. Although Satisfaction with College Major (variable #5) is the next most influential predictor with a multiple R score of .661 that explains an additional 4% of the variance, its p value of .1624 makes it insignificant. Only Variable #1 (Congruence between

TABLE 32

MULTIPLE REGRESSION ANALYSIS FOR GROUP A USING
THE WEIGHTED FROWARD STEPWISE PROCEDURE FOR
THE CRITERION VARIABLE (JOB SATISFACTION
SCORE ON THE JIG SCALE OF THE JDI)

(#)	Variable	Stepwise Mult. Corr. (R)	Stepwise R ²	R ² Increment	F Value	Prob. Level (p>)
# 1	C/PT-POC	.6274	.3936	.39	18.17	.0002
# 5	SATIS/CM	.6608	.4366	.04	2.06	.1624

N = 30

Personality Type Code and Present Occupation Code) meets the .05 significance level standard. Based on the findings of both simple and multiple regression analyses, Variable #1 clearly has the strongest association with the criterion variable for subjects in Group A.

As Table 33 shows for Group S, Variable #5 (Satisfaction with College Major) has the strongest relation to the criterion variable. This variable's multiple R score of .453 explains 21% of the variance in the criterion variable. Although Gender (Variable #12) is the next most influential predictor with a multiple R score of .510 that explains an additional 6% of the variance, its p value of .1671 makes it insignificant. Only Variable #5 (Satisfaction with College Major) meets the .05 significance

TABLE 33

MULTIPLE REGRESSION ANALYSIS FOR GROUP S USING
THE WEIGHTED FORWARD STEPWISE PROCEDURE FOR
THE CRITERION VARIABLE (JOB SATISFACTION
SCORE ON THE JIG SCALE OF THE JDI)

(#)	Variable	Stepwise Mult. Corr. (R)	Stepwise R ²	R ² Increment	F Value	Prob. Level (p>)
# 5	SATIS/CM	.4528	.2050	.21	7.22	.0120
#12	GENDER	.5102	.2603	.06	2.02	.1671

N = 30

level standard. Based on the findings of both simple and multiple regression analyses, Variable #5 clearly has the strongest association with the criterion variable for subjects in Group S.

As Table 34 shows for Group E, Variable #1 (Congruence between Personality Type Code and Present Occupation Code) again has the strongest association with the criterion variable. This variable's multiple R value of .483 explains 23% of the variance in the criterion variable. The second most influential predictor is Variable #2 (Congruence between Personality Type Code and Top Aspiration Code). This variable's multiple R score of .633 explains an additional 17% of the variance. Congruence between Top Aspiration Code and Present Occupation Code (Variable #10) is the third most influential predictor for this group. The multiple R score of .741 for Variable #10 explains an additional 15% of the variance. All three of these variables (#1, #2, #10) met the significance level standard of .05. While two other variables (#3 and #9) may be considered to have marginal significance (.0954 and .1356), they add relatively little to the proportion of variance (.05 and .04). The analyses performed clearly show that Variable #1 (Congruence between Personality Type Code and Present Occupation Code) have the strongest association with the criterion variable for subjects in Group E.

TABLE 34

MULTIPLE REGRESSION ANALYSIS FOR GROUP E USING
THE WEIGHTED FORWARD STEPWISE PROCEDURE FOR
THE CRITERION VARIABLE (JOB SATISFACTION
SCORE ON THE JIG SCALE OF THE JDI)

(#)	Variable	Stepwise Mult. Corr. (R)	Stepwise R ²	R ² Increment	F Value	Prob. Level (p>)
# 1	C/PT-POC	.4830	.2333	.23	8.52	.0069
# 2	C/PT-TAC	.6327	.4003	.17	7.52	.0107
#10	C/TAC-PO	.7405	.5484	.15	8.53	.0071
# 3	C/PT-CAC	.7726	.5969	.05	3.00	.0954
# 9	C/POC-CM	.7958	.6333	.04	2.38	.1356

N = 30

As Table 35 shows for Group C, Variable #8 (Congruence between Composite Aspiration Code and College Major Code) has the strongest relation to the criterion variable. This variable's multiple R score of .359 explains 13% of the total variance. Variable #12 (Gender) has the next strongest relation to the criterion variable. The multiple R score of .348 for Variable #12 explains 16% of the variance in the criterion variable. The third most influential predictor was Congruence between Top Aspiration Code and Present Occupation (Variable #10). Although the multiple R score of .620 for Variable #10 explains an additional 9% of the

variance, its p value of .0581 makes it only marginally significant. Variable #5 (Satisfaction with College Major) was the fourth most influential predictor. While this variable's multiple R score of .684 explains an additional 8% of the variance, its p value of .0598 gives it only marginal significance. Only Variables #8 and #12 have findings that are significant at the .05 level. The analyses performed clearly show that Variable #8 (Congruence between Composite Aspiration Code and College Major Code) has the strongest association with the criterion variable for subjects in Group C.

TABLE 35

MULTIPLE REGRESSION ANALYSIS FOR GROUP C USING
THE WEIGHTED FORWARD STEPWISE PROCEDURE FOR
THE CRITERION VARIABLE (JOB SATISFACTION
SCORE ON THE JIG SCALE OF THE JDI)

(#)	Variable	Stepwise Mult. Corr. (R)	Stepwise R ²	R ² Increment	F Value	Prob. Level (p>)
# 8	C/CAC-CM	.5394	.1292	.13	4.15	.0511
#12	GENDER	.5398	.2914	.16	6.18	.0194
#10	C/TAC-PO	.6201	.3845	.09	3.93	.0581
# 5	SATIS/CM	.6836	.4673	.08	3.89	.0598

N = 30

The findings of the regression calculations used to test Hypothesis 5 with each of the six groups of the sample indicate that for Groups R, A, and E there is a significant predictive relationship between Variable #1 (Congruence between Personality Type Code and Present Occupation Code) and the criterion variable (job satisfaction score on the JIG scale of the JDI). Variable #10 (Congruence between Top Aspiration Code and Present Occupation Code) shows the strongest association with the criterion variable in Group I. Satisfaction with College Major (Variable #5) shows the most significant predictive relationship with the criterion variable for Group S. For Group C, Variable #8 (Congruence between Composite Aspiration Code and College Major Code) is the predictor most strongly associated with the criterion variable.

Thus, the findings of the preceding regressions indicate the existence of substantial support among the six groups for the supposition that congruence between personality type code (as assessed and defined in the summer of 1979 by Holland's "Self-Directed Search") and present occupation code (as reported in the winter of 1989-90 on the Data Collection Instrument and defined by "The Occupations Finder") has a closer association with the criterion variable—job satisfaction score on the Job-in-General scale of the Job Descriptive Index—than the other variables chosen for inclusion in the set of predictors that was tested.

Therefore, Hypothesis 5—Congruence between Personality Type code (as measured and defined in the summer of 1979 by Holland's "Self-Directed Search") and Present Occupation code (as reported in the winter of 1989-90 on the Data Collection Instrument and defined in Holland's The Occupations Finder) has a strong predictive relationship with job satisfaction (as measured by the Job-in-General Scale of the Job Descriptive Index)—is accepted for Groups R, A, and E and rejected for Groups I, S, and C.

The data collected and the analyses performed for this study have been presented in this chapter. A discussion of the findings reported in this chapter along with some implications of this investigation and recommendations for future research will be presented in Chapter V.

ENDNOTES

¹John L. Holland, 1987 Manual Supplement for the Self-Directed Search (Odessa, FL: Psychological Assessment Resources, Inc., 1987), 19.

²Ibid.

³John L. Holland, The Self-Directed Search Professional Manual - 1985 Edition (Odessa, FL: Psychological Assessment Resources, Inc., 1985), 85.

⁴Graham J.G. Upton, The Analysis of Cross-tabulated Data (New York: John Wiley, 1978), 16.

⁵Sidney Siegel, Nonparametric Statistics for the Behavioral Sciences (New York: McGraw-Hill, 1956), 96.

⁶Ibid., 101.

⁷Ibid., 102.

⁸Donald Rosen, Kay Holmberg, and John L. Holland, The College Majors Finder (Odessa: FL: Psychological Assessment Resources, Inc., 1987).

⁹James M. O'Neil, and Thomas M. Magoon, "The Predictive Power of Holland's Personality Type and Consistency Levels Using the Self Directed Search," Journal of Vocational Behavior 10 (1977): 39.

¹⁰Ibid.

¹¹John L. Holland, 1987 Manual Supplement for the Self-Directed Search (Odessa, FL: Psychological Assessment Resources, Inc., 1987), 4.

¹²John L. Holland, The Occupations Finder (Odessa, FL: Psychological Assessment Resources, Inc., 1985).

¹³James M. O'Neil, Thomas M. Magoon, and Terence J. Tracey, "Status of Holland's Investigative Personality Types and Their Consistency Levels Seven Years Later," Journal of Counseling Psychology 25 (1978): 530-32.

¹⁴John L. Holland, The Self-Directed Search Professional Manual - 1985 Edition (Odessa, FL: Psychological Assessment Resources, Inc., 1985), 85.

¹⁵Patricia C. Smith, Lorne M. Kendall, and Charles L. Hulin, The Measurement of Satisfaction in Work and Retirement (Bowling Green, OH: Bowling Green State University, 1975), 6.

¹⁶James L. Bruning, and B.L. Kintz, Computational Handbook of Statistics. 2nd ed. (Glenview, IL: Scott, Foresman and Company, 1977), 175.

¹⁷*Ibid.*

¹⁸Sam Kash Kachigan, Statistical Analysis. An Interdisciplinary Introduction to Univariate and Multivariate Methods (New York: Radius Press, 1982), 263.

¹⁹*Ibid.*, 263-64.

²⁰*Ibid.*, 265.

CHAPTER V

DISCUSSION, IMPLICATIONS AND RECOMMENDATIONS

In the present study, the relation between personality type and selected career choice decisions—as understood within the context of John L. Holland's theory of vocational personalities and work environments—was investigated. Of special significance to the study's purpose and direction is Holland's assumption that people tend to select a work environment that is congruent with their personality type.

The present study sought to test a set of hypotheses related to this assumption. Several of these hypotheses contend that a higher percent of subjects in this study with a high-moderate level of congruence between their Personality Type code and the code of selected vocational choice variables will be satisfied with their choice than those subjects with a weak-poor level of congruence between the two codes. All five hypotheses assume that the majority of subjects in all six sub-groups (each one representing a Holland personality type: Realistic, Investigative, Artistic, Social, Enterprising, and Conventional) would make certain educational and vocational choices that had high-moderate congruence with their personality type and that a higher percent of these subjects would be satisfied with

their selections than those whose choices reflected a weak-poor congruence.

Specific hypotheses were derived from the research literature to investigate the validity of the preceding assumptions. These hypotheses were then submitted to an empirical test to gain a better understanding of how the variables selected for this study relate to one another in the making of vocational decisions. In the following discussion, an effort has been made to examine the results of the present study in light of its purpose.

Discussion of the Findings

Of general interest to the present study was the predictive validity of Holland's Self-Directed Search (SDS) with regard to a specific set of variables related to vocational choice. All the variables chosen for testing the SDS in this study have been tested in previous studies with a number of respected assessment instruments (including Holland's Vocational Preference Inventory and SDS). These studies have yielded mixed results. The present study expected to obtain more definitive findings than similar studies. The variables chosen for the present study included subjects' Personality Type (SDS Summary) code, Occupational Aspiration (SDS Day Dream) code, College Major chosen, Satisfaction with chosen College Major, Present Occupation, and Satisfaction with Present Occupation.

Congruence and Persistence to Graduation

Of particular interest to this study is the supposition addressed in Hypothesis 1 that congruence between the subjects' Personality Type (Summary) code and their Occupational Aspiration (Daydream) code is predictive of their persistence to graduation.

Persistence and the Total Sample

In contrast with the expectation, the data showed that for the total sample, there was insufficient support to accept the hypothesis that congruence between students' Summary Code and their Occupational Aspiration (Day Dream) Code is predictive of their persistence to graduation.

Holland's theory contends that the direction of a person's educational choice is stabilized or maintained when he or she studies in a congruent environment. This notion suggests that the more similar individuals' personality types are to their environmental models, the greater the likelihood they will experience certain outcomes such as academic achievement and persistence to graduation.

However, the evidence from a large body of research studies is equivocal. A number of studies have shown that congruent students are more stable, academically oriented, successful, and persistent than those who are incongruent (Reuterfors, Schneider, and Overton¹; Spokane, Malett, and Vance²; Posthuma and Navran³; Walsh⁴; Walsh, Howard, O'Brien, Santa-Maria, and Edmunson⁵; Walsh and Lewis⁶; Walsh and Russell⁷;

Walsh, Spokane, and Mitchell⁸). An equally impressive set of studies have failed to produced any evidence providing clear support for Holland's congruency hypothesis (Frantz and Walsh⁹; Morrow¹⁰; Schaefer¹¹; Walsh and Barrow¹²; Walsh and Hanle¹³).

Persistence and the Six Sub-groups

In the present study, congruence between the Summary Code and the Occupational Aspiration code appears to have been a moderately efficient predictor of persistence to graduation for subjects in Groups R, I, and S. In all three of these groups, the largest number of "Graduated" subjects were also those subjects who had a high-moderate congruence between personality type code (SDS Summary Code) and Occupational Aspiration code (Daydream code) when measured by close three-letter agreement (Group R, 61%; Group I, 92%; and Group S, 95%). This finding for Groups I and S appears to concur with Holland's assertion that the Investigative and Social types have high educational aspirations and achievement.¹⁴ However the finding for Group R seems to be at variance with Holland's theoretical model for Realistic types in that they generally have an aversion to educational activities which is expressed in a low level of educational aspirations and achievement. Worth noting is the phenomenon that among the college majors and occupations requiring a college education are Architectural Drafting, Computer Technology, Industrial Arts, Oceanography, and Engineering

(i.e., Electronics-Research, Mechanical, and Automotive)--all of which are classified as Realistic types and attract "R-type" subjects to major programs of the host university from which the "R" Group sample for this study was drawn. Also significant is the probable desire of a substantial number of the "R-type" subjects in this study to achieve greater financial success in a higher status occupation.

In the present study, Groups R, I, and S appear to fit Holland's theoretical description for the Realistic, Investigative, and Social personality types and their respective environmental models. The following paragraphs offer a fuller discussion of the findings for all six sub-groups.

The Realistic Type "perceives self as having mechanical and athletic ability and lacking ability in human relations"¹⁵ This type prefers a Realistic environment that "is characterized by the dominance of environmental demands and opportunities that entail the explicit, ordered, or systematic manipulation of objects, tools, machines, and animals, and by a population dominated by Realistic types."¹⁶

For the subjects in the present study in Group R, personality type did predict with relatively good efficiency (73% of those with high-moderate congruence; 53% of the total R Group) persistence to graduation. The relatively high number of non-graduated subjects (twelve out of thirty,

40%) tends to support Holland's assumption that of the six personality type groups, Realistic individuals have the lowest education aspirations and achievement.¹⁷ Of these twelve non-graduates in Group R, eight (67%) had a "non-R" first letter in their three-letter Daydream code indicating that as entering college freshmen they had a strong vocational interest in a "non-R" type occupation. By comparison, of the eighteen graduates in Group R, eleven (61%) had an R as the first letter in their three-letter Daydream code indicating that as entering college freshmen they had a strong vocational interest in an "R" type occupation. Of the other seven graduates, five (71%) had as a second choice an occupation with an "R" as the first letter in the three-letter Daydream code. Sixteen of the eighteen subjects (89%) who ultimately persisted to graduation in Group R had a strong orientation toward an "R" type occupation when they completed the SDS as entering college freshmen.

Several factors related to the vocational (educational) environment for the present study may help to explain why a significant number of subjects in the R Group did persist to graduation. First, most of the subjects in this group indicated at the beginning of their freshman year when they took the SDS that they were pre-engineering majors. For these subjects and others with the Realistic personality type, there were enough course offerings and

major field options in the curricula of the host university to offer a good opportunity for them to make a vocational (academic) choice that would have positive personal appeal. These phenomena add support to a fundamental assumption of Holland's theory: people seek work environments which are as similar to their vocational interests as possible. Second, Holland's theory assumes that "persons with different personality patterns respond to instructors, teaching methods, and styles according to the formulations for the types."¹⁸ Students in this study in Group R (Realistic) appear to have been part of an educational environment that had enough compatible aspects so as to promote—rather than prevent—their persistence to graduation.

The Investigative Type "perceives self as scholarly, intellectual, having mathematical and scientific ability, and lacking in leadership ability."¹⁹ This type prefers an investigative environment that "is characterized by the dominance of environmental demands and opportunities that entail the observation and symbolic, systematic, creative investigation of physical, biological, or cultural phenomena, and by a population dominated by Investigative types."²⁰ In light of this description and Holland's contention that Investigative types have the highest educational aspirations and achievement,²¹ the deduction can be made that "I-type" persons would tend to pursue occupations that require a college degree or specialized

post-secondary training. As predicted, the majority of subjects in Group I (92% of those with high-moderate congruence; 77% of the total I Group) of this study persisted to graduation.

The Social Type "perceives self as liking to help others, understanding others, having teaching ability, and lacking mechanical and scientific ability."²² This type prefers a Social environment that "is characterized by the dominance of environmental demands and opportunities that entail the manipulation of others to inform, train, develop, cure, or enlighten, and by a population dominated by Social types."²³ According to the personality pattern order for educational behavior derived from Holland's theory,²⁴ subjects with the Social personality type have the second highest educational aspirations and achievement. As predicted, the majority of subjects in Group S (95% of those with high-moderate congruence; 67% of the total S Group) of this study persisted to graduation.

However, the results for Groups A, E, and C indicate some rather different patterns. Holland's definitive description and characteristics for each of the three types represented by these three groups (A,E,C) will provide some valuable insight into understanding the meaning of the results obtained for each group.

The Artistic Type "perceives self as expressive, original, intuitive, nonconforming, introspective,

independent, disorderly, having artistic and musical ability, and ability in acting, writing, and speaking."²⁵ This type prefers an Artistic environment that "is characterized by the dominance of environmental demands and opportunities that entail ambiguous, free, unsystematized activities and competencies to create art forms or products, and by the dominance of Artistic types in the environment."²⁶ According to the personality pattern order for educational behavior derived from Holland's theory, subjects with the Artistic personality type have the third highest educational aspirations and achievement.²⁷

For the subjects in the present study in Group A, Personality Type did predict with moderately high-to-moderate efficiency (67% of those with high-Moderate congruence; 47% of the total A Group) persistence to graduation. The number of non-graduated subjects (eight out of thirty, 27%) tends to support Holland's assumption that of the six personality type groups, Artistic individuals generally have higher aspirations and achievement than three of the other groups.²⁸ Of these eight non-graduates in Group A, four (50%) had a "non-A" first letter in their three-letter Daydream code indicating that as entering college freshmen they had a strong vocational interest in a "non-A" type occupation. By comparison, of the twenty-two graduates in Group A, only eight (36%) had an "A" as the first letter in their three-letter Daydream code indicating

that as entering college freshmen they also had a strong vocational interest in a "non-A" type occupation. Of the other fourteen graduates, six (43%) had as a second choice an occupation with an "A" as the first letter in the three-letter Daydream code. Of special note is the finding that of the twenty-two subjects who ultimately persisted to graduation in Group A, fourteen (64%) had a definite orientation toward an "A" type occupation when they completed the SDS as entering college freshmen.

The Enterprising Type "perceives self as aggressive, popular, self-confident, sociable, possessing leadership and speaking abilities, and lacking scientific abilities."²⁹ This type prefers an Enterprising environment that "is characterized by the dominance of environmental demands and opportunities that entail the manipulation of others to attain organizational or self-interest goals, and by the dominance of Enterprising types."³⁰

For the subjects in the present study in Group E, personality type did predict with moderately high-to-moderate efficiency (71% of those with high-good congruence; 40% of the total E Group) persistence to graduation. The number of non-graduated subjects (five out of thirty, 17%) provides rather weak support for Holland's assumption that of the six personality type groups, Enterprising individuals have next to the lowest educational aspirations and achievement.³¹ Of these five non-graduates in Group E,

three (60%) had a "non-E" first letter in their three-letter Daydream code indicating that as entering college freshmen they had a strong vocational interest in a "non-E" type occupation. By comparison, of the twenty-five graduates in Group E, ten (40%) had an "E" as the first letter in their three-letter Daydream code indicating that as entering college freshmen they had a strong vocational interest in an "E" type occupation. Of the other fifteen graduates, six (40%) had as a second choice an occupation with an "E" as the first letter in the three-letter Daydream code. Sixteen of the twenty-five subjects (64%) who ultimately persisted to graduation in Group E had a definite orientation toward an "E" type occupation at the time they completed the SDS as entering college freshmen.

The Conventional Type "perceives self as conforming, orderly, and as having clerical and numerical ability."³² This type prefers a Conventional environment that "is characterized by the dominance of environmental demands and opportunities that entail the explicit, ordered, systematic manipulation of data, such as keeping records, filing materials, reproducing materials, organizing written and numerical data according to a prescribed plan, operating business and data processing machines, and by a population dominated by Conventional types."³³

Although the calculated significance level for Group C (.40941) did not meet the .05 standard established for this

study, some discussion of the findings is offered. For the subjects in Group C, personality type appears to have predicted with high-to-moderate efficiency (92% of those with high-moderate congruence; 40% of the total C Group) persistence to graduation in spite of the fact that a high percent of subjects (82%, fourteen of seventeen) with weak-poor congruence also persisted to graduation. The number of non-graduated subjects (seventeen out of thirty, 57%) provides rather strong support for Holland's assumption that of the six personality type groups, Conventional individuals have third lowest educational aspirations and achievement.³⁴ Of these seventeen non-graduates in Group C, three (50%) had a "non-C" first letter in their three-letter Daydream code indicating that as entering college freshmen they had a strong vocational interest in a "non-C" type occupation. By comparison, of the twenty-six graduates in Group C, twelve (46%) had a "C" as the first letter in their three-letter Daydream code indicating that as entering college freshmen they had a strong vocational interest in an "C" type occupation. Of the other fourteen graduates, five (36%) had as a second choice an occupation with a "C" as the first letter in the three-letter Daydream code. Noteworthy is the finding that of the twenty-six subjects who ultimately persisted to graduation in Group C, sixteen (62%) had a definite orientation toward a "C" type occupation at

the time they completed the SDS as entering college freshmen.

Several explanations can be advanced for the lower predictive efficiency of the personality type for subjects in the other three groups (A,E,C). First, there were considerably fewer fields at the host university from which to select a college major for subjects in these three groups (Artistic, Enterprising, and Conventional). Therefore, these subjects had a much diminished opportunity to select an appealing college major from a vocational environment that was compatible with their personality type. Second, the majority of subjects in these groups may not have been convinced that a college degree would help them obtain employment in an occupation compatible with their personality type and occupational aspiration. These subjects may have lost interest in persisting to graduation because of the lack of monetary return on their protracted, demanding, and costly college investment. Limited curricula, low motivation to graduate and low expectation of employment in the occupational field of choice for subjects in these groups may have contributed to a lower rate of graduation.

Several factors may have contributed to the majority of subjects in Groups A, E, and C having higher graduation rates when the Summary Code and Occupational Aspiration Code are not related (have a weak-poor congruence). Subjects in

Group A (Artistic) may have concluded that there was little or no future for them in an Artistic occupation. Therefore, they pursued a degree with a college major that offered a better hope of employment. A number of subjects in Group E may have had a rather low academic interest because Enterprising types tend to have "an aversion to observational, symbolic, and systematic activities" which are quite common to college academia.³⁵ Therefore, regardless of the major field chosen, graduation from college appears to have been less essential for these "E" types in light of their career interests. Excluding accounting, subjects in Group C had a paucity of college majors from which to chose. Perhaps these subjects, like those in Group E, made a practical decision to pursue employment opportunities rather than continue a course of study that was not exactly in alignment with their personal interests.

Summary and Conclusion

According to the above discussion, the analyses of the data and interpretation of the resultant findings from the subjects in the total sample indicate that congruence between Personality Type (Summary) code and Occupational Aspiration (Daydream) code was not an efficient predictor of Persistence to Graduation for the majority of subjects.

However, the findings for the majority of subjects in the combined Groups of R, I, and S were at variance with the

finding for the total sample. For these combined groups, high-moderate congruence between the Personality Type (Summary) code and the Occupational Aspiration (Daydream) code predicted Persistence to Graduation for 87% of the subjects at the high-moderate congruence level (and 66% of all the subjects of the combined groups at both congruence levels).

For the majority of subjects in Groups R, I, and S, high-moderate congruence between Holland's Self-Directed Search (SDS) Personality Type (Summary) code and SDS Occupational Aspiration (Daydream) code was moderately efficient in predicting College Major.

In contrast, the findings for the majority of subjects in Groups A, E, and C were similar to the finding for the total sample. For these combined groups, weak-poor congruence between the Personality Type (Summary) code and the Occupational Aspiration (Daydream) code predicted Persistence to Graduation for 90% of their subjects at the weak-poor congruence level (and 39% of all the subjects of the combined groups at both congruence levels).

For the majority of subjects in Groups A, E, and C, high-moderate congruence between the SDS Personality Type (Summary) code and the SDS Occupational Aspiration (Daydream) code was not an efficient predictor of persistence to graduation.

Congruence and Choice of College Major

Assumptions related to the choice and stability of college major have for many years been investigated by researchers in the testing of Holland's person-environment theory. Of particular interest to the present study was the supposition that Holland's Personality Type (Summary) code had a predictive relationship for the College Major code for the subjects in the study's sample.

Choice of College Major and the Total Sample

In compliance with the expectation, the data showed that for the total sample there was moderate support for the hypothesis that the Summary Code is a predictor of the chosen College Major code. An assumption that is integral to Holland's theory of vocational personalities and work environments suggests that "people search for environments that will let them exercise their skills and abilities, express their attitudes and values, and take on agreeable problems and roles."³⁶ Thus, people entering college tend to seek out an educational environment and make academic decisions that will be compatible with their basic personality orientation.

Therefore, the assumption follows that individuals will tend to select college majors that will be compatible with their basic personality type.³⁷ This assumption is supported by a number of relevant studies. Holland and Nichols,³⁸ and Kipnis, Lane, and Berger³⁹ found that college

students in their studies tended to select academic majors that related to distinctive abilities.

Using a broad segment of entering college students in a study designed to test certain assumptions related to Holland's person-environment theory, Osipow, Ashby, and Wall found that subjects chose college majors consistent with their personality type, though not uniformly so.⁴⁰ They found that (1) the choices of the R and I types appeared to be consistent with the theory since the largest number of them were in appropriate categories, (2) although a large number of choices for the E type were made in the E category, even larger numbers were made in the R and I categories, and (3) most of the occupational choices for the C type fell into the R and I categories, clearly inconsistent with theoretical considerations.⁴¹

In two separate studies using samples (senior male college students in 1969, and senior female college students in 1970), assigned to one of Holland's personality types, Walsh and Lacey⁴² investigated whether the subjects perceived themselves as having changed in a direction consistent with the profile of that type during the college years. They found that the test for the main effect of groups was significant for the Realistic scale, the Investigative scale, and the Artistic scale.⁴³ They concluded from their findings that "subjects in these three college major groups perceived themselves as changing in a

direction consistent with the profile of the respective personality orientation."⁴⁴

Choice of College Major and the Six Sub-groups

In the present study, the Summary Code appears to have been a moderately efficient predictor of college major chosen for subjects in Groups R, I, and S. In all three of these groups the majority of subjects had a high-moderate level of congruence between Personality Type code and chosen College Major code when measured by exact first-letter agreement (Group R, 53%; Group I, 60%, and Group S, 57%), and by close three-letter agreement (Groups R,I, and S, 67%). The finding for the Investigative and Social types in this study suggests a definite affinity for academics which adds support to Holland's assertion that subjects in these two types generally have higher educational aspirations and higher educational achievement than the other four types.⁴⁵

The findings of the present study for Groups R, I, and S appear to support both Holland's theoretical description for the respective Realistic, Investigative, and Social personality types and their corresponding environmental models, and the expectations of Hypothesis 2. An excellent opportunity to select a compatible college major was afforded subjects in these three groups since the curricula for each of the educational environments at the host institution offered numerous major field options.

For the subjects in the present study in Group R, the SDS Summary Code (Personality Type code) did predict with moderate efficiency (53% of those with exact first-letter agreement and 67% of those with close three-letter agreement) the college major field that was later chosen.

The relatively high number of non-graduated R subjects (twelve out of thirty, 40%) tends to support Holland's assumption that among the six personality type groups, Realistic individuals have low educational aspirations and achievement.⁴⁶ Of these twelve non-graduates in Group R, eight (67%) had a "non-R" first letter in their three-letter Daydream code indicating that as entering freshmen they had a strong vocational interest in a "non-R" type occupation. Five of these eight (63%) subjects later chose a "non-R" college major. One other subject in the group of twelve non-graduates chose a "non-R" college major. Thus six of the twelve non-graduates (50%) chose a "non-R" college major. The choosing of a college major that was incompatible with either the personality type or the occupational aspiration may well have been a significant factor affecting persistence to graduation for these six subjects. In general, the educational choices of the twelve non-graduates concurred with the assumptions of Holland's theory. The conclusion can also be made that for these subjects, Personality Type (Summary) code was a moderately effective predictor of College Major field.

As reported earlier, of the eighteen graduates in Group R, eleven (61%) had an R as the first letter in their three-letter Daydream code indicating that as entering college freshmen they had a strong vocational interest in an "R" type occupation. The subjects in this group were designated "R-matching" graduates. The finding obtained here was not surprising. In contrast to the finding for the "non-R" group of non-graduates referred to in the preceding paragraph, ten of the eleven (91%) "R-matching" graduates chose an "R" college major. Additionally, four other subjects in the group of eighteen graduates chose a college major that matched their personality type. In general, the choice of college major for the majority of R Group graduates concurred with the assumptions of Holland's theory. The conclusion can also be made that for 78% of these subjects (fourteen out of eighteen), Personality Type (Summary) code was an accurate predictor of College Major field.

The findings for both the "non-R" and "R-matching" groups seem to indicate that twenty of the thirty (67%) subjects in Group R made a choice of college major field that agreed with their personality type and/or vocational interest. These findings for the majority of subjects in Group R appear to support Holland's theory, particularly regarding the assumptions pertaining to the behavioral tendencies of Realistic subjects.

For the subjects in the present study in Group I, the SDS Summary Code (Personality Type code) did predict with moderate efficiency (60% of those with exact first-letter agreement and 67% of those with close three-letter agreement) the college major field that was later chosen.

The relatively high number of graduated "I" subjects (twenty-five out of thirty, 83%) tends to support Holland's assumption that of the six personality type groups, Investigative individuals have high educational aspirations and achievement.⁴⁷ Of these five non-graduates in Group I, two (40%) had a "non-I" first letter in their three-letter Daydream code indicating that as entering freshmen they had a strong vocational interest in a "non-I" type occupation. Not surprisingly, both of these two (100%) subjects later chose a "I-type" college major. Two other subjects in the group of five non-graduates chose a "non-I" college major. Thus two of the five non-graduates (40%) appear to have had a definite interest in a "non-I" vocational field. The choosing of a college major that was incompatible with either the personality type or the occupational aspiration may well have been a significant factor affecting persistence to graduation for four of the five (80%) "non-graduated" subjects. The educational choices for 80% of the non-graduates concurred with the assumptions of Holland's theory. The conclusion can also be made that for these

subjects, Personality Type (Summary) code was a moderately effective predictor of College Major field.

As reported earlier, of the twenty-five graduates in Group I, twenty-one (84%) had an "I" as the first letter in their three-letter Daydream code indicating that as entering college freshmen they had a strong vocational interest in an "I" type occupation. The subjects in this group were designated "I-matching" graduates. This finding was anticipated since it reflects vocational choice behavior clearly in keeping with that described by Holland for the Investigative type. In contrast to the finding for the "non-I" group of non-graduates referred to in the preceding paragraph, fourteen of the twenty-five (56%) "I-matching" graduates chose an "I" college major. Additionally, two other subjects in the group of twenty-five graduates chose a college major that had close agreement with their personality type. The choice of college major for the majority of I-Group graduates concurred with the assumptions of Holland's theory. The conclusion can also be made that for 64% of these subjects (sixteen out of twenty-five), Personality Type (Summary) code was an accurate predictor of College Major field.

The findings for both the "non-I" and "I-matching" groups seem to indicate that twenty of the thirty (67%) subjects in Group I made a choice of college major field that agreed with their personality type and/or vocational

interest. These findings for the majority of subjects in Group I appear to support Holland's theory, particularly regarding the assumptions pertaining to the behavioral tendencies of Investigative subjects.

For the subjects in the present study in Group S, the SDS Summary Code (Personality Type code) did predict with moderate efficiency (57% of those with exact first-letter agreement and 70% of those with close three-letter agreement) the college major field that was later chosen.

As pointed out previously, the relatively high number of graduated S subjects (twenty-five out of thirty, 83%) tends to support Holland's assumption that among the six personality type groups, Social individuals have high educational aspirations and achievement.⁴⁸ Of the five non-graduates in Group S, one (20%) had a "non-S" first letter in his three-letter Daydream code indicating that as an entering freshmen he had a strong vocational interest in a "non-S" type occupation. As might be expected, this subject later chose a "non-S" type college major. Two other subjects in the group of "non-S" graduates chose a "non-S" college major. Thus three of the "non-S" graduates (60%) appear to have had a definite interest in a "non-S" vocational field. The choosing of a college major that was incompatible with either the personality type or the occupational aspiration (Day Dream Code) may well have been a significant factor affecting persistence to graduation for

three of the five (60%) "non-graduated" subjects. In general, the educational choices for 60% of the non-graduates concurred with the assumptions of Holland's theory. The conclusion can also be made that for these subjects, Personality Type (Summary) code was a moderately effective predictor of College Major field.

As reported earlier, of the twenty-five graduates in Group S, nineteen (76%) had an S as the first letter in their three-letter Daydream code indicating that as entering college freshmen they had a strong vocational interest in an "S" type occupation. The subjects in this group were designated "S-matching" graduates. This finding was not surprising since it reflects vocational choice behavior clearly in keeping with that described by Holland for the Social type. In contrast to the finding for the "non-S" group of non-graduates referred to in the preceding paragraph, fourteen of the twenty-five (64%) "S-matching" graduates chose an "S" college major. Additionally, three other subjects in the group of twenty-five graduates chose a college major that had close agreement with their personality type. In general, the choice of college major for the majority of S-Group graduates concurred with the assumptions of Holland's theory. The conclusion can also be made that for 68% of these subjects (seventeen out of twenty-five), Personality Type (Summary) code was an accurate predictor of College Major field.

The findings for both the "non-S" and "S-matching" groups seem to indicate that twenty-one of the thirty (70%) subjects in Group S made a choice of college major field that agreed with their Personality type and/or vocational interest. These findings for the majority of subjects in Group S appear to support Holland's theory, particularly regarding the assumptions pertaining to the behavioral tendencies of Social subjects.

Several possible explanations can be advanced for the moderate predictive efficiency of the personality type for subjects in the three preceding groups (R, I, and S). First, there were numerous major fields at the host university from which to select a college major. Therefore, subjects in these groups had good opportunity to select an appealing college major from a vocational environment that was compatible with their personality type. Second, subjects in these groups had reasonable expectation that educational attainment in a college major field compatible with their personality type would most likely enhance their employability. Third, for subjects in these three groups, opportunities for employment in an occupation compatible with the chosen college major field and personality type appeared to be reasonably good.

In the other three Groups (A, E, and C), the majority of subjects in each group had a weak-poor level of congruence between their Personality Type and College Major

codes whether measured by exact first-letter agreement or close three-letter agreement.

For the subjects in the present study in Group A, the SDS Summary Code (Personality Type code) predicted with rather low efficiency (30% of those with exact first-letter agreement and 37% of those with close three-letter agreement) the college major field that was later chosen.

The relatively high number of graduated A subjects (twenty-two out of thirty, 73%) tends to support Holland's assumption that among the six personality type groups, Artistic individuals are third highest in personality pattern order for educational aspirations and achievement.⁴⁹ Of the eight non-graduates in Group A, three (38%) had a "non-A" first letter in their three-letter Daydream code indicating that as entering freshmen they had a strong vocational interest in a "non-A" type occupation. Not surprisingly, two of these three subjects (67%) later chose a "non-A" type college major. Four other subjects in the group of eight non-graduates chose a "non-A" college major. Thus six of the eight non-graduates (75%) appear to have had a definite interest in a "non-A" vocational field. The choosing of a college major that was incompatible with either the personality type or the occupational aspiration may well have been a significant factor affecting persistence to graduation for five of the eight (63%) "non-graduated" subjects. In general, the educational

choices for only 25% of the non-graduates (two out of eight) concurred with the assumptions of Holland's theory. The conclusion can also be made that for these subjects, Personality Type (Summary) code was an ineffectual predictor of College Major field.

As reported earlier, of the twenty-two graduates in Group A, ten (45%) had an A as the first letter in their three-letter Daydream code indicating that as entering college freshmen they had a strong vocational interest in an "A" type occupation. The subjects in this group were designated "A-matching" graduates. This finding was anticipated since it reflects vocational choice behavior clearly in keeping with that described by Holland for the Artistic type. In contrast to the finding for the "non-A" group of non-graduates referred to in the preceding paragraph, five of these ten (50%) "A-matching" graduates chose an "A" college major. Additionally, only one other subject in the group of ten "A-matching" graduates chose a college major that had close agreement with their personality type, and only two other subjects in the group of twenty-two graduates chose a college major that matched their Summary Code. The choice of college major for the majority of A Group graduates did not concur with the assumptions of Holland's theory. The conclusion can also be made that for only 36% of these subjects (eight out of

twenty-two) did Personality Type (Summary) code predict the College Major field they later chose.

The findings for both the "non-A" and "A-matching" groups seem to indicate that ten of the thirty (33%) subjects in Group A made a choice of college major field that agreed with their personality type and/or vocational interest. These findings for the subjects in Group A appear to offer only limited support for Holland's theory as regarding the assumptions pertaining to the behavioral tendencies of Artistic subjects.

For the subjects in the present study in Group E, the SDS Summary Code (Personality Type code) predicted with rather low efficiency (33% of those with exact first-letter agreement and 37% of those with close three-letter agreement) the college major field that was later chosen.

The relatively high number of graduated E subjects (twenty-five out of thirty, 83%) was a stronger than expected result since a Holland assumption indicates that among the six personality type groups, Enterprising individuals are second lowest in personality pattern order for educational aspirations and achievement.⁵⁰ Of the five non-graduates in Group E, four (80%) had a "non-E" first letter in their three-letter Daydream code indicating that as entering freshmen they had a strong vocational interest in a "non-E" type occupation. As might be expected, three of these four subjects (75%) later chose a "non-E" type

college major. This finding indicated that three of the five non-graduates (60%) appear to have had a definite interest in a "non-E" vocational field at the beginning of their freshman year of college. The choosing of a college major that was incompatible with either the personality type or the occupational aspiration may well have been a significant factor affecting persistence to graduation for three of the five (60%) "non-graduated" subjects. Only 40% (two out of five) of the Group E "non-graduates" made educational choices that concurred with Holland's assumptions for educational behavior. In conclusion, the above findings show that for these subjects, Personality Type (Summary) code was an ineffectual predictor of College Major field.

As reported earlier, of the twenty-five graduates in Group E, only eight (32%) had an "E" first letter in their three-letter Daydream code indicating that as entering college freshmen they had a strong vocational interest in a "E" type occupation. The subjects in this group were designated "E-matching" graduates. This finding was not surprising since it reflects vocational choice behavior clearly in keeping with that described by Holland for the Enterprising type. In comparison to the finding for the "non-E" group of non-graduates referred to in the preceding paragraph, seven of these seventeen (41%) "E-matching" graduates chose an "E" college major. There were no other

subjects in the group of "E-matching" graduates who chose a college major that had close agreement with their personality type, and only one other subject in the group of twenty-five graduates chose a college major that matched their Summary Code. The choice of college major for the majority of E Group graduates did not concur with the assumptions of Holland's theory. In conclusion, the above findings show that for only 32% of the "E" subjects who graduated (eight out of twenty-five) did Personality Type (Summary) code predict the College Major field they later chose.

The findings for both the "non-E" and "E-matching" groups seem to indicate that ten of the thirty (33%) subjects in Group E made a choice of college major field that agreed with their personality type and/or vocational interest. These findings for the subjects in Group E appear to offer only limited support for Holland's theory as regarding the assumptions pertaining to the behavioral tendencies of "Enterprising" subjects.

For the subjects in the present study in Group C, the SDS Summary Code (Personality Type code) predicted with rather low efficiency (27% of those with exact first-letter agreement and 27% of those with close three-letter agreement) the college major field that was later chosen.

The relatively high number of graduated C subjects (twenty-six out of thirty, 87%) was a stronger than expected

result since a Holland assumption indicates that among the six personality type groups, Conventional individuals are third lowest in personality pattern order for educational aspirations and achievement.⁵¹ Of the four non-graduates in Group C, three (75%) had a "non-C" first letter in their three-letter Daydream code indicating that as entering freshmen they had a strong vocational interest in a "non-C" type occupation. Not surprisingly, all three of these subjects (100%) later chose a "non-C" type college major. This finding indicated that three of the four non-graduates (75%) appear to have had a definite interest in a "non-C" vocational field at the beginning of their freshman year of college. The choosing of a college major that was incompatible with either the personality type or the occupational aspiration may well have been a significant factor affecting persistence to graduation for three of the four (75%) "non-graduated" subjects. Only 25% (one out of four) of the Group C non-graduates made educational choices that concurred with Holland's assumptions for educational behavior. In conclusion, the above findings show that for these subjects, Personality Type (Summary) code was an ineffectual predictor of College Major field.

As reported earlier, of the twenty-six graduates in Group C, only seven (27%) had a "C" first letter in their three-letter Daydream code indicating that as entering college freshmen they had a strong vocational interest in a

"C" type occupation. The subjects in this group were designated "C-matching" graduates. This finding was anticipated since it reflects vocational choice behavior clearly in keeping with that described by Holland for the "Conventional" type. In contrast to the finding for the "non-C" group of non-graduates referred to in the preceding paragraph, three of these seven (43%) "C-matching" graduates chose a "C" college major. There were not other subjects in the group of "C-matching" graduates who chose a college major that had close agreement with their personality type, and only four other subjects in the group of twenty-six graduates chose a college major that matched their Summary Code. The choice of college major for the majority of "C" Group graduates did not concur with the assumptions of Holland's theory. In conclusion, the above findings show that for only 27% of the "C" subjects who graduated (seven out of twenty-six) did Personality Type (Summary) code predict the College Major field they later chose.

The findings for both the "non-C" and "C-matching" groups seem to indicate that eight of the thirty (27%) subjects in Group C made a choice of college major field that agreed with their Personality type and/or vocational interest. These findings for the subjects in Group C appear to offer only limited support for Holland's theory as regarding the assumptions pertaining to the behavioral tendencies of "Conventional" subjects.

Although the findings for Groups A, E, and C do not appear to support the expectations of Hypothesis 2, the findings do seem to concur with the assumptions underlying Holland's theoretical description for the Artistic, Enterprising, and Conventional personality types and environmental models. Several possible explanations can be advanced for the poor predictive efficiency of the personality type for subjects in these three groups (A, E, and C). First, for subjects in these groups, there were a limited number of major fields at the host university from which to select a college major. Therefore, subjects in these groups had a narrower range of choices or no opportunity at all to select an appealing college major from a vocational environment that was compatible with their personality type. Second, subjects in these three groups may have felt that educational attainment in a college major field compatible with their personality type would not necessarily enhance their employability (at an entry level of compensation commensurate with their needs and/or appropriate for their expectations), thus prompting them to chose a major (of low congruence) that would help in this regard. Third, subjects in these three groups, may have felt that opportunities for employment in an occupation compatible with their chosen college major field and personality type were too limited, required additional education (post-graduate studies) or in-service/on-the-job

preparation (intensive specialized training, certification, licensure, etc.), or necessitated undesirable risk-taking and/or capital investment.

Summary and Conclusion

According to the above discussion, the analyses of the data and interpretation of the resultant findings from the subjects in the total sample indicate that Personality Type was a moderately efficient predictor of College Major for the majority of subjects.

This finding especially applied to the subjects in Groups R, I, and S. For these combined groups, the Personality Type (Summary) code predicted College Major for 68% of their subjects. Also worth noting is the finding that 73% of these subjects had high-moderate congruence between their Personality Type (Summary) code and Occupational Aspiration (Daydream) code. For these subjects, high-moderate congruence between the Personality Type (Summary) Code and the Occupational Aspiration (Daydream) code also seemed to indicate the likelihood of high-moderate congruence between the Personality Type and College Major codes.

For those subjects in the combined Groups of R, I, and S for whom the Personality Type code did not predict College Major, 38% had weak-poor congruence between their Personality Type (Summary) code and their Occupational Aspiration (Daydream) code. For most of these subjects,

weak-poor congruence between Personality Type code and Occupational Aspiration code seemed to have had little association with weak-poor congruence between personality type and college major.

For the majority of subjects in Groups R, I, and S, the Personality Type (Summary) code of the Self-Directed Search had moderately good efficiency in predicting college major type.

Analysis of the data for Groups A, E, and C indicates that personality type was not an efficient predictor of college major for the majority of subjects in each of these groups. However, for 33% of the subjects in these combined groups, personality type did predict college major. Also worth noting is the finding that 77% of these subjects had high-moderate congruence between and Personality Type (Summary) code and Occupational Aspiration (Daydream) code. For these subjects, high-moderate congruence between Personality Type (Summary) code and Occupational Aspiration (Daydream) code seemed to indicate the likelihood of congruence between personality type and college major.

On the other hand, for those subjects in these three groups for whom the personality type did not predict college major, 77% had weak-poor congruence between Personality Type code and Occupational Aspiration code. For these subjects, weak-poor congruence between Personality Type code and Occupational Aspiration code seemed to indicate the

likelihood of weak-poor congruence between personality type and college major.

For the majority of subjects in Groups A, E, and C, the Personality Type (Summary) code of the Self-Directed Search was not a efficient predictor of college major type.

Congruence and Satisfaction with College Major

Of special interest to the present study was the question of whether high-moderate congruence between subjects' Personality Type code and College Major code was a better predictor of satisfaction with the chosen college major than weak-poor congruence between the two codes.

Satisfaction with College Major and the Total Sample

In compliance with the expectation of Hypothesis 3, the data showed that for the total sample there was moderate support for the notion that high-moderate congruence between the Summary Code and the chosen College Major code is a better predictor of satisfaction with the college major chosen than weak-poor congruence between these same two codes. This determination concurs with the findings of the following relevant studies.

Holland and Nichols⁵² determined that students remaining in their chosen major field resembled typical subjects (as defined by the classifications of the Vocational Preference Inventory) in that field, while

students changing their major were dissimilar to typical students in that field.

In an early study of the effects of college environments on the career choices of college students, Astin⁵³ found that subjects curricular choices conformed to the vocations typified by the college environmental code type.

In two broader investigations of Holland's person-environment theory, Pervin⁵⁴ and Richardson⁵⁵ found that the better the "fit" between students and their college environment, the more satisfied they will be.

In a study designed to investigate variables related to satisfaction among a sample of university students, Schmidt and Sedlacek⁵⁶ found that the most dissatisfied subjects were those indicating difficulty in choosing a major field or career.

Walsh and Russell⁵⁷ found that congruent choices of college majors were associated with personal stability while incongruent choices were associated with instability.

Using Holland's Vocational Preference Inventory (VPI) to assign personality classifications to subjects, Morrow⁵⁸ found that satisfaction with college major was significantly related to personality type among the Intellectual (Investigative) subjects (those majoring in mathematics) but not among the Social subjects (those majoring in sociology). However, even in the case of the sociology group, the

pattern of satisfaction expressed by four of the six personality types (Artistic, Social, Enterprising, and Conventional) was in the predicted direction.

Walsh and Lewis⁵⁹ using the VPI found that subjects in the congruent (i.e., close agreement between college major and personality type) male group tended to have greater satisfaction with their college major than subjects in the undecided and incongruent male groups.

In a study using the VPI with a sample of junior and senior high school students in a vocational program, Werner⁶⁰ found that subjects with a clear role choice were more satisfied with their training program than students with an unclear role choice.

Using the Self-Directed Search (SDS) with a sample of college subjects, Nafziger, Holland, and Gottfredson⁶¹ found that congruency with one's major field of study was a good predictor of satisfaction with that environment.

Spokane⁶² used the Strong-Campbell Interest Inventory (SCII) and a modified version of the Hoppock Job Satisfaction Blank (HJSB) with a sample of male and female college students of all six Holland types to investigate Holland's congruence-satisfaction assumption and found that congruent subjects were more satisfied with their college major than incongruent subjects.

Reuterfors, Schneider, and Overton⁶³ found that college freshmen with congruent college major choices had

greater academic success (and thus were likely to be more satisfied) than students who reported incongruent choices.

Satisfaction with College
Major and the Six Sub-groups

In the present study, high-moderate congruence between the Personality Type code and the College Major code appears to have been a moderately efficient predictor of satisfaction with college major for subjects in Groups R, I, A, S, and E. In three of these five groups (R,I,S) the majority of subjects were satisfied with their college major at the high-moderate level of congruence. In the other two groups (A and E) the largest number of subjects in each group was found in the satisfied category at the weak- poor level of congruence. However, because the ratio of satisfied to unsatisfied subjects was better at the high-moderate level of congruence than at the weak-poor level, high-moderate congruence was determined to be the a better predictor of satisfaction than weak-poor congruence.

For the majority of subjects (67%) in the present study in Group R, high-moderate congruence between Personality Type code and College Major code predicted satisfaction with total efficiency (100%). This finding appears to show a positive association with the previously stated finding that the majority of subjects in Group R (67%) reported an exact or close agreement between Personality Type and College Major. According to Holland's

theory, the majority of these subjects would be expected to be satisfied with an "R-compatible" major.

Also pertinent is the finding that the majority of subjects (60%) with high-moderate congruence between Personality Type code and College Major code who were satisfied with their major persisted to graduation. In contrast to these findings, 40% of the subjects in Group R who chose a "non-R" or "non-close-match" college major were dissatisfied with their college major. Only 50% of these subjects persisted to graduation.

For the majority of subjects (63%) in the present study in Group I, high-moderate congruence between Personality Type code and College Major code predicted satisfaction with very high efficiency (95%). This finding appears to show a positive association with the previously stated finding that the majority of subjects in Group I (67%) reported an exact or close agreement between personality type and college major. As expected, the majority of these subjects were satisfied with an "I-compatible" major.

Here also the majority of subjects (79%) with high-moderate congruence between Personality Type code and College Major code who were satisfied with their major persisted to graduation. In contrast to these findings, 40% of the subjects in Group I who chose a "non-I" or "non-close-matching" college major were dissatisfied with

their college major. The majority of these subjects did persist to graduation.

For the majority of subjects (57%) in the present study in Group S, high-moderate congruence between Personality Type code and College Major code predicted satisfaction with very high efficiency (100%). This finding appears to show a positive association with the previously stated finding that the majority of subjects in Group S (70%) reported an exact or close agreement between personality type and college major. As expected, the majority of these subjects were satisfied with an "S-compatible" major.

Here too in Group S as was the case with the two previous groups, the majority of subjects (85%) with high-moderate congruence between Personality Type code and College Major code who were satisfied with their major persisted to graduation. In contrast, 31% of the subjects in Group S with weak-poor congruence between Personality Type code and College Major code were dissatisfied with their major field and only half of these subjects persisted to graduation.

Contrary to the findings for the three previous groups, the category in Group A with the largest percent of subjects satisfied with their college major (43%) was at the weak-poor level of congruence between Personality Type code and College Major code. However, the highest efficiency for

predicting satisfaction with college major was claimed by subjects at the high-moderate level where all of the subjects with high-moderate congruence between Personality Type code and College Major type were satisfied with their major field. This finding appears to support the assertion that subjects with close agreement between personality type and college major are likely to be satisfied with the major field of study.

The majority of subjects in Group A with high-moderate congruence between Personality Type code and College Major code who were satisfied with their major field (82%) persisted to graduation. In contrast, 38% of the subjects in Group A at the weak-poor level of congruence between Personality Type code and College Major code were dissatisfied with their major. About two-thirds of these subjects persisted to graduation.

As was the case for the preceding group, the category in Group E with the largest percent of subjects satisfied with their college major (60%) was at the weak-poor level of congruence between Personality Type code and College Major code. However, the highest efficiency for predicting satisfaction with college major was again claimed by subjects at the high-moderate level where all of the subjects with high-moderate congruence between Personality Type code and College Major type were satisfied with their major field. This finding adds support to the notion that

subjects with close agreement between personality type and college major are likely to be satisfied with the major field of study.

The majority of subjects in Group E with high-moderate congruence between Personality Type code and College Major code who reported being satisfied with their college major (82%) persisted to graduation. In contrast, 31% of the subjects in Group E at the weak-poor level of congruence between Personality Type code and College Major code were dissatisfied with their major. Most of these subjects also persisted to graduation.

As was true for the two previous groups, the category in Group C with the largest percent of subjects satisfied with their College Major (60%) was at the weak-poor level of congruence between Personality Type code and College Major code. However, the highest efficiency for predicting satisfaction with college major was again claimed by subjects at the high-moderate level where all of the subjects with high-moderate congruence between Personality Type code and College Major type were satisfied with their major field. This finding also adds support to the notion that subjects with close agreement between personality type and college major are likely to be satisfied with the major field of study. Nearly all these subjects (88%) persisted to graduation.

In contrast, 14% of the subjects in Group C at the weak-poor level of congruence between Personality Type code and College Major code were dissatisfied with their major. Most of these subjects also persisted to graduation.

Summary and Conclusion

As the above discussion relates, the statistical analyses performed on the data from the total sample and interpretation of the resultant findings appear to affirm the assumption derived from Holland's person-congruence theory that satisfaction with a field of academic study is positively associated with congruence between subjects' Personality Type (Summary) code and their College Major code for the majority of subjects.⁶⁴

This determination was especially true for the majority of the subjects in Groups R, I, A, and S. For these combined groups, high-moderate congruence between Personality Type (Summary) code and College Major code predicted satisfaction for 98% of the subjects at the high-moderate congruence level (and 54% of all the subjects of the combined groups at both congruence levels). Among the remaining subjects in this composite group (R, I, A, and S), weak-poor congruence between the Personality Type code and the College Major code predicted Satisfaction with College Major for 62% of the subjects at the weak-poor congruence level (and 28% of all the subjects of the combined groups at both congruence levels.)

For the majority of subjects in Groups R, I, A, and S, high-moderate congruence between the SDS Personality Type (Summary) code and Holland College Major code was a moderately efficient predictor of Satisfaction with College Major.

Analysis of the data for Groups C and E indicated that high-moderate congruence between the Personality Type (Summary) code and College Major code was also an efficient predictor of satisfaction with college major for all of the subjects at the high-moderate congruence level (and 32% of all the subjects of the combined groups at both congruence levels).

However, for the majority of subjects in these combined groups, weak-poor congruence between Personality Type code and College Major code predicted satisfaction with college major for 90% of the subjects at the weak-poor congruence level (and 62% of all the subjects of the combined groups at both congruence levels.)

For the most of subjects in Groups E and C, high-moderate congruence between the SDS Personality Type (Summary) code and Holland College Major code was not found to be an efficient predictor of satisfaction with college major.

Congruence and Present Occupation

Since the introduction of Holland's vocational choice theory, researchers have had a continuing interest in

testing the derived person-environment congruence assumptions with regard to choice and stability of occupation. Of special interest to the present study was the supposition that Holland's Personality Type (Summary) code has a predictive relationship for the Type of Occupation in which the sample's subjects were employed at the time the study's questionnaire was administered.

Choice of Occupation and the Total Sample

According to Holland's theory, choice of occupation is assumed to be related to an individual's personality orientation. Of particular interest to the present study is the validity of this assumption and whether the Summary code of the SDS would predict present occupation for the subjects in the sample chosen for this study. As was true for choice of college major, choice of occupation has long been of interest to researchers in the testing of Holland's person-environment congruence assumptions, especially with regard to vocational stability and satisfaction. Also of special interest to the present study was the possible association of subjects' present occupation with certain other variables deliberately chosen for testing in this study and whether there was a predictive relationship between subjects' Summary code and their Present Occupation code.

In compliance with the expectation, the data showed that for the total sample there was moderate support for the hypothesis that the Summary code is a predictor of the

present occupation type. This determination concurs with the findings reported by a number of studies, of which some of the most pertinent follow.

Lacey⁶⁵ tested the concurrent validity of Holland's person-environment theory using the Vocational Preference Inventory (VPI) with a sample consisting six groups composed of older workers at executive and professional levels that matched Holland's six vocational orientations of employed males in eight different occupations and found that five of the VPI scales (Investigative, Artistic, Social, Enterprising, and Conventional) successfully differentiated each of the eight occupational groups.

Using the Self-Directed Search (SDS) and the Vocational Preference Inventory (VPI), Walsh found support for the concurrent validity of Holland's theory for male workers in eight different occupations.⁶⁶ The findings of this study strengthened Holland's assumption that types may be assessed by both the SDS and the VPI with about equal results for research and practical purposes.

Using the VPI to assess the stability of Holland's six Personality Types over an extended period of time with a sample of employed men and women, Lucy⁶⁷ found that the interests and attributes characterizing each Personality Type are fairly consistent over a thirty-five-year period of time. Lucy suggested that Holland's personality types may offer a relatively permanent and useful model for

understanding and predicting an individual's vocational behavior.

Smart found that college students in the sample he used were likely to seek long-term careers in occupations they perceived would "encourage the use of their distinctive competencies, support their dominant values, and permit them to assume agreeable occupational roles."⁶⁸

Using the SDS and the VPI with a sample of degreed working women, Horton and Walsh found that the scales of the instruments tended to effectively discriminate among the six different occupations used in the study consistent with Holland's theory.⁶⁹

Fishburne and Walsh⁷⁰ used the SDS and VPI with a sample of non-college-degreed men and found that the former tended to support the concurrent validity of Holland's theory thereby concurring with the findings of an earlier study by Gaffey and Walsh⁷¹ which used male college graduate workers.

O'Neil, Magoon, and Tracey used the SDS with a sample of male Investigative subjects over a seven-year period and found that the instrument had moderately high efficiency in predicting the actual job (and occupation) entered by them.⁷²

Mount and Muchinsky used the SDS with a sample of workers from five of Holland's six environmental typologies

and found that the majority of subjects were working in environments congruent with their personality types.⁷³

Using the VPI with a sample of women and men employed in traditional female occupations, Walsh and Huston reported that the findings for the Social scale for the occupational groups were consistent for women and men.⁷⁴ In addition, these findings tended to hold for the Investigative, Conventional, Enterprising, and Artistic scales of the VPI as well.

In the present study, Holland's Personality Type (Summary) Code appears to have been a moderately efficient predictor of present occupation for a sizable number of subjects in Groups R (Realistic), S (Social), and E (Enterprising). In two of these groups—Group S and Group E—a significant percent of subjects had high-moderate congruence between personality type code and present occupation code when measured by exact first-letter agreement (Group S, 47%; Group E, 50%). A similar percent of subjects in all three groups (R, S, and E) also had high-moderate congruence between the two codes when measured by close three-letter agreement (Group R and E, 50%; Group S, 57%).

These findings appear to positively relate to Holland's assertion that the Enterprising and Social types have higher vocational aspirations and vocational achievement than the other types.⁷⁵ The findings for Groups

R, S, and E in the present study appear to support the predictive expectation of Hypothesis 4 and also to fit Holland's theoretical description for the Realistic, Social, and Enterprising personality types and environmental models.

Several possible explanations can be advanced for the moderate predictive efficiency of the personality type for subjects in the three preceding groups (R, S and E). First, a relatively wide range of job opportunities in the Realistic, Social, and Enterprising fields had existed for some years at the time these data were gathered for this study. In general, employment opportunities in the 1980s tended to be good in the Realistic occupations (i.e., skilled trades and technical areas), Social occupations (i.e., educational and social welfare areas), and Enterprising occupations (i.e., managerial and sales areas). Therefore, subjects in these groups had enjoyed a fairly good opportunity to pursue an appealing occupation in a vocational environment that was compatible with their personality type. Second, because the job market was generally favorable at the time, the subjects in these three groups had a relatively high expectation that they would gain acceptable employment in an occupation compatible with their interest.

However, while the findings for Groups I, A, and C did not meet the predictive expectations of Hypothesis 4, the findings do appear to be consistent with Holland's

theoretical description for the Investigative, Artistic, and Conventional personality types and environmental models. In these three Groups (I, A, and C), a clearly smaller percent of subjects in each group had a high-moderate congruence between the two codes whether measured by exact first-letter agreement (Group I, 27%; Group A, 20%; and Group C, 30%), or by close three-letter agreement (Group I, 33%; Group A, 27%, and Group C, 30%). This finding appears to concur with Holland's theoretical description of the vocational behavior for each of these three personality types and environmental models.

Several possible explanations can be advanced for the poor predictive efficiency of the personality type for subjects in Groups I, A, and C. First, for the majority of subjects in the Investigative, Artistic, and Conventional groups, there was a limited number of occupations in which to gain employment. Therefore, subjects in these groups had a narrow range of choices from which to select an appealing occupation from a vocational environment that was compatible with their personality type. Second, some subjects in these three groups may have felt that employment in an occupation compatible with their personality type would not at entry level provide compensation that would meet their basic needs and/or expectations. Still other subjects may have experienced the harsh reality of too much competition for too few employment opportunities in the occupations of their

choice. This realization may have prompted some subjects to chose an occupation that offered a more realistic possibility of employment even if such a decision meant that they had to modify their primary needs and initial expectations. Third, subjects in these three groups, may have felt that opportunities for employment in an occupation compatible with their personality type were too limited, required additional education (post-graduate studies) or preparation (intensive specialized training, certification, licensure, etc.), or required undesirable risk-taking and/or unavailable capital investment, or perhaps too little compensation for work in the "C" category which typically does not require a degree.

Choice of Occupation and the Six Sub-groups

In the present study, the Summary Code appears to have been a moderately efficient predictor of present occupation for the subjects in Groups S and E. In these two groups a significant percent of the subjects had a high-moderate level of congruence between Personality Type code and Present Occupation code when measured by exact first-letter agreement, and by close three-letter agreement. This finding seems to provide some support for Holland's view that Enterprising and Social types have higher vocational aspirations and achievement than the other types.⁷⁶

The findings of the present study for Groups S and E also appear to concur with Holland's theoretical

descriptions for the Enterprising and Social personality types as well as the descriptions for their corresponding environmental models. Thus, the expectations of Hypothesis 4 for a substantial number of subjects in these two groups appears to have been met.

The Social Type "perceives self as liking to help others, understanding others, having teaching ability, and lacking mechanical and scientific ability."⁷⁷ Correspondingly, Social types are said to prefer an environment that "is characterized by the dominance of environmental demands and opportunities that entail the manipulation of others to inform, train, develop, cure, or enlighten, and by a population dominated by Social types."⁷⁸ According to Holland, the Social type ranks second highest among the six types in positive association between the Personality Type and both vocational aspirations and vocational achievement.⁷⁹

For the subjects in Group S of this study, Personality Type predicted with moderate efficiency (fourteen out of thirty, 47%, of those with exact first-letter agreement and seventeen out of thirty, 57%, of those with close three-letter agreement) their occupational field at the time this study's questionnaire was completed. This finding appears to positively associate with several important vocational choice decisions made by these subjects in two prior instances. In the first case, 80% of the subjects in

Group S designated an "S-type" occupational aspiration in the Daydream section of the SDS they completed in 1979. The import of this data is both salient and credible since rather extensive research has shown the "Daydream" designations of the SDS to have moderately high reliability as a predictors of eventual occupation.⁸⁰

In the second case, a similar pattern was found for Group S subjects when 70% of them reported choosing an "S-type" college major during their undergraduate program. These two findings appear to support the notion that a majority of the subjects in Group S had a definite affinity for an "S-type" vocation prior to entering the work force. Another finding may also provide some support for this notion: 83% of the subjects in Group S persisted to graduation; and while most of these persisters (72%) chose an "S-type" college major, only 56% of these persisters eventually chose a "S-type" occupation. Although the type of occupational aspiration reported and college major selected may have been key elements in the decision to chose an "S-type" occupation, apparently persistence to college graduation was not a significant factor.

At this point a brief discussion of the more important findings for Group S seems beneficial. First, consideration will be given to the thirteen subjects in Group S who reported being employed in a "non-S" occupation at the time they were interviewed. Of these thirteen

subjects, ten (77%) had made at least one previous vocational choice decision that resulted in the reporting of a major code of interest to this study (i.e., Daydream, College Major) that was incompatible with their Personality Type code. The designation of an Occupational Aspiration code and/or the choosing of a College Major code that was incompatible with the Personality Type code appears to have been an early indicator that these ten subjects might well eventually choose a "non-S" occupational field.

When the subjects in S Group of this study completed the Self-Directed Search in 1979, a rather low number of them (six out of thirty, 20%) listed a "non-S" Occupational Aspiration in the booklet's Occupational Daydreams section. Of these six subjects with "non-S" Daydream codes, four (67%) had a "non-S" first letter in their three-letter College Major code indicating that as upper level college undergraduates, they had a strong interest in a "non-S" educational field. Not surprisingly, three of these six "non-S" subjects (50%) later chose a "non-S" occupational field.

The above findings appear to indicate that the majority of S-Group subjects in this study made selected vocational choice decisions compatible with their Personality Type that pointed them toward an S-type occupation.

The number/percent of S-Group subjects who reported being employed in an occupation compatible with their Personality Type (seventeen out of thirty, 57%) seems to offer moderate support for Holland's assumption that Social types will choose Social occupations. Thus, the expectation that the majority of subjects in the "S" Group would chose an "S" type occupation was met.

The Enterprising Type "perceives self as aggressive, popular, self-confident, sociable, possessing leadership and speaking abilities, and lacking in scientific ability."⁸¹ Correspondingly, Enterprising types are said to prefer an environment that "is characterized by the dominance of environmental demands and opportunities that entail the manipulation of others to attain organizational or self-interest goals, and by the dominance of Enterprising types."⁸² According to Holland, the Enterprising type ranks highest among the six types in positive association between the Personality Type and both vocational aspirations and vocational achievement.⁸³

For the subjects in Group E of this study, Personality Type predicted with moderate efficiency (50% of those with exact first-letter agreement and 50% of those with close three-letter agreement) their present occupational field. This finding appears to positively associate with several important vocational choice decisions made by these subjects in two prior instances. In the first case, 50% of the

subjects in Group E designated an "E-type" occupational aspiration in the Daydream section of the SDS they completed in 1979.

In the second case, a somewhat similar pattern was found for Group E subjects when 37% of them reported choosing an "E-type" college major during their undergraduate program. These two findings appear to offer some support for the notion that about half of the subjects in Group E had a definite affinity for an "E-type" vocation prior to entering the work force. Several other findings may also provide some additional insight: although 83% of the subjects in Group E persisted to graduation, only 33% of the "persisters" chose an "E-type" college major, and only 47% of these "persisters" eventually chose a "E-type" occupation. While the designation of an "E- type" occupational aspiration and the selection of an "E- type" college major may have played a role in the decision to chose an "E-type" occupation, apparently persistence to college graduation was not a major factor.

At this point a brief discussion of the more important findings for Group E seems beneficial. Attention will first be given to the fifteen subjects in Group E who reported being employed in a "non-E" occupation at the time they were interviewed. Of these fifteen subjects, thirteen (87%) had made at least one previous vocational choice decision that resulted in the reporting of a major code of interest to

this study (i.e., Daydream, College Major) that was incompatible with their Personality Type code. The designation of an Occupational Aspiration code and/or the choosing of a College Major code that was incompatible with the Personality Type code appears to have been an early indicator that these thirteen subjects might well eventually choose a "non-E" occupational field.

There were fifteen subjects (out of thirty, 50%) in the "E" Group who listed a "non-E" Occupational Aspiration in the Occupational Daydream section of the SDS. Of these fifteen subjects who had "non-E" aspirations, ten (67%) had a "non-E" first letter in their three-letter College Major code indicating that as upper level college undergraduates, they had a strong interest in a "non-E" educational field. Not surprisingly, seven of these ten (70%) "non-E" subjects who chose a "non-E" college major also later chose a "non-E" occupational field.

The above findings appear to indicate that a significant number of Group E subjects in this study made selected vocational choice decisions that were compatible with their Personality Type and that helped move them toward an "E" type occupation.

The number/percent of E-Group subjects who reported being employed in an occupation compatible with their Personality Type (fifteen out of thirty, 50%) seems to offer some support for Holland's assumptions regarding the

vocational tendencies of Enterprising subjects. While the expectation that the majority of subjects in the E Group would chose an "E" type occupation was not met, a significant number/percent of "E" Group subjects did choose an "E" type occupation.

Personality Type was also a moderately efficient predictor of occupation at the time of the interview for subjects in Group R (50% of the group had close three-letter agreement).

The Realistic Type "perceives self as having mechanical and athletic ability and lacking in human relations."⁸⁴ Correspondingly, Realistic types are said to prefer an environment that "is characterized by the dominance of environmental demands and opportunities that entail the explicit, ordered, or systematic manipulation of objects, tools, machines, and animals and by a population dominated by realistic types."⁸⁵ According to Holland, the Realistic type ranks lowest among the six types in positive association between the Personality Type and both vocational aspirations and vocational achievement.⁸⁶

For the subjects in Group R of this study, Personality Type predicted with moderate efficiency (33% of those with exact first-letter agreement and 57% of those with close three-letter agreement) their present occupational field. This finding appears to positively associate with several important vocational choice decisions made by these subjects

in two prior instances. In the first case, 70% of the subjects in Group R designated an "R-type" occupational aspiration in the Daydream section of the SDS they completed in 1979.

In the second case, a somewhat similar pattern was found for Group R subjects when 67% of them reported choosing an "R-type" college major during their undergraduate program. These two findings appear to offer some support the notion that about half of the subjects in Group R had a definite affinity for an "R-type" vocation prior to entering the work force. Several other findings may also provide some additional insight: although only 60% of the subjects in Group R persisted to graduation, 67% of the "persisters" chose an "R-type" college major, and 67% of these "persisters" eventually chose a "R-type" occupation. While the designation of an "R-type" occupational aspiration and the selection of an "R-type" college major may have played a role in the decision to chose an "R-type" occupation, apparently persistence to college graduation was not a major factor.

Thirteen subjects in Group R reported that they were employed in a "non-R" occupation at the time they were interviewed. Of these thirteen subjects, eleven (85%) had made at least one previous vocational choice decision that resulted in the reporting of a major code of interest to this study (i.e., Daydream, College Major) that was

incompatible with their Personality Type code. The designation of an Occupational Aspiration code and/or the choosing of a College Major code that was incompatible with the Personality Type code appears to have been an early indicator that these eleven subjects might well eventually choose a "non-R" occupational field.

There were a rather low number of subjects in Group E (eight out of thirty, 27%) who listed a "non-R" Occupational Aspiration in the Daydream section of the SDS. Of these eight subjects who had "non-E" aspirations, three (38%) had a "non-R" first letter in their three-letter College Major code indicating that as upper level college undergraduates, they had a strong interest in a "non-R" educational field. Not surprisingly, two of these three (67%) "non-R" subjects who chose a "non-R" college major also later chose a "non-R" occupational field. Also, four of the five (80%) other subjects with "non-R" Daydream codes later chose a "non-R" occupational field.

The above findings appear to indicate that a significant number of Group R subjects in this study made selected vocational choice decisions that were compatible with their Personality Type and that helped move them toward an R-type occupation.

The number/percent of R-Group subjects who reported being employed in an occupation compatible with their Personality Type (seventeen out of thirty, 57%) seems to

offer some support for Holland's assumptions regarding the vocational tendencies of Realistic subjects. The expectation that the majority of subjects in the "R" Group would chose an "R" type occupation was met.

However, the results for Groups I, A, and C indicate some rather different patterns. In these three groups the majority of subjects in each group had a rather weak level of congruence between their Personality Type and Present Occupation codes whether measured by exact first-letter agreement, or by close three-letter agreement. A discussion of the findings for each of these groups follows.

The Investigative Type "perceives self as scholarly, intellectual, having mathematical and scientific ability, and lacking in leadership ability."⁸⁷ Correspondingly, Investigative types are said to prefer an environment that "is characterized by the dominance of environmental demands and opportunities that entail the observation of symbolic, systematic, creative, investigation of physical, biological, or cultural phenomena, and by a population dominated by Investigative types."⁸⁸ According to Holland, the Investigative type ranks third lowest among the six types in positive association between the Personality Type and vocational aspirations/vocational achievements.⁸⁹

For the subjects in Group I of this study, Personality Type predicted with rather low efficiency (eight out of thirty, 27%, of those with exact first-letter agreement and

ten out of thirty, 33%, of those with close three-letter agreement) their occupational field at the time this study's questionnaire was completed. This finding appears to be at variance with several important vocational choice decisions made by these subjects in two prior instances. In the first case, 80% of the subjects in Group I designated an "I-type" occupational aspiration in the Daydream section of the SDS they completed in 1979.

In the second case, a similar pattern was found for Group I subjects when 67% of them reported choosing an "I-type" college major during their undergraduate program. These two findings appear to support the notion that a majority of the subjects in Group I had a definite affinity for an "I-type" vocation prior to entering the work force. Another finding may also provide some support for this notion: 83% of the subjects in Group I persisted to graduation; and while most of these persisters (80%) chose an "I-type" college major, only 50% of these persisters eventually chose a "I-type" occupation. Although the type of occupational aspiration and college major selected may have been key elements in the decision to choose an "I-type" occupation, apparently persistence to college graduation was not a significant factor.

Twenty subjects in Group I reported that they were employed in a "non-I" occupation at the time they were interviewed. Of these twenty subjects, sixteen (80%) had

made at least one previous vocational choice decision that resulted in the reporting of a major code of interest to this study (i.e., Daydream, College Major) that was incompatible with their Personality Type code. The designation of an Occupational Aspiration code and/or the choosing of a College Major code that was incompatible with the Personality Type code appears to have been an early indicator that these sixteen subjects might well eventually choose a "non-I" occupational field.

There were ten subjects (out of thirty, 33%) in Group I who listed a "non-I" occupational aspiration in the Daydream section of the SDS they completed in 1979. Of these ten subjects, four (40%) had a "non-I" first letter in their three-letter College Major code indicating that as upper level college undergraduates, they had a strong interest in a "non-I" educational field. All four (100%) of these "non-I" subjects who chose a "non-I" college major also later chose a "non-I" occupational field. Also, of the twelve subjects in Group I who chose a "non-I" college major, all twelve (100%) later chose a "non-I" occupational field. Finally, nine of ten (90%) subjects in Group I who had a "non-I" Occupational Aspiration code later chose a "non-I" occupational field.

The above findings appear to indicate that about one-third of Group I subjects in this study made some "early" vocational choice decisions that were at variance with their

Personality Type indicating that they were inclined toward a "non-I" type occupation.

The number/percent of Group I subjects in this study who reported being employed in an occupation compatible with their Personality Type (ten out of thirty, 33%) provides rather exiguous support for Holland's assumption that Investigative types will choose Investigative occupations. The expectation of Hypothesis 4 that the majority of subjects in the "I" Group would chose an "I" type occupation was not met. This finding was not surprising since a high percent (80%) of "I" group subjects who later chose to enter a "non-I" occupation had previously expressed a definite interest in a "non-I" work environment by making a major "non-I" vocational choice decision (i.e., designating a "non-I" occupational aspiration or selecting a "non-I" college major). One factor that may well have some bearing on these findings is that most "I-type" jobs require postgraduate education if the individual is to move beyond an entry-level position. Most of the "non-I" subjects above would by now have moved beyond an entry-level position if they wanted (or needed) to make more money. Either they would have pursued more education or switched to a "non-I" occupation by now.

The Artistic Type "perceives self as expressive, original, intuitive, nonconforming, introspective, independent, disorderly, having artistic and musical

ability, and ability in acting, writing, and speaking."⁹⁰ Correspondingly, Artistic types prefer an Artistic environment that "is characterized by the dominance of environmental demands and opportunities that entail ambiguous, free, unsystematized activities and competencies to create art forms or products, and by the dominance of Artistic types in the environment."⁹¹ According to Holland, the Artistic type ranks third highest among the six types in positive association between the Personality Type and vocational aspirations. The same rank is held for this type in its association with vocational achievement.⁹²

For the subjects in Group A of this study, Personality Type predicted with rather low efficiency (20% of those with exact first-letter agreement and 27% of those with close three-letter agreement) their occupation at the time they were interviewed for this study. This finding appears to reflect a definite interest by these subjects in a "non-A" occupation that was expressed in two prior instances. The first indication of a definite "non-A" vocational interest for the majority of these subjects occurred when 53% of the subjects in this group designated a "non-A" type of occupational aspiration in the Daydream section of the SDS they completed in 1979.

A definite pattern was found for Group A subjects when 63% of them reported choosing a "non-A" college major during their undergraduate program. This finding further supports

the notion that a majority of the subjects in Group A seem to have had an affinity for a "non-A" type of vocation prior to entering the work force in a particular occupation. Another finding may also provide some support for this notion: 27% of the subjects in Group A did not persist to graduation. Nearly all of these non-persisters had chosen a "non-A" college major and nearly all of them eventually chose a "non-A" type occupation. The type of college major selected and the persistence to college graduation may have been significant factors in the decision to chose a "non-A" type of occupation.

Twenty-two subjects in Group A reported that they were employed in a "non-A" occupation at the time they were interviewed. Of these twenty-two subjects, eighteen (82%) had made at least one previous vocational choice decision that resulted in the reporting of a major code of interest to this study (i.e., Daydream, College Major) that was incompatible with their Personality Type code. The designation of an Occupational Aspiration code and/or the choosing of a College Major code that was incompatible with the Personality Type code appears to have been an early indicator that these eighteen subjects might well eventually choose a "non-A" occupational field.

A moderately high number of subjects (twenty out of thirty, 67%) in the "A" Group listed a "non-A" occupational aspiration in the Daydream section of the SDS they completed

in 1979. Of these twenty subjects with "non-A" Daydream codes in Group A, sixteen (80%) had a "non-A" first letter in their three-letter College Major code indicating that as upper level college undergraduates, they had a strong interest in a "non-A" educational field. Additionally, fourteen (88%) of these "non-A" subjects who chose a "non-A" college major also later chose a "non-A" occupational field. Also, of the twenty-one subjects in Group A who chose a "non-A" college major, seventeen (81%) later chose a "non-A" occupational field. Finally, seventeen of the twenty (85%) subjects in Group A who had a "non-A" Occupational Aspiration code later chose a "non-A" occupational field.

The above findings indicate that about two-thirds of the Group A subjects in this study made at least one "early" major vocational choice decision that was at variance with their Personality Type code indicating that they were inclined toward a "non-A" type occupation.

The number/percent of Group A subjects in this study who reported being employed in an occupation compatible with their Personality Type (eight out of thirty, 27%) provides rather exiguous support for Holland's assumption that Artistic types will choose Artistic occupations. The expectation of Hypothesis IV that the majority of subjects in the "A" Group would chose an "A" type occupation was not met. This finding was not surprising since a high percent (82%) of "A" group subjects who later chose to enter a

"non-A" occupation had previously expressed a definite interest in a "non-A" work environment by making a major "non-A" vocational choice decision (i.e., like selecting a "non-A" college major). The findings for Group A appear to reflect the conditions in our society. Jobs paying a liveable wage or commission in today's work force for Artistic types are more limited in number than jobs for the other five work environments. Also noteworthy is the fact that financial compensation for the "A-type" tends to be modest (even meager) except for the few who excel in their "A" occupation. Many students realize this by the time they complete a year or so of college work and consequently do not aspire to "A-type" jobs, choose a "non-A" college major, and eventually seek/gain employment in a "non-A" occupation.

The Conventional Type "perceives self as conforming, orderly, and as having clerical and numerical ability."⁹³ Correspondingly, Conventional types prefer an environment that "is characterized by the dominance of environmental demands and opportunities that entail the explicit, ordered, systematic manipulation of data, such as keeping records, filing materials, organizing written and numerical data into a prescribed plan, operating business and data processing machines, and by a population dominated by Conventional types."⁹⁴ According to Holland, the Conventional type ranks second lowest among the six types in positive association between the Personality Type and vocational aspirations.

The same rank is held for this type in its association with vocational achievement.⁹⁵

The data collected for Group C indicates that only 30% of its subjects were employed in an "C-type" occupation at the time they were interviewed for this study. This finding appears to reflect an earlier interest by the majority of "C" Group subjects in a "non-C" vocation that was expressed in two prior instances. The first indication of a definite "non-C" vocational interest for the majority of these subjects occurred when 47% of the subjects in this group designated a "non-C" type of occupational aspiration in the Daydream section of the SDS they completed in 1979.

A similar pattern was found for Group C subjects when 73% of them reported choosing a "non-C" college major during their undergraduate program. This finding further supports the notion that a majority of the subjects in Group C seem to have had an affinity for a "non-C" type of vocation prior to entering the work force in a particular occupation. Another finding may also provide some support for this notion: 13% of the subjects in Group C did not persist to graduation. Most of the non-persisters (75%) chose a "non-C" college major and half of them eventually chose a "non-C" type occupation. The type of college major selected and persistence to college graduation may have been significant factors in the decision to chose a "non-C" type of occupation.

Twenty-one subjects in Group C reported that they were employed in a "non-C" occupation at the time they were interviewed. Of these twenty-one subjects, eighteen (86%) had made at least one previous vocational choice decision that resulted in the reporting of a major code of interest to this study (i.e., Daydream, College Major) that was incompatible with their Personality Type code. The designation of an Occupational Aspiration code and/or the choosing of a College Major code that was incompatible with the Personality Type code appears to have been an early indicator that these eighteen subjects might well eventually choose a "non-C" occupational field.

A substantial number of subjects (twenty-two out of thirty, 73%) in the "C" Group listed a "non-C" occupational aspiration in the Daydream section of the SDS they completed in 1979. Of these twenty-two subjects, eighteen (82%) had a "non-C" first letter in their three-letter College Major code indicating that as upper level college undergraduates, they had a strong interest in a "non-C" educational field. All eighteen (100%) of these "non-C" subjects who chose a "non-C" college major also later chose a "non-C" occupational field. Also, of the twenty-two subjects in Group C who chose a "non-C" college major, seventeen (77%) later chose a "non-C" occupational field. Finally, eighteen of the twenty-two (82%) subjects in Group C who had a

"non-C" Occupational Aspiration (Daydream) code later chose a "non-C" occupational field.

The above findings indicate that about two-thirds of the Group C subjects in this study made at least one "early" major vocational choice decision that was at variance with their Personality Type code indicating that they were inclined toward a "non-C" type occupation.

The number/percent of Group C subjects in this study who reported being employed in an occupation compatible with their Personality Type (nine out of thirty, 30%) provides only moderate support for Holland's assumption that Conventional types will choose Conventional occupations. The expectation of Hypothesis 4 that the majority of subjects in the "C" Group would chose a "C" type occupation was not met. This finding was not surprising since a high percent (86%) of "C" group subjects who later chose to enter a "non-C" occupation had previously expressed a definite interest in a "non-C" work environment by making a major "non-C" vocational choice decision (i.e., designating a "non-C" occupational aspiration). Although most "C-type" (Conventional) occupations are at the non-college level, "C-type" individuals in college would probably aspire to higher level occupations and therefore not choose "C-type" majors or occupations.

Summary and Conclusion

According to the above discussion, the analyses of the data and interpretation of the resultant findings from the subjects in the total sample indicate that Personality Type was a moderately efficient predictor of present occupation for the majority of subjects.

This outcome was especially true for the subjects in Groups R, S, and E. For these groups, Personality Type code predicted Present Occupation for 54% of their subjects. Also worth noting is the finding that 84% of these subjects had high-moderate congruence between and Personality Type (Summary) code and Occupational Aspiration (Daydream) code and 74% had high-moderate congruence between Personality Type code and College Major code. For these subjects, high-moderate congruence between personality type and other major variables in this study seems to indicate the likelihood of high-moderate congruence between personality type and present occupation. For the majority of subjects in Groups R, S, and E, the Summary Code of the Self-Directed Search seemed to have some definite value in predicting Present Occupation.

For those subjects in these three groups for whom the Personality Type code did not predict Present Occupation, 63% had weak-poor congruence between Personality Type code and Occupational Aspiration code and 63% had weak-poor congruence between Personality Type code and College Major

code. For these subjects, weak-poor congruence between personality type and other major variables in this study seems to indicate the likelihood of weak-poor congruence between personality type and present occupation.

Analysis of the data for Groups A, I, and C indicates that Personality Type was not an efficient predictor of present occupation for the majority of subjects in each group. However, for 30% of the subjects in these groups, Personality Type did predict Present Occupation. Also worth noting is the finding that 85% of these subjects had high-moderate congruence between Personality Type (Summary) code and Occupational Aspiration (Daydream) code and 63% had high-moderate congruence between Personality Type code and College Major Code. For these subjects, high-moderate congruence between personality type and other major variables in this study seems to indicate the likelihood of congruence between personality type and present occupation.

On the other hand, for those subjects in these three groups for whom the Personality Type did not predict Present Occupation, 57% had weak-poor congruence between Personality Type code and Occupational Aspiration code and 67% had weak-poor congruence between Personality Type code and College Major code. For these subjects, weak-poor congruence between personality type and other major variables in this study seems to indicate the likelihood of weak-poor congruence between personality type and present occupation.

Congruence and Satisfaction with Present Occupation

Of special interest to the present study was the question of whether high-moderate congruence between subjects' Personality Type code and Present Occupation code was a better predictor of satisfaction with the present occupation (i.e., the one held at the time the study was conducted) than weak-poor congruence between the two codes.

Satisfaction with Occupation and the Total Sample

In compliance with the expectation of Hypothesis 5, the data showed that for the total sample there was moderate support for the notion that high-moderate congruence between the Summary Code and the Present Occupation code at the time the study was conducted is a better predictor of satisfaction with the present occupation than weak-poor congruence between these same two codes.

Results from studies investigating the relationship of congruence to job satisfaction have been mixed. Strong⁹⁶ first suggested that the greater the interest congruency, the higher the job satisfaction is expected to be. Studies by Sarbin and Anderson⁹⁷ and Bedrosian⁹⁸ showed that occupationally dissatisfied individuals did not have interest patterns highly congruent with their occupations. A number of early studies using the Strong Vocational Interest Blank by Schlectzer,⁹⁹ Dolliver, Irvin, and Bigley,¹⁰⁰ and Hughes¹⁰¹ found no association between congruence of

personal interests and job type and job satisfaction while others by Holland,¹⁰² Richards and Jones,¹⁰³ Morrow,¹⁰⁴ Walsh and Lewis,¹⁰⁵ Barak and Meir,¹⁰⁶ and Nafziger, Holland, and Gottfredson,¹⁰⁷ found positive relationships between congruence and job satisfaction.

Lopez¹⁰⁸ studied Holland's six vocational models in a work environment and found support for the congruence-satisfaction concept for four of the six Holland classifications (Realistic, Investigative, Social, and Enterprising).

Using the Job Descriptive Index (JDI) to measure job satisfaction, McDonald and Gunderson¹⁰⁹ found that health related variables, naval experience, and level of responsibility were closely related to job satisfaction. Smart¹¹⁰ concluded from his research involving university departmental chairmen in Holland's six model environments that overall job satisfaction in these environments resulted from a unique combination of satisfactions with different aspects of one's job.

In another attempt to clarify the relation of vocational interests to job satisfaction, Wiggins¹¹¹ found that for 110 of 126 known female teachers of the educable mentally retarded (Social occupation) in Delaware, there was a significant positive relationship between job satisfaction and the Social and Artistic Scales of the Vocational Preference Inventory. Variables such as age, years of

experience, and educational level were not statistically significant.

Using Roe's eight classifications of occupations instead of Holland's six, Peiser and Meir¹¹² found for the 360 subjects in their study that for both males and females, higher occupational choice satisfaction is predictable when the occupational field is congruent with the subject's vocational interests.

Wiener and Klein¹¹³ using the Strong Vocational Interest Blank (SVIB) and the Job Descriptive Index (JDI) with 101 middle managers from a variety of managerial functions (Enterprising occupations) found that for long job-tenured individuals, strong interest congruency was associated with high satisfaction with work.

Using the Job Descriptive Index and the Self-Directed Search (SDS) with a sample of 362 employees from five of Holland's six environmental typologies, Mount and Muchinsky¹¹⁴ found higher job satisfaction among congruent employees in Investigative, Conventional, and Enterprising environments than among workers in Social and Artistic environments. Also of note was the finding that employees in congruent environments had significantly higher satisfaction scores on all five scales of the JDI than workers in incongruent environments.

In 1981 Hener and Meir¹¹⁵ reported that there was a positive correlation between congruence and job satisfaction

in a study they conducted to test Holland's congruence hypothesis within the nursing occupation (Social occupation). A similar study was done with engineers (Realistic occupations) by Meir and Erez¹¹⁶ with similar results.

The results of a study reported in 1981 by Aranya, Barak, and Amernic¹¹⁷ of 810 CPAs in California using the Self-Directed Search found that the Holland code pattern of these subjects was characterized by combinations of the Conventional, Enterprising, and Social types. These three scales were also found to have the highest correlations with vocational satisfaction for these subjects.

Wiggins, Lederer, Salkowe, and Rys¹¹⁸ found that personality-environment congruence as measured by Holland's Vocational Preference Inventory was predictive of overall job satisfaction for a sample of secondary teachers (of English, history, business, mathematics, and vocational agriculture) from Maryland, New Jersey, Pennsylvania, and Delaware as measured by Hoppock's Job Satisfaction Blank.

In a similar study reported in 1984, Wiggins¹¹⁹ tested 123 secondary school counselors (Social occupation) from the same states and found that congruence was positively and significantly correlated with job satisfaction. The results of this study also showed that the tested variables of age, gender, and years of experience were not positively correlated with job satisfaction.

The results of a study reported in 1986 by Smart, Elton, and McLaughlin¹²⁰ not only generally supported Holland's premise that job satisfaction is positively related to the congruence between subjects' personality type and their work environment, but also showed that the level of job satisfaction for males and females did not vary according to their primary personality type.

Elton and Smart¹²¹ found that women and men at the highest level of congruence are slightly more satisfied with the extrinsic aspects of their job such as income, fringe benefits, and opportunities for advancement than those at the lowest level of congruence.

Using a modified version of the Job Descriptive Index, Meir and Yaari¹²² found that for the subjects in the eight different occupations they tested there was a positive correlation between within-occupation congruence and satisfaction.

Using the Job Descriptive Index and the Job Satisfaction Blank to assess both specific and global job satisfaction of the subjects, Gottfredson and Holland¹²³ found that person-job congruence had substantial correlations with job satisfaction in a well-defined, homogeneous sample (bank tellers, Conventional occupation).

Discussion of the Initial Analysis for the Total Sample

In the present study, Hypothesis 5 was proposed to test Holland's premise that there is a positive correlation between person-environment (work-type) congruence and job satisfaction. Results from the use of Iachan's Index to calculate congruence and the derived frequency distribution indicated that the higher number/percent of "Satisfied" subjects (fifty-three, 73%) occurred at the "High-Moderate" level of congruence (as compared with thirty-seven, 35% at the "Weak-Poor" level), and that the higher number/percent of "Satisfied" subjects (fifty-three, 73%) as compared to "Dissatisfied" (twenty, 27%) also occurred at the "High-Moderate" level of congruence rather than at the Weak-Poor level ("Satisfied:" thirty-seven, 35%), "Dissatisfied:" seventy, 65%). These findings show that there were twice the number of "Satisfied" subjects and three and one-half times fewer "Dissatisfied" subjects at the High-Moderate level of congruence than at the Weak-Poor level. High-moderate congruence resulted in a higher frequency of subjects satisfied with their jobs and a lower frequency of dissatisfied subjects. Findings from the Chi-square test for independence showed that the frequency distribution of the congruence results met the .05 level of significance. The initial analysis of the distribution configuration derived from the congruence calculations for

the total sample revealed that there was a definite association between congruence and job satisfaction.

Discussion of Regression Analyses for the Total Sample

Further analysis using simple and multiple regression was performed in order to identify from a set of variables (that were drawn from those used to test the other four hypotheses) which variable(s) had the strongest association with job satisfaction. The set of variables used to test the fifth hypothesis included Congruence between Personality Type (SDS Summary) code and Present Occupation code, Congruence between Personality Type code and Daydream (Occupational Aspiration) code, Congruence between Personality Type code and College Major code, Satisfaction with College Major, Graduation Status (Graduated from College/Not Graduated from College), Congruence between Daydream code and College Major code, Congruence between Present Occupation code and College Major code, and Congruence between Daydream code and Present Aspiration Code.

The simple regression analysis that were performed revealed which of the variables in the preceding paragraph had the highest correlation at the .05 significance level with the values of job satisfaction that had been obtained from the Job-in-General scale of the Job Descriptive Index. These variables were: Congruence between Personality Type

code and Present Occupation code, Satisfaction with College Major, Congruence between Daydream code and Present Occupation code, and Graduation Status. Of these variables, Congruence between Personality Type code and Present Occupation code had the strongest association with job satisfaction, followed by Satisfaction with College Major.

The results of the multiple regression analysis that was conducted indicated that "Congruence between Personality Type code and Present Occupation code" and "Satisfaction with College Major" were the strongest of the predictor variables, with the former having the highest correlation with the job satisfaction scores accounting together for 15% of the variance in those values.

These results for the total sample affirm the findings of those broad studies cited above supporting Holland's general premise that job satisfaction is enhanced when the personality of the worker is congruent with his or her work environment.

Satisfaction with Occupation and the Six Sub-groups

Hypothesis 5 also served as the basis for determining how Holland's congruence-satisfaction premise applied to all six sub-groups. Frequency distributions derived from the calculations of congruence (using Iachan's index) varied considerably among the six sub-groups. This outcome in turn caused notable differences among these groups in (1) the

number of "Satisfied" and "Dissatisfied" subjects that occurred at the High-Moderate and Weak-Poor levels of congruence, (2) the percent of "Satisfied" and "Dissatisfied" subjects that occurred at each of these levels, and therefore, (3) the level of statistical significance for each sub-group as determined by the Chi-square test for independence.

For all six sub-groups (R,I,A,S,E,C) in this study, there is a higher frequency of job satisfaction for subjects with high-moderate congruence between personality Type and present occupation than there is for subjects with Weak-Poor congruence between the two variables. For Groups R, I, and E, the percent of frequency for subjects with High-Moderate congruence is twice as high as those with Weak-Poor congruence (Group R, 80% vs. 40%; Group I, 80% vs. 30%; Group E, 79% vs. 38%). For Group A the percent is more than five times higher (100% vs. 18%). Even though the percent levels are lower overall for Groups S and E, the frequency percent for subjects with high-moderate congruence is still higher than those with weak-poor congruence (Group S, 53% vs. 31%; Group C, 56% vs. 52%). The lower percentages for these two groups (particularly Group C) may reflect some general discontent that carried over to their assessment of their occupation in 1989 when the follow-up data were collected. This discontent may have been expressed in the high percentages of reported job dissatisfaction at both the

High-Moderate and Weak-Poor Congruence levels (Group S, 47% and 69%; Group C, 44% and 48%).

The findings of the initial analysis of the congruence calculations and of the distribution configurations for each of the six sub-groups are discussed in the following paragraphs.

Discussion of the Initial Analyses for the Six Sub-groups

In the present study, high-moderate congruence between the Personality Type code and the Present Occupation code appears to have been a moderately efficient predictor of satisfaction with present occupation for subjects in Groups R, I, A, and E. In two of these four groups (R,E) the category with largest number of subjects was "Satisfied" with their Present Occupation at the high-moderate level of congruence. In the other two groups (I and A), the largest number of subjects was found in the "Dissatisfied" category at the weak-poor level of congruence. However, because the ratio of satisfied to unsatisfied subjects was better at the high-moderate level of congruence than at the weak-poor level, high-moderate congruence was determined to be the a better predictor of satisfaction than weak-poor congruence.

For a moderate number of subjects (40%) in the present study in Group R, high-moderate congruence between Personality Type code and Present Occupation code predicted satisfaction with good efficiency (80%). This finding

appears to show a positive association with a previously stated finding that half of the subjects in Group R (50%) reported an exact or close agreement between Personality Type and Present Occupation codes. In light of Holland's theory, a high percent of these subjects would be satisfied in an "R-compatible" occupation. Also pertinent are the findings that (1) 93% of the subjects in Group R who chose an "R-compatible" or "close match" present occupation also had reported an "R" compatible or "close-match" occupational aspiration, (2) the majority of subjects with high-moderate congruence between Personality Type code and Present Occupation code who were satisfied with their present occupation persisted to graduation (83%), (3) 73% chose an "R" or "close-match" college major, (4) 75% of whom were satisfied with the major field they chose.

In contrast to these findings, (1) 60% of the subjects in Group R who chose an "non-R-compatible" or "non-close match" present occupation also had reported an "non-R-compatible" or "non-close-match" occupational aspiration, (2) 73% of the subjects in Group R who chose a "non-R" or "non-close-match" occupation were dissatisfied with that occupation, (3) only 43% of these subjects persisted to graduation, (4) 40% had also chosen a "non-R" or "non-close-match" college major, and (5) 18% of these subjects were dissatisfied with the "non-R" or "non-close-match" college major they chose.

Likewise, for a moderate number of subjects (37%) in the present study in Group E, high-moderate congruence between Personality Type code and Present Occupation code predicted satisfaction with good efficiency (79%). This finding appears to show a positive association with a previously stated finding that half of the subjects in Group E (50%) reported an exact or close agreement between Personality Type and Present Occupation codes. According to Holland's theory, a high percent of these subjects would be satisfied in an "E-compatible" occupation. Also pertinent are the findings that (1) 47% of the subjects in Group E who chose an "E-compatible" or "close match" present occupation also had reported an "E" compatible or "close-match" occupational aspiration, (2) the majority of subjects with high-moderate congruence between Personality Type code and Present Occupation code who were satisfied with their present occupation persisted to graduation (92%), (3) 53% chose an "E" or "close-match" college major, (4) 47% of whom were satisfied with the major field they chose.

In contrast to these findings, (1) 73% of the subjects in Group E who chose an "non-E-compatible" or "non-close match" present occupation also had reported an "non-E-compatible" or "non-close-match" occupational aspiration, (2) 56% of the subjects in Group E who chose a "non-E" or "non-close-match" occupation were dissatisfied with that occupation, (3) only 33% of these subjects

persisted to graduation, (4) 80% had also chosen a "non-E" or "non-close-match" college major, and not surprisingly, (5) the majority of these subjects were satisfied with the "non-E" or "non-close-match" college major they chose.

Similarly, for a moderate number of subjects (27%) in the present study in Group I, high-moderate congruence between Personality Type code and Present Occupation code predicted satisfaction with high efficiency (90%). This finding appears to show a positive association with a previously stated finding that one-third the subjects in Group I (33%) reported an exact or close agreement between Personality Type and Present Occupation codes. According to Holland's theory, a high percent of these subjects would be satisfied in an "I-compatible" occupation. Also pertinent are the findings that (1) all of the subjects in Group I who chose an "I-compatible" or "close match" present occupation also had reported an "I" compatible or "close-match" occupational aspiration, (2) the majority of subjects with high-moderate congruence between Personality Type code and Present Occupation code who were satisfied with their present occupation persisted to graduation (89%), (3) 100% chose an "I" or "close-match" college major, (4) all of whom were satisfied with the major field they chose.

In contrast to these findings, (1) 15% of the subjects in Group I who chose an "non-I-compatible" or "non-close match" present occupation also had reported an

"non-I-compatible" or "non-close-match" occupational aspiration, (2) 14% of the subjects in Group I who chose a "non-I" or "non-close-match" occupation were dissatisfied with that occupation, (3) only 21% of these subjects persisted to graduation, (4) 50% had also chosen a "non-I" or "non-close-match" college major, and (5) 21% of these subjects were dissatisfied with the "non-I" or "non-close-match" college major they chose.

In a similar way, for a moderate number of subjects (27%) in the present study in Group A, high-moderate congruence between Personality Type code and Present Occupation code predicted satisfaction with high efficiency (100%). This finding appears to show a positive association with a previously stated finding that 27% of the subjects in Group A reported an exact or close agreement between Personality Type and Present Occupation codes. In light of Holland's theory, a high percent of the subjects who chose an "A-compatible" occupation would be satisfied with that occupation. Also pertinent are the findings that (1) 88% of the subjects in Group A who chose an "A-compatible" or "close match" present occupation also had reported an "A" compatible or "close-match" occupational aspiration, (2) the majority of subjects (88%) with high-moderate congruence between Personality Type code and Present Occupation code who were satisfied with their present occupation persisted to graduation, (3) 73% chose an "A" or "close-match" college

major, (4) 82% of whom were satisfied with the major field they chose.

In contrast to these findings, (1) 36% of the subjects in Group A who chose an "non-A-compatible" or "non-close match" present occupation also had reported an "non-A-compatible" or "non-close-match" occupational aspiration, (2) 82% of the subjects in Group A who chose a "non-A" or "non-close-match" occupation were dissatisfied with that occupation, (3) only 33% of these subjects persisted to graduation, (4) 68% had also chosen a "non-A" or "non-close-match" college major, and (5) 33% of these subjects were dissatisfied with the "non-A" or "non-close-match" college major they chose.

However, for a moderate number of subjects (30%) in the present study in Group S, high-moderate congruence between Personality Type code and Present Occupation code predicted satisfaction with rather weak efficiency (53%). This finding appears to show only a moderate association with a previously stated finding that slightly more than half the subjects in Group S (57%) reported an exact or close agreement between Personality Type and Present Occupation codes. Contrary to Holland's theory, the expectation that a high percent of these subjects would be satisfied in an "S-compatible" occupation was not realized. Also pertinent are the findings that (1) 82% of the subjects in Group S who chose an "S-compatible" or "close match"

present occupation also had reported an "S-compatible" or "close-match" occupational aspiration, (2) the majority of subjects with high-moderate congruence between Personality Type code and Present Occupation code who were satisfied with their present occupation persisted to graduation (88%), (3) 88% chose an "S" or "close-match" college major, (4) 88% of whom were satisfied with the major field they chose.

In contrast to these findings, (1) only 23% of the subjects in Group S who chose an "non-S" or "non-close match" present occupation also had reported an "non-S" or "non-close-match" occupational aspiration, (2) 69% of the subjects in Group S who chose a "non-S" or "non-close-match" occupation were dissatisfied with that occupation, (3) 78% of these subjects persisted to graduation, (4) 54% chose a "non-S" or "non-close-match" college major, and (5) only 11% of these subjects were dissatisfied with the "non-S" or "non-close-match" college major they chose.

Similarly, for only 17% of subjects in the present study in Group C, high-moderate congruence between Personality Type code and Present Occupation code predicted satisfaction with rather weak efficiency (56%). This finding appears to show only a moderate association with a previously stated finding that only 30% of the subjects in Group C reported an exact or close agreement between Personality Type and Present Occupation codes. Contrary to Holland's theory, the expectation that a high percent of

these subjects would be satisfied in an "C-compatible" occupation was not realized. Also pertinent are the findings that (1) only 33% of the subjects in Group C who chose a "C-compatible" or "close match" present occupation also had reported an "C" compatible or "close-match" occupational aspiration, (2) all of the subjects with high-moderate congruence between Personality Type code and Present Occupation code who were satisfied with their present occupation persisted to graduation, (3) only 44% chose a "C" or "close-match" college major, (4) 60% of whom were satisfied with the major field they chose.

In contrast to these findings, (1) only 33% of the subjects in Group C who chose an "non-C" or "non-close match" present occupation also had reported an "non-C" or "non-close-match" occupational aspiration, (2) 48% of the subjects in Group C who chose a "non-C" or "non-close-match" occupation were dissatisfied with that occupation, (3) a surprising 90% of these subjects persisted to graduation, (4) 81% had also chosen a "non-C" or "non-close-match" college major, and (5) 20% of these subjects were dissatisfied with the "non-C" or "non-close-match" college major they chose.

Discussion of Regression Analyses for the Six Sub-groups

As was the case with the total sample, here also further analysis using simple and multiple regression was

performed with each of the six sub-groups in order to identify (from among the same set of variables that were used to test the Hypothesis 5 with the total sample) which variable(s) had the strongest association with job satisfaction.

The simple regression analyses that were performed indicated for each sub-group which (of the set of previously referenced) variables had the highest correlation at the .05 significance level with the values of job satisfaction that had been obtained from the Job-in-General scale of the Job Descriptive Index. The variables emerging as significant for each of the sub-groups were as follows:

- Group R - Congruence between Personality Type and Present Occupation
 - Congruence between Top Daydream Choice and Present Occupation
 - Congruence between Composite Daydream Choice and Present Occupation
 - Graduation Status (Graduated/Not Graduated)
- Group I - Top Daydream Choice and Present Occupation
 - Congruence between Personality Type and Present Occupation
 - Graduation Status (Graduated/Not Graduated)
- Group A - Congruence between Personality type and Present Occupation
- Group S - Satisfaction with College Major
- Group E - Congruence between Personality Type and Present Occupation
 - Congruence between Composite Daydream Choice and Present Occupation
 - Graduation Status (Graduated/Not Graduated)
- Group C - Congruence between Composite Daydream Choice and College Major

As the preceding list of variables clearly shows, "Congruence between Personality Type and Present Occupation" emerged more often than any of the other variables, occurring in four of the six groups.

The results of the multiple regression analyses identified which (of the set of previously referenced) predictor variables had the highest correlation at the .05 significance level with the values of job satisfaction (criterion variable) that had been obtained from the Job-in-General scale of the Job Descriptive Index. The variables emerging as significant for each of the sub-groups were as follows:

- Group R - Congruence between Personality Type and Present Occupation
- Group I - Top Daydream Choice and Present Occupation
 - Graduation Status (Graduated/Not Graduated)
 - Congruence between Personality Type and College Major
- Group A - Congruence between Personality type and Present Occupation
- Group S - Satisfaction with College Major
- Group E - Congruence between Personality Type and Present Occupation
 - Congruence between Personality Type and Top Daydream Choice
 - Congruence between Top Daydream Choice and Present Occupation
- Group C - Gender
 - Congruence between Composite Daydream Choice and College Major

For Group R, "Congruence between Personality Type code and Present Occupation" ($r=.54$, $p<.01$) was the best

predictor variable of the set of variables used in the regression analysis. This variable was the only predictor of the set used in the regression computation for the R-Group that met the .05 standard of statistical significance established for this study. This finding supports Holland's person-satisfaction premise and Hypothesis 5 of this study.

Similarly, the predictor variable that had the strongest correlation ($r=.42$, $p<.01$) with job satisfaction for the subjects in Group A was also "Congruence between Personality Type code and Present Occupation." In this case also this variable was the only one of the set used in the regression analysis for Group A that met the .05 standard of statistical significance. The finding for this Group also supports the person-satisfaction assumption and Hypothesis 5 of this study.

As was true for the two previous groups, the results of the regression analysis for Group E also revealed that "Congruence between Personality Type code and Present Occupation" had the highest correlation with job satisfaction ($r=.48$, $p<.01$).

The predictor variable that had the highest correlation ($r=.42$, $p<.05$) with the criterion variable of job satisfaction for Group I was "Congruence between Top Aspiration Code and Present Occupation Type Code." Having a long-term aspiration for an Investigative-type occupation may be a necessary component to eventually entering an

Investigative occupation and then being satisfied in it because of the time, work, and cost required to achieve it. Contributing to a viable explanation for "Congruence between Personality Type code and Present Occupation" not being among the variables having the highest correlation with job satisfaction is the fact that 67% of the subjects in Group I of this study were employed in "non-I" occupations at the time they completed the Data Collection Instrument in 1989. Perhaps the demanding and often protracted investment required to prepare for an "I-type" occupation was too great for the majority of these subjects even though they had an "I-type" Summary Code and 90% of them had an "I-type" Occupational aspiration (Daydream code).

"Satisfaction with College Major" correlated more highly ($r=.45$, $p<.01$) with job satisfaction than the other predictor variables for subjects in Group S. A noteworthy comparison can be made that may shed some light on the this finding. About 70% of subjects in Group S had High-Moderate congruence between Daydream (Occupational Aspiration) code and College Major code, and of this sub-group, 95% were satisfied with their College Major. In contrast, only 57% of the subjects in Group S had High-Moderate congruence between Personality Type code and Present Occupation code, and of this sub-group only 31% were satisfied with their Present Occupation. The high correlation between Job Satisfaction and "Satisfaction with College Major" may

reflect the Social type's tendency to overall satisfaction and may have played a role here regardless of congruence (as the high percent (95%) of those satisfied with College Major suggests). Such an occurrence would likely mask a true assessment of the relationship between Personality Type code and Present Occupation. Then too, the "S-type" subjects in this study may well have experienced some "burn out" as frequently this happens with Social types. This occurrence would work against a high correlation between Job Satisfaction and "Congruence between Personality Type code and Present Occupation."

For the subjects in Group C, "Congruence between Composite Aspiration Code and College Major Code" had the highest correlation ($r=.54$, $p<.05$) with job satisfaction. "Gender" had the next highest correlation and made its only appearance among the six sub-groups here as a significant predictor variable. Although about 60% of the subjects in Group C listed "non-C" occupational aspirations, chose a "non-C" college major, and entered a "non-C" occupation, "Congruence between Personality Type Code and Present Occupation" did not have a high correlation with Job Satisfaction. These findings raise questions about why so many subjects in this group made "non-C" vocational choices. One conjecture is that the "C" group of subjects in this study tended to be dissatisfied (unfulfilled, even unhappy) with their "work" environments and thus felt the

need to explore other vocational options. This notion may tend to be true of the Conventional type. Not only did a majority of the subjects in this study's Group C list occupations that do not require a college degree among their occupational aspirations in the Daydream section of the SDS they completed in 1979, but a substantial number of these subjects reported (ten years later when they completed the Data Collection Instrument) that they were employed in an occupation that does not require a college degree.

Summary and Conclusion

As the above discussion relates, the statistical analyses performed on the data from the total sample and interpretation of the resultant findings appear to affirm the assumption derived from Holland's person-congruence theory that satisfaction with an occupation is positively associated with congruence between subjects' Personality Type (Summary) code and their College Major code for the majority of subjects.¹²⁴

The main source of support for the congruence-satisfaction hypothesis of Holland's person-environment theory was provided by findings of statistical analyses performed on data from subjects in Groups R, I, A and E. For these combined groups, high-moderate congruence between Personality Type (Summary) code and Present Occupation code predicted satisfaction for 83% of the subjects at the high-moderate congruence level (and 32.5% of all the

subjects of the combined groups at both congruence levels). For the other subjects at the high-moderate level in this combined group, 17% were dissatisfied with their Present Occupation. A total of 7% of all the subjects of the combined groups (R,I,A,E) were dissatisfied at both the high-moderate and weak-poor congruence levels.

In contrast, among the remaining subjects in this composite group (R, I, A, and E), weak-poor congruence between the Personality Type code and the Present Occupation code predicted Satisfaction with Present Occupation for only 30% of the subjects at the weak-poor congruence level (and just 18% of the total number of subjects in the combined groups at both congruence levels). Also among the remaining subjects at the weak-poor level in this combined group, 70% were dissatisfied with their Present Occupation. A total of 42.5% of all the subjects of the combined groups (R,I,A,E) were dissatisfied at both the high-moderate and weak-poor congruence levels.

For the majority of subjects in Groups R, I, A, and E, high-moderate congruence between the Holland SDS Personality Type (Summary) code and Present occupation code was a moderately efficient predictor of Satisfaction with Present occupation.

Analysis of the data for Groups S and C indicated that high-moderate congruence between the Personality Type (Summary) code and College Major code was also an efficient

predictor of Satisfaction with College Major for 54% of the subjects at the high-moderate congruence level (and 23% of all the subjects of the combined groups (S and C) at both congruence levels). For the other subjects at the high-moderate level in this combined group, 46% were dissatisfied with their Present Occupation. A total of 20% of all the subjects of the combined groups (S and C) were dissatisfied at both the high-moderate and weak-poor congruence levels.

However, for the majority of subjects in these combined groups, weak-poor congruence between Personality Type code and Present Occupation code predicted Satisfaction with Present Occupation for 44% of the subjects at the weak-poor congruence level (and 25% of all the subjects of the combined groups at both congruence levels.) Also among the remaining subjects at the weak-poor level in this combined group, 56% were dissatisfied with their present occupation. A total of 32% of all the subjects of the combined groups (S and C) were dissatisfied at both the high-moderate and weak-poor congruence levels.

For the most of subjects in Groups S and C, high-moderate congruence between the SDS Personality Type (Summary) code and Present Occupation code was not found to be an efficient predictor of satisfaction with present occupation.

Additional statistical analyses were performed to determine which of the set of variables selected for testing

Hypothesis 5 had the closest association with job (occupational) satisfaction. The findings showed that for the total sample, high-moderate congruence between Personality Type (Summary) code and Present Occupation code was the best predictor of job satisfaction. Using the same set of variables, the same statistical analyses were performed with each of the six sub-groups to test Hypothesis 5. The findings showed that for Groups R, A, and E, high-moderate congruence between Personality Type (Summary) code and Present Occupation code was the best predictor of job satisfaction.

Implications

Overall, the findings discussed above indicate that for the subjects in certain of the personality type groups in this study, the tested vocational choice decisions do appear to have been influenced by their personality type. For a majority of the subjects in these groups, there was a positive association between their personality type and the vocational choice they made, (i.e., college major, occupation). This outcome would seem to have implications for both selection and placement for study in higher education, completion of an educational/training program, and for entrance into an occupation.

Since having successful and satisfied students and graduates is one of the goals of most high schools, colleges/universities, and other post-secondary educational

institutions, the results of this study suggest that students would likely benefit from academic counseling using the Self-Directed Search that would help them to give due consideration to the types of colleges and/or institutions, curricula and college majors, programs and specialized courses of training that have a high level of compatibility with their personality type. Similarly, for those students who are dissatisfied with their educational choices, the findings of this study suggest that data from the SDS could provide valuable assistance in gaining insight into one's vocational interests.

The same need exists for vocational advisement for any organization that wants to hire and retain employees who will be successful and satisfied in their work environment. With respect to job placement, person-environment interactions disclosed by the Self-Directed Search would appear to be useful in these ways: organizing and locating similar jobs for people who are moving to another geographic location within the same organization; reassigning an individual who is dissatisfied with his/her present position within the organization; designing or redesigning the activities performed at a job to make them more fulfilling to the worker; detecting and diagnosing potential conflicts among supervisors and subordinates more effectively; and developing training programs based on the competencies and abilities for people of a given environmental type.

The making of vocational decisions is not a single, solitary, spontaneous event but rather a process that operates over an extended period of time. To enhance the probability of making vocational choice decisions that will be congruous and fulfilling, this process needs to be regularly infused with information, explanations, and educational/occupational contacts from many competent and caring sources including professional counselors. The results obtained in this study appear to support the view that Holland's vocational choice theory offers a useful explanation for organizing, explaining, and interpreting vocational information. The timely and proper use of the Self-Directed Search and related materials (based on Holland's theory) can provide valuable assistance to a person in discovering personal strengths and interests, in exploring educational/ occupational options and opportunities, and in formulating vocational and educational plans.

The value of educational and vocational counseling that utilizes Holland's person-environment theory can be measured by the many important practical benefits that result for students and workers, and the educational institutions, business organizations, and industries of which they are a part.

Recommendations

The findings of the present study suggest a number of investigations that would add to the body of research on Holland's theory of vocational personalities and work environments. Following are some recommendations for future research that need to be addressed:

1. Further research is needed that incorporates multiple dimensions of vocational satisfaction to investigate how the person-environment hypothesis applies to all aspects of satisfaction.
2. A further test of Holland's theory and its applicability to various vocational environments should be based on research that controls for the possible moderating effects of specific tasks performed by the subjects in their work environment.
3. Research needs to assess the impact of such factors as socioeconomic status, geographic compatibility, religious convictions, philosophic perspectives, family values, and cultural mores on personality-environment congruence.
4. Further research is needed to explore the degree to which the relationship between specialty congruence (i.e., within occupation congruence) and satisfaction can be stated as a general relationship between specialty congruence (i.e., for people preparing for or engaged in various types of religious work) and a variety of well-being measures.

5. A replication of the present study with a national sample that would include a broader representation of females and minority groups. A sample containing equal numbers of males and females within each of the compared environments is strongly recommended in order to minimize the possibility of deriving results with a gender bias.

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¹²⁴Holland, Making Vocational Choices. A Theory of Vocational Personalities and Work Environments, 55.

APPENDIX A

THE HEXAGON MODEL

PLEASE NOTE

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303, Appendix A

305-311, Appendix B

University Microfilms International

APPENDIX B

THE JOB DESCRIPTIVE INDEX INCLUDING
THE JOB-IN-GENERAL SCALE

APPENDIX C

THE DATA COLLECTION INSTRUMENT

DATA COLLECTION INSTRUMENTPART I: GENERAL DEMOGRAPHIC DATA

Name _____ Date ____/____/1989

Street Address/Other _____

City _____ State _____ Zip Code _____

Social Security Number: _____ - _____ - _____

Gender: ____ Male ____ Female

EDUCATIONAL EXPERIENCE:

1. Indicate the highest level of post-secondary education you have obtained from the selections that follow:

____ Associate's Degree

____ Bachelor's Degree

____ Graduate/Professional School

____ Some College-level Credit

____ Certificate/Diploma

____ Apprenticeship

____ Other (Specify): _____

2. If you completed a bachelor's degree, what was your major field of study? _____
3. If you completed less than a bachelor's degree, what was your major field of study/training? _____

4. Indicate the level of satisfaction you had with your college major/major field of study/training:

____ Very Dissatisfied ____ Satisfied
____ Dissatisfied ____ Very Satisfied
____ Undecided

(Satisfaction Level: major would be selected again)

5. Are you presently enrolled in an educational/training program? ____ Yes ____ No

6. If so, what kind of program? _____

7. Do you have as a goal any further education/training?

____ Yes ____ No

8. If so, what is your goal? _____

OCCUPATIONAL EXPERIENCE:

In the section that follows, "occupation" means the vocation (i.e., electrician, musician, high school teacher, salesperson, bookkeeper) in which you regularly work to earn a living. It is not to be confused with the current specific job that you hold. For example, you may have been a school counselor (your occupation) for 10 years but in your present job at a particular school for only the last 3 years.

1. What is your present occupation? _____

2. How long have you been in your present occupation?
Number of years: _____
3. How closely related is your present occupation to your college major/major field of training?
____ Closely related
____ Somewhat related
____ Unrelated
4. Indicate the level of satisfaction you have with your present occupation:
____ Very Dissatisfied ____ Satisfied
____ Dissatisfied ____ Very Satisfied
____ Undecided
(Satisfaction Level: occupation would be selected again)
5. In what other occupation(s) have you worked? _____

6. What is your current career goal? _____

7. What, if any, other occupation(s) do you think would provide you satisfaction? _____

PART II: THE JOB DESCRIPTIVE INDEX

APPENDIX D

THE INTERVIEW FORMAT AND PROCEDURE USED
TO COLLECT DATA IN 1990

PROCEDURE FOR CALLING RESEARCH STUDY SUBJECTS

- 1 - May I speak with... (Subject's first and last name).
- 2 - Hello. My name is Elizabeth Brackney and I am calling you on behalf of my husband, Ken Brackney, who is a doctoral student at Old Dominion University. Ken is conducting a research project that involves people who attended Freshmen Orientation at Old Dominion University during the summer of 1979. He is working closely with Dr. Dana Burnett, Vice President for Student Services, and Dr. James Calliotte, Director of the University's Counseling Center.
- 3 - According to University records, you attended Freshmen Orientation in the summer of 1979 and filled out a vocational counseling tool called the Self-Directed Search. The research my husband is conducting is based on the data reported by the individuals who took the Self-Directed Search. We need your help to complete the research. I will only need a few minutes of your time.
- 4 - Let me briefly explain the purpose of this research study. We're seeking to gather some educational and career information from former ODU students--like yourself--that may be of use to the University and to these students as well. We believe this information will give important insight into the value of the Self-Directed Search as a useful tool in vocational planning and career counseling.

- 5 - If you agree to help me by answering some general questions, my husband will be glad to send you a summary of the research findings. I think you will find the interview interesting to do. It will cover such things as your educational and occupational experiences since 1979, your assessment of your present work situation, and any career plans you have.
- 6 - Be assured that the information you share with me will be kept confidential. As a matter of fact, all the data collected in this study will be organized into groups and analyzed and reported only in group form.
- 7 - If your willing to help me, let's begin the interview with some general demographic items.

PART I. PLEASE PROVIDE THE INFORMATION REQUESTED.

- 8 - Now let's look at your educational experiences since 1979.
- 9 - The second and last part of the interview is concerned with your occupational experiences.

PART II. [CALLER READS THE DIRECTIONS FOR THE JDI.]

- 10 - Thank you for sharing this information with me.
- 11 - Would you like my husband to send you a summary of his research findings? (If yes, he will send it to you once it has been prepared).

- 12 - If the ODU Counseling Center was to provide you—at no cost to yourself—another Self-Directed Search and a profile of your vocational preferences as derived from it, would you be interested in taking the SDS again?
- 13 - I hope all goes well for you in the future. Thank you again for helping us.
- 14 - Good-by.

APPENDIX E

THE INTRODUCTORY LETTER SENT TO HALF
THE SUBJECTS IN THE PILOT STUDY

_____ 1989

Dear _____,

We need your help! We are conducting a study of alumni and former students of Old Dominion University. This study is part of a dissertation project being done by one of our doctoral students, Mr. Ken Brackney. The purpose of the study is to gather some basic educational and career information from students who took the Self-Directed Search (SDS) while attending Freshmen Orientation at ODU during the summer of 1979. The results of this study will help us determine the best use of the SDS here at Old Dominion in the career counseling and academic advising of our students.

In the next few weeks you will be receiving a call from Mr. Brackney asking you to provide some information related to your college and occupational experience during the last ten years. The phone interview has been designed to make it possible for us to obtain all necessary data while requiring a minimum of your time. Your responses will be very important to the success and value of the study.

A NOTE ON CONFIDENTIALITY

A vital concern of the Darden College of Education and the University's Office of Research and Graduate Studies is the importance of confidentiality in research. Please be assured that your responses will be held in strictest confidence. All the data will be organized, analyzed, and reported by groups of respondents and no attempt will be made to identify or report individual responses.

If you have any questions, please call Mr. Brackney at (804) 423-2027. We will be pleased to send you a summary of the study's results if you desire. Thank you for your time and cooperation.

Sincerely, Dana D. Burnett
Vice President of Student Services

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AUTOBIOGRAPHICAL STATEMENT

Kennard S. Brackney, Sr. was born in Washington, D.C. on January 2, 1938. He was awarded a Bachelor of Science degree by the University of Maryland in College Park, Maryland, in 1966 with a major in Elementary Education and a minor in English. He was awarded a Master of Education degree with a concentration in Education Administration by the University of Maryland in 1971. He was awarded a Master of Divinity degree with a concentration in Biblical Studies by Eastern Baptist Theological Seminary in Philadelphia, Pennsylvania in 1973.

Mr. Brackney entered public education in 1962 as an elementary school teacher with the Board of Education of Anne Arundel County, Maryland. In 1968 he became a Vice Principal of Adams Park Elementary School in Annapolis, Maryland. The following year he became the school's Principal.

Mr. Brackney entered higher education in 1973 when he accepted the positions of Director of Student Personnel Services and Assistant Professor of Biblical Studies and Education with Pinebrook Junior College in Coopersburg, Pennsylvania. In 1980 he became the Director of the Norfolk Extension of Washington Bible College. As a clergyman he

has served pastorates in North Carolina, Maryland, Pennsylvania and Virginia.

While working on his doctorate at Old Dominion University, Mr. Brackney received Special Doctoral Research Assistantships and Special Doctoral Fellowships. For three years beginning in 1986 he assisted the Director of Urban Education Concentration of the Ph.D. Urban Services Program. In 1989 he served the Associate Dean of the Darden College of Education as an academic counselor for military personnel in a master's degree program.

Mr. Brackney was elected to the honor societies of Epsilon Pi Eta (1958, Campbell University, Buies Creek, North Carolina), Kappa Delta Pi (1966, University of Maryland, College Park, Maryland), Phi Delta Kappa (1970, University of Maryland, College Park, Maryland), and Phi Kappa Phi (1988, Old Dominion University, Norfolk, Virginia).