Order Number 9234287

The relationship between the Myers-Briggs Type Indicator and Strong-Campbell Interest Inventory

DeCola, Louis Anthony, Jr., Ph.D.

The University of Akron, 1992

U·M·I
300 N. Zeeb Rd.
Ann Arbor, MI 48106

THE RELATIONSHIP BETWEEN THE MYERS-BRIGGS TYPE INDICATOR AND STRONG-CAMPBELL INTEREST INVENTORY

A Dissertation

Presented to

The Graduate Faculty of The University of Akron

In Partial Fulfillment

of the Requirements for the Degree

Doctor of Philosophy

Louis A. DeCola, Jr.

December, 1992

THE RELATIONSHIP BETWEEN

THE MYERS-BRIGGS TYPE INDICATOR

AND STRONG-CAMPBELL INTEREST INVENTORY

Louis A. DeCola, Jr.

Dissertation

Approved:

Advisor

Faculty Reader

Department Head

Accepted:

Dean of the College

Dean of the Graduate School

August 6, 1992
Date

ABSTRACT

The investigation empirically examined the relationship between the four Myers-Briggs Type Indicator (MBTI) scale scores and selected Strong-Campbell Interest Inventory (SCII) continuous scale scores. Eleven t-tests and three multivariate analyses--discriminant function, canonical correlation and Q factor--were used to determine the extent to which the MBTI is related to Holland codes. Holland codes, which are measured by the SCII, comprise an established vocational criterion.

The archival data were taken from the University of Maryland Career Development Center. One hundred and eighty six subjects who were enrolled in college participated.

Results of the investigation showed MBTI types were not good predictors of Holland codes and that across all three of the multivariate analyses, two MBTI scale scores were related to the SCII and predicted SCII scores at a statistically significant level. The MBTI Sensing-Intuition (S-N) scale showed the strongest association with and ability to predict Holland codes. The Extraversion-Introversion (E-I) scale also was significant in its relation to the SCII and ability to predict Holland codes. This would mean that (1) one's preferred way of becoming

aware (S-N), and (2) sociability (E-I), are statistically related to vocational interests.

The results were consistent with previous research investigating the relationship between the MBTI and SCII in finding significant, yet weak relationships. The results also supported the belief held by a majority of vocational psychologists that personality variables and vocational interests are related. The major implications from this investigation were that the MBTI could augment, but not replace the SCII in career counseling and that only the MBTI E-I and J-P scales ought to be used in career counseling. It was recommended that future research replicate the present investigation using samples of both sexes and a wider age range; pool the three major scales on the SCII as criterion variables on the discriminant function analysis; use Holland codes to predict MBTI dimensions; further research the MBTI S-N and T-F scales in order to identify what the scales measure; and, determine whether using the MBTI was efficacious in career counseling.

DEDICATION AND ACKNOWLEDGEMENT

I dedicate this Dissertation to my grandfather, the late Ralph Penna and my parents, Louis and Virginia DeCola. I wish to thank all of the members of my Dissertation Committee for helping me to complete this project: Drs. Steiner, Weis, Murphy, Blackwood, Zarski and Sipps. Finally, I would like to thank the following people for their support: Drs. Steiner, Subich, and Weis of The University of Akron, and Drs. Thomas and Brewster of The Child and Adolescent Service Center in Canton, Ohio where I did my internship, and Betty Lytle.

TABLE OF CONTENTS

TABLE OF CONTENTS

TABLE OF CONTENTS Page

TABLE OF CONTENTS Page

LIST OF TABLES

LIST OF TABLES

LIST OF TABLES

LIST OF TABLES

CHAPTER I

THE PROBLEM

Introduction

The majority of vocational counseling psychologists agree that vocational interests and personality traits are related (Zagar, Arbit, Falconer and Friedland, 1983). From a research perspective, however, a review of studies of the relationships between personality dimensions and vocational interests suggests that most personality scales do not exhibit substantial associations with interest scales (Nelson, 1987). A review of studies examining the relationship between personality dimensions and vocational interests has shown the relationship between the two variables to be weak (e.gs., Costa, McCrae, & Holland, 1984; Martin & Bartol, 1986; and Zagar, Arbit, Falconer, & Friedland, 1983; and Nelson, 1987).

Research on the Myers-Briggs Type Indicator (MBTI) and Strong-Campbell Interest Inventory (SCII) (e.gs., Dillon & Weissman, 1987; Gryskiewicz and Vaught, 1975, cited in Myers & McCaulley, 1985; Kauppi, 1981; Lacy, 1984, cited in Myers and McCaulley, 1985; Moore, 1983; Nelson, 1987; Velsor & Campbell, 1984, cited in Myers and McCaulley, 1985) has also shown relationships between the two instruments to be

weak (see Healy, 1989a; Nelson, 1987). However, the MBTI Manual (Myers and McCaulley, 1985) presents data showing that MBTI scores are often statistically related to several widely used career counseling instruments at $p < .05$ or lower; suggests that the MBTI is a useful career counseling instrument; and describes individuals' strengths and weaknesses as related to career behavior. Further research is needed to clarify the extent to which both personality dimensions and vocational interests are related and whether the MBTI is related to vocational counseling instruments such as the SCII.

Many issues have been raised in the vocational literature by both Healy (1989a; 1989b) and Carlson (1989a; 1989b) regarding the appropriateness of the routine use of the MBTI in counseling. Healy (1989a) has recommended against the routine use of the MBTI. Healy suggests that research using the MBTI is needed to substantiate claims that it 1) improves client decision-making and career planning; 2) assists in prescribing counselors or treatments (1989b); 3) helps anticipate growth; or 4) promotes development. Healy (1989a) also has stated that the use of the MBTI in conjunction with other instruments must be considered experimental until it is clearly known how the MBTI is related to those instruments.

In contrast, Carlson (1989a; 1989b) supports the routine use of the MBTI in counseling. Although Carlson

(1989a) called for longer test-retest reliability studies and more research on convergent validity, the author praised recent positive criterion based research in spite of being mostly unsystematic in theory; noted the increase of methodological sophistication in some studies; and pointed out that more studies have focused on dimensions other than the Extraversion-Introversion (E-I) scale. Carlson (1989b) additionally noted that the MBTI seems reliable on at least three of its scales and concluded that the MBTI is ready for cautious and prudent routine use. While Carlson and Healy disagree over the routine use of the MBTI in counseling, both have called for continued research. Carlson (1989a) wrote: "New statistical approaches to the MBTI may have the potential for disclosing uses and relationships not hitherto revealed." (p. 486)

In summary, further research examining the relationship between the MBTI and SCII is needed. Such research can both clarify the strength of any relationships between the two instruments and help determine whether the MBTI is useful in career counseling.

Purpose of the Study

The MBTI is being used in career counseling routinely even though few research investigations have either pointed to the efficacy of the MBTI or showed that it is strongly related to the SCII, an established vocational criterion test (Healy, 1989b). Previous research has

directly examined the relationship between the SCII and MBTI (Dillon & Weissman, 1987; Gryskiewicz and Vaught, 1975, cited in Myers and McCaulley, 1985; Kauppi, 1981; Lacy, 1984, cited in Myers and McCaulley, 1985; Moore, 1983; Nelson, 1987; and Velsor & Campbell, 1984, cited in Myers and McCaulley, 1985). For example, Nelson (1987) investigated only two of the four MBTI scales and their relationship to the SCII using multivariate analysis of variance and discriminant function analysis. Kauppi (1981) examined all four MBTI scales and their relationship to the SCII using multiple regression analyses. But Kauppi (1981) also included sex, the Rod-and-Frame Test results, and the Embedded Figures Test results. No studies to date have either investigated the MBTI types or solely researched the relationship between continuous scores of each of the four MBTI scales and how they relate to interest preferences as measured by SCII continuous score scales using multivariate analyses. Analyses on the eight MBTI types and the four separate MBTI scales and the SCII would determine whether the MBTI is strongly related to an established vocational criterion test, the SCII.

The Statement of the Problem

The problem was to investigate the relationship between MBTI types and selected SCII scores and each of the four continuous scale scores on the MBTI and selected SCII scores. Three multivariate analyses and eleven t-tests were

used to determine the relationship between the MBTI and Holland codes. The multivariate analyses consisted of canonical correlation, discriminant function, and Q factor analysis.

The MBTI continuous scale scores consist of Extraversion-Introversion (E-I), Sensing-Intuition (S-N), Thinking-Feeling (T-F), and Judging-Perceiving (J-P) scales, all of which purportedly measure personality dimensions. The SCII continuous scale scores consist of the General Occupational Themes (GOT), Basic Interest Scales (BIS), and a subset of the Occupational Interest Scales (OIS). The OIS subset consisted of all (N = 74) pure, single-letter Holland codes (e.gs., Enterprising: Personnel Director, Female; Enterprising: Elected Public Official, Male). For both male and female subjects in this study, all OIS single-letter Holland codes (male and female) were used. The SCII continuous scale scores were converted to single-letter Holland codes as indicated in the SCII manual (see Hansen & Campbell, 1985). For the discriminant function analyses, a Holland code was assigned by taking the highest mean score from all of the Holland code scores on the GOT; BIS; and OIS subset, respectively.

General Hypothesis

The MBTI and SCII each measure overlapping personality dimensions. Therefore, the two instruments are statistically related. The MBTI continuous scale scores and

MBTI types are related to and can predict Holland codes, which are derived from SCII scores.

Delimitations

Archival data taken from the University of Maryland were used in this study. The subjects were college students who had taken both the MBTI and SCII in either 1988 or 1989.

Definitions of Terms

Abbreviations are used throughout this dissertation. Table 1 is comprised of MBTI abbreviations (Myers & McCaulley, 1985; see Table 1). The abbreviations are comprised of the first letter of the actual words that they stand for except for the word "intuition" in which N is the abbreviation. The abbreviations consist of a psychometric instrument (MBTI) and dichotomous scale classifications that are measured by the MBTI.

The MBTI consists of four personality scales that measure extraversion-introversion (E-I), thinking-feeling (T-F), sensing-intuition (S-N), and judgement-perception (J-P). The latter scale determines whether a rational function (T or F) or an irrational function (S or N) predominates in individual with a dichotomous scale classification of both one's inner and outer world. If extraverted, judgement (J) signifies that a rational function predominates in the outer world and perception (P) signifies

Table 1

Myers-Briggs Type Indicator Abbreviations

Abbreviations	Terms
MBTI	Myers-Briggs Type Indicator
E	Extraversion
I	Introversion
S	Sensing
N	Intuition
T	Thinking
F	Feeling
J	Judging
P	Perceiving

that an irrational function predominates in the outer world. If introverted, perception (P) signifies that a rational function predominates in the outer world and judgement (J) signifies that an irrational function predominates in the outer world. An individual's score on each of the four scales can be converted to a dichotomous scale classification of either 1) E or I; 2) T or F; 3) S or N; or 4) J or P. The dichotomous scale classifications can be combined to yield eight MBTI types (see Myers & McCaulley, 1985). For example, an INTJ or INFJ would habitually prefer to use the irrational function of intuition (N) when socially interacting with people in contrast to the rational function

of thinking (T). This person would tend to perceive patterns in others' behavior instead of determining the logical cause and effect of others' behavior.

Table 2 is comprised of SCII abbreviations (Hansen & Campbell, 1985; see Table 2). The abbreviations are comprised of the first letter of the word being represented.

Table 2

Strong-Campbell Interest Inventory Abbreviations

Abbreviations	Terms
SCII	Strong-Campbell Interest Inventory
GOT	General Occupational Themes
BIS	Basic Interest Scales
OIS	Occupational Interest Scales
R	Realistic Holland Code
I	Investigative Holland Code
A	Artistic Holland Code
S	Social Holland Code
E	Enterprising Holland Code
C	Conventional Holland Code

The abbreviations consist of a psychometric instrument (SCII), the three main scales of the SCII (i.e. GOT, BIS, and OIS) and the six Holland codes (R, I, A, S, E, C) that are measured on each of the three main scales.

The genesis of the eight MBTI Typology abbreviations came from Jung (1971). He delineated that there are four functions (thinking, feeling, sensation, and intuition) which combine with an attitude (extraversion or introversion) to form eight function types. Listed below are the eight MBTI typology abbreviations (Myers & McCaulley, 1985).

There are eight possible function combinations which could vary in conscious strength/differention/development (Jung, 1971). If thinking is the conscious, primary function, for example, it can be allied with sensation or intuition which

> . . . are functions of perception, affording welcome assistance to thought. But as soon as they reached the same level of differentiation as thinking, they would bring about a change of attitude which would contradict the whole trend of thinking. They would change the judging attitude into a perceiving one; whereupon the principle of rationality indispensable to thought would be suppressed in favour of the irrationality of perception. (p. 406)

Additionally, each of the possible function combinations are oriented in an extraverted or introverted manner, forming sixteen possible dynamic combinations. While there are sixteen possible dynamic combinations, Jung was clear (Jung, 1971) in delineating that there are only four possible function-types (thinking, feeling, sensation, and intuition) which combine with an attitude-type to form eight function-types. In contrast, the MBTI (Myers & McCaulley, 1985) yields sixteen types based on all possible dichotomous bipolar combinations of its four scale dimensions.

The Eight MBTI Types

1. Extraverted Thinking Types (ENTJ, ESTJ): Individuals whose MBTI scores place them in dichotomous type classifications of Extraverted, Thinking, and Judging.

2. Introverted Thinking Types (INTP, ISTP): Individuals whose MBTI scores place them in dichotomous type classifications of Introverted, Thinking, and Perceiving.

3. Extraverted Feeling Types (ENFJ, ESFJ): Individuals whose MBTI scores place them in dichotomous type classifications of Extraverted, Feeling, and Judging.

4. Introverted Feeling Types (INFP, ISFP): Individuals whose MBTI scores place them in dichotomous type classifications of Introverted, Feeling, and Perceiving.

5. Extraverted Sensing Types (ESTP, ESFP): Individuals whose MBTI scores place them in dichotomous type classifications of Extraverted, Sensing, and Perceiving.

6. Introverted Sensing Type (ISTJ, ISFJ): Individuals whose MBTI scores place them in dichotomous type classifications of Introverted, Sensing, and Judging.

7. Extraverted Intuitive Types (ENTP, ENFP): Individuals whose MBTI scores place them in dichotomous type classifications of Extraverted, Intuitive, and Perceiving.

8. Introverted Intuitive Types (INTJ, INFJ): Individuals whose MBTI scores place them in dichotomous type classifications of Introverted, Intuitive, and Judging (Jung, 1971).

CHAPTER II

REVIEW OF THE LITERATURE

Introduction

In order to acquaint the reader with relevant background literature, the following areas are reviewed in this chapter: Holland's Theory, Jung's Typology, and studies examining the relationship between the Myers-Briggs Type Indicator and Strong-Campbell Interest Inventory.

Holland's Theory

In a review of the career counseling field, Weinrach (1985) stated: "Holland's theory and its instrumentation are among the most widely used, if not the most widely used today by researchers and counselors alike" (p. 79). The theory has been supported by numerous positive research results (see Holland, 1985; Weinrach, 1985).

Holland's most recent formulation (Holland, 1985), which closely parallels an earlier summary (Holland, 1973) has four basic assumptions. First, most individuals in our culture can be classified as being one of six types: realistic, investigative, artistic, social, enterprising, or conventional. Second, there are six same named environments in which a certain personality type predominates and in

which certain problems and opportunities are present. Third, people seek out environments that will allow them to use both their skills and abilities, express their attitudes and values, and to assume agreeable problems and roles. Finally, behavior is determined by an interaction between both personality and environment.

Holland (1985) listed several secondary assumptions which add to the theory. The secondary assumptions ". . . moderate or qualify predictions or explanations that are derived from main concepts" (p. 4). The secondary assumptions are called consistency, differentiation, identity, congruence, and calculus. Consistency is the relatedness between environmental models or the personality types. The degree of consistency affects vocational preference. A person is more predictable with regard to career behavior if type codings are more similar or related. Differentiation is the degree to which a person or environment resembles a pure type. A person or environment resembling many types is undifferentiated. Identity is the extent to which a person possesses a stable and clear picture of talents, goals, and interests; for an environment it is the extent to which it has stable, long-term clearly defined rewards, tasks, and goals that are integrated. Congruence is the degree to which there is a match between a personality type and environment. If opportunities and rewards in an environment do not correspond to the preferences and abilities of a person,

incongruence occurs (e.g., an Investigative type in an Enterprising environment). Finally, calculus refers to the fact that types or environments can be placed on a hexagon in which the distances are negatively related to the similarity between types or environments. Calculus determines consistency in either a person's personality pattern or an environment and the degree of congruence between person and environment.

Important background principles in the theory that Holland noted were that vocational choice expresses personality; an interest inventory is a personality inventory; stereotypes of vocations are important and reliable both in a sociological and psychological sense; and people in a vocation have both similar personal development histories and similar personalities (Holland, 1985). Because people with similar personalities occupy certain vocations, interpersonal environments differ. Finally, congruence between personality and work environment determines achievement, stability, and vocational satisfaction.

Holland wrote:

> A type is a model against which we can measure the real person . . . each type has a characteristic repertoire of attitudes and skills
> . . . Different types select and process information in different ways . . . By comparing a person's attitudes with those of each model type, we can determine which type he or she most resembles. That model becomes a person's personality type. Then we can also determine what other types a person resembles. (pp. 2-3)

Holland Personality Types (Holland, 1985) consist of Realistic (R), Investigative (I), Artistic (A), Social (S), Enterprising (E), and Conventional (C). The R type prefers to manipulate objects, tools, machines, or animals and dislikes educational or therapeutic activities. The I Type prefers endeavors involving creative, observational, symbolic, and systematic examination of biological, cultural, and physical facts or events to both understand and control such facts or events. The I type dislikes persuasive, repetitive, or social activities. The A type prefers ambiguous, free, unsystematized behaviors that involve manipulating human, physical, or verbal materials and dislikes explicit, ordered, and systematic activities. The S type prefers activities involving manipulation of others to cure, develop, enlighten, inform, or train them and dislikes explicit, ordered, and systematic activities involving machines, materials, or tools. The E type prefers behaviors that entail manipulating others for either economic gain or organizational goals and dislikes observational, symbolic, and systematic activities. The C type prefers structured behaviors that involve explicit, ordered, and systematic data manipulation and dislikes ambiguous, exploratory, free, and unsystematic activities.

Holland types approximate Guilford's comprehensive factor analysis of human interest: mechanical, scientific,

social welfare, clerical, business, and aesthetic (Holland, 1966). Holland stated that Guilford's factor analysis is the most explicit forerunner of his typology (Holland, 1966). The origins of Holland's six occupational categories (Holland, 1966) came from his experience as a vocational counselor; constructing a personality inventory from interest material; and reviewing the vocational literature, especially factor analytic studies of personality and vocational interests.

A person's personality type (Holland, 1985) can be assessed by qualitative methods of vocational training or vocational choice, vocational aspirations prior to employment, and work history; quantitative methods of personality and interest inventories; or combinations of these. Holland (1985) mentioned three instruments which can measure types: The Vocational Preference Inventory, Self-Directed Search, and the six theme scales of the Strong-Campbell Interest Inventory. Holland (1985) provided only one explicit definition of determining personality type, however. The six scales of the Vocational Preference Inventory (Realistic, Intellectual, Social, Conventional, Enterprising, and Artistic) are both scored and profiled with a higher scale score meaning a closer resemblance to the type corresponding to the scale.

> The highest score represents a person's personality type; the profile of scores (obtained by ranking the scale scores from highest to lowest) represent the personality pattern. (p. 23)

(There are other instruments which estimate Holland code types, such as the Sixteen Personality Factor Questionnaire and Kuder Occupational Interest Profile.) Additionally, (Holland) code types (Realistic [R], Investigative [I], Artistic [A], Social [S], Enterprising [E], and Conventional [C]) can be measured by rank ordering highest scores from the SCII General Occupational Themes, Basic Interest Scales, and Occupational Scales, with up to a three letter code (e.g., IAS) being determined on each of the three scales (see Hansen & Campbell, 1985).

As mentioned previously, Holland's theory has been supported by numerous research articles. Spokane's monograph (1985) reviewed research on person-environment congruence in Holland's career choice theory. He wrote:

> Correlational studies consistently show significant positive relationships between congruence and academic performance and persistence, job satisfaction, stability of choice, perceived congruence, and personality, but nonsignificant relationships between congruence and self-concept or sociability. (p. 306)

Holland (1985) has provided a cognitive-behavioral explanation to account for how people develop. The most salient weakness in the theory appears to be that it does not adequately account for personality development (Brown, 1985).

> Since personality development has not really been discussed, it is not surprising that Holland has not commented on how problematic personality patterns can be altered. Failure to address the development and change of personality stands as a glaring omission as the theory now stands. (p. 322)

Weinrach (1985) wrote:

> The fact remains that although Holland's theory of vocational choice is predicated on the assumption that vocational choices are a function of one's personality, it does not explain in great detail how personalities develop or can be changed. (p. 78)

Additionally, career decision problems are not looked at from a psychological perspective and Holland's theory offers little help to the person who is unable to make a career choice because of psychological dysfunction (Brooks, 1985).

Holland's theory does not emphasize developmental aspects of career choice. The trait-factor approach of Holland's has the goal of helping a person find a match between personality and work environment. If a person had a "personality dysfunction" the theory would suggest a change of environment versus a change of the person.

In summary, Holland's theory of career choice is well defined and has been supported by research. However, it is especially weak in explaining development of personality, helping those with personality dysfunction, and looking at career decision problems from a psychological perspective. Holland's theory helps a person match personality to a work environment and therefore does not focus on personality change issues.

Jung's Typology

The personality theory of Carl Jung is a comprehensive, biologically oriented, dynamic, in-depth analysis of the individual. The theory addresses certain basic,

consistent differences in the way people approach life. These intrapsychic differences were outlined in Psychological Types (Jung, 1971).

The original purpose of Jung's Psychological Typology was to reduce the chaos of individual experiences into order; to understand the variability among people; and assist the clinician, via self knowledge, to help clients (Jung, 1971). Jung (1971) also believed that conflicts could be helped by recognizing the existence of the different attitude-types and realizing that people cannot totally understand another attitude-type.

The MBTI was developed to make Jung's theory of psychological types both understandable and useful in people's lives (Myers & McCaulley, 1985). A description of Jung's Typology as presented by both Jung (1971) and the MBTI Manual (Myers & McCaulley, 1985) is presented in the appendix (see Appendix A).

Jung described people's behavior based on combinations of Attitudes (Extraversion-Introversion), Rational Functions (Thinking-Feeling), Irrational Functions (Sensing-Intuition), and whether the Rational or Irrational Function was dominant. Jung's Psychological Typology can be clearly taxonomized as being prescientific (see Cattell & Kline, 1977), being grounded, in 20 years of clinical observations as a physician (Jung, 1971).

Jung (1971) defined a type as:

> . . . a specimen or example which reproduces in a characteristic way the character of a species or class. In the narrower sense used in this particular work, a type is a characteristic specimen of a general attitude (q.v) occurring in many individual forms. From a great number of existing or possible attitudes I have singled out four; those namely, that are primarily oriented by the four basic psychological functions (q.v): thinking, feeling, sensation, intuition (qq.v). When any of these attitudes are habitual, thus setting a definite stamp on the character of an individual (q.v), I speak of a psychological type . . . In my previous contributions to typology I did not differentiate the thinking and feeling types from the introverted and extraverted types, but identified the thinking type with the introverted, and the feeling type with the extraverted. But a more thorough investigation of the material has shown me that we must treat the introverted and extraverted types as categories over and above the function-types. (pp. 482-483)

The types were described as being continuous (a person can have more or less of an attitude or function) instead of discrete or dichotomous in nature. Additionally, the attitudes (extraversion/introversion) and functions (thinking/feeling and sensation/intuition) were described as being three respective pairs, both opposing and mutually excluding one another (i.e., bipolar in nature).

> This opposition, however, is not perceived as a conflict so long as the conscious attitude is not too one-sided and not too remote from that of the unconscious. (Jung, 1971, p. 522)

> One mechanism will naturally predominate, and if this condition becomes in any way chronic a type will be produced; that is, an habitual attitude in which one mechanism predominates permanently, although the other can never be completely suppressed since it is an integral part of the psychic economy. Hence there can never be a pure type in the sense that it possesses only one mechanism with the complete atrophy of the other. A typical attitude is merely the relative preponderance of one mechanism. (Jung, 1971, p. 6)

In summary, Jung's Typology summarizes basic, consistent ways people approach life. There are eight basic function types which are derived from whether a person is introverted or extraverted and which of the four functions is used relatively more. A person's psychological type influences development. The MBTI measures Jung's Typology and was constructed to make Jung's theory of psychological types both understandable and useful in people's lives (Myers & McCaulley, 1985).

Studies Examining the Relationship Between the Myers-Briggs Type Indicator and Strong-Campbell Interest Inventory

The majority of vocational counseling psychologists agree that vocational interests and personality traits are related (Zagar, et al., 1983) thereby providing a basis for the correlational studies between personality dimensions and vocational interests. The MBTI measures personality dimensions. The SCII measures vocational interests. Research investigating the relationship between the MBTI and SCII was found mainly in the MBTI Manual (Myers & McCaulley, 1985) and in dissertations. Only two studies used multivariate analyses (i.e., Kauppi, 1981 and Nelson, 1987). Kauppi (1981) examined the relationship between the MBTI (Form G) and SCII (Form T325) continuous scores on the "Holland Occupational Theme Scales" (i.e. GOT) using 134 volunteer subjects (60 male, 74 female) who were enrolled in college. The mean age was 20.5 years; the mean GPA was 3.5 versus the

mean GPA of 2.4 of the entire college population where Kauppi conducted his investigation.

Both dichotomous and continuous scores were used and the results were similar. When MBTI continuous scale scores were used along with the Rod-and-Frame Test, Embedded Figures Test and sex scores as predictor variables, the multiple R^2 values ranged from .07 to .28. Since R^2 represents an estimation of the proportion of variance in the criterion accounted for by the independent variables (i.e., sex, Embedded Figures, Portable Rod-and-Frame, and the four MBTI indices), the MBTI variables do not appear to account for much variance. Semi-partial correlations from multiple regression analyses showed that E was significantly correlated with both Social ($p < .01$) and Enterprising ($p < .05$) Themes; N was significantly correlated with the Artistic Theme ($p < .01$); S was significantly correlated with the Conventional Theme ($p < .01$); F was significantly correlated with the Social Theme ($p < .01$); J was significantly correlated with the Conventional Theme ($p < .01$); and P was significantly correlated with the Realistic ($p < .05$) and Artistic Themes ($p < .05$).

Moore (1983) tested 147 (88 female and 59 male) University of Maryland undergraduates enrolled in a career course, giving them both the MBTI and SCII (forms not reported). He found "significant overlap" between the two instruments using dichotomous type classifications.

Forty-eight percent of Conventional types were dominant S; 72% were either ST or SF; and only 5% of Artistic types were dominant S types. Seventy-three percent of Investigative types were also N types. Additionally, 41% of NT's were in the Artistic theme category, while 56% of NF's were classified as also being either Artistic or Social.

The MBTI Manual (Myers and McCaulley, 1985) reports product-moment correlations of MBTI continuous scores with the SCII. The correlations were reportedly done from three separate data sources: Gryskiewicz and Vaught, (1975, cited in Myers & McCaulley, 1985); Lacy (1984, cited in Myers & McCaulley, 1985); and Velsor and Campbell (1984, cited in Myers & McCaulley, 1985). The data sources and results, all obtained from the 1985 MBTI Manual, are discussed below.

Lacy's sample consisted of 912 males and 848 females who entered Franklin and Marshall College in 1980, 1981, 1982, and 1983. Results, reported separately for males and females, included the SCII General Occupational Themes, Basic Interest Scales, Occupational Scales, and Academic Comfort and Introversion-Extraversion Scale for a total of 896 correlation coefficients. Velsor and Campbell's sample consisted of 1,228 participants, most of whom were managers in business organizations in Leadership Development Programs from 1979-1983 at the Center for Creative Leadership in Greensboro, North Carolina. Basic Interest Scale, Academic Comfort, and Introversion-Extraversion scores were reported,

totaling 100 correlation coefficients. Finally, Gryskiewicz and Vaught's sample consisted of 157 male and female participants in a Creative Leadership Development Program in Greensboro, North Carolina. SCII General Occupational Themes, Academic Comfort, and Introversion-Extraversion scores were reported, totaling 32 correlation coefficients.

Results across each of these studies yielded significant findings of $p < .05$ and $p < .01$. However, none of the studies accounted for alpha-error build-up, thereby rendering the numerous significant correlations difficult to interpret.

MBTI I scores were positively associated with SCII Introversion and Investigative code scores and negatively associated with Social and Enterprising code scores. MBTI N scores were positively associated with SCII Investigative and Artistic code and Academic Comfort scores and negatively associated with Enterprising and Conventional code and Introversion scores. MBTI F scores were positively associated with Artistic and Social SCII code scores and negatively associated with Investigative and Introversion scale scores. And finally, MBTI P scores were positively associated with Artistic code scores and negatively associated with Investigative and Conventional code scores. Overall, the MBTI N code scores appeared to be the most discriminating among occupational interests on the SCII. (The reader is referred to the Instruments section in Chapter Three for

descriptions of further studies and analyses examined in the 1985 MBTI Manual on the aforementioned data as well as data from additional samples.)

Nelson (1987) examined the personality type theory of Myers and Briggs that states that the four function combinations (S-T, S-F, N-F, and N-T) are especially important in vocational choice with the S-N dimension considered to be the most important. E-I and J-P are postulated to be an important vocational influence only once a vocational field is chosen. The SCII, 1981 version form T325 (SVIB-SCII; Campbell & Hansen, 1981) and MBTI form G (MBTI; Myers & McCaulley, 1985) were administered to 260 male and 278 female introductory psychology students as part of Nelson's (1987) dissertation research. Analyses included multivariate analysis of variance and discriminant function analysis. Results

> . . . provided weak evidence in support of Myers and Briggs four personality types as they relate to vocational interests. The evidence does not support using MBTI results to predict interests or using SCII results to predict personality type within college populations. (Nelson, 1987, Abstract)

Nelson explained that

> . . . the four Myers' and Briggs' personality types represent broad constructs and that the interests of individuals in any type category may be expected to be varied rather than uniform. Therefore, in applied settings (especially college settings) caution is indicated for counselors tempted to make predictions about vocational interests from personality type or vice versa. (p. 303)

Interestingly, the S-N dimension was found to be the "most powerful" dimension in discriminating interests of the four groups. Nelson suggested that future research ought to focus on the S-N dimension since it repeatedly appeared to account for differences in interests; in conjunction with the E-I dimension since her review of the literature indicated that this dimension ". . . may be the personality dimension most strongly related to vocational interests" (p. 302). No suggestion was made, however, to examine the entire MBTI profile and how it relates to vocational interests.

Dillon and Weissman (1987) calculated Pearson correlation coefficients on the SCII Form T325 Occupational Scales scores and MBTI Form F continuous scores. Additionally, within each of the six Holland occupational categories of the Occupational Scales, they computed percentages of the scales which were significantly correlated with MBTI continuous scale scores ($p < .05$). Participants were 394 male and female students attending California State University, Sacramento who were tested on campus during the 1983-84 academic year. They came to testing centers for career counseling services, asked for vocational tests, and were given both instruments.

Six hundred sixty-eight Pearson correlation coefficients were listed, with .49 being the largest.

Two consistent relationships across sexes emerged. N was positively related to Artistic Theme scores (range: .08 to .34) and I was negatively related to Enterprising Theme scores (range: -.03 to -.44). Categories were designated as having an "Agreement over 50%" of significant correlations ($p < .05$), making use of MBTI continuous scale scores and Occupational Scales. Realistic SCII scales were in agreement with Sensing and Thinking MBTI Scales, for men only. Investigative SCII scales were in agreement with Intuition and Thinking MBTI Scales, for women only. Artistic SCII scales were in agreement with Intuition (both sexes) and Perceptive (both sexes) and Feeling (men only) MBTI Scales. Social SCII scales were in agreement with Extraversion (both sexes), Intuition (women only), Feeling (men only), and Perceptive (women only) MBTI Scales. Enterprising SCII scales were in agreement with Extraversion (both sexes) and Thinking (women only) MBTI Scales. And finally, Conventional SCII scales were in agreement with Extraversion (men only), Sensing (both sexes), and Judging (both sexes) MBTI Scales.

The studies reviewed here suggest that the MBTI and SCII are related in predictable ways at the individual scale level. However, none of the studies solely examined each of the four separate MBTI dimension continuous scale scores using multivariate analyses and how they relate to SCII continuous scale scores.

Summary

Holland's theory of career choice is presently the predominant career counseling theory, being supported by numerous research endeavors. The MBTI was developed to measure Jung's Typology. Studies examining relationships between the MBTI and SCII have resulted in statistically significant and predictable findings. However, Nelson's (1987) multivariate investigation, which only looked at S-N and T-F MBTI dimension combinations, found weak relationships between the MBTI and SCII. Kauppi's (1981) multiple regression equations, which included the MBTI and three additional variables, found that MBTI variables plus the three additional variables only accounted for variance ranging from .07 to .38 when Holland scales (GOT) were criterion variables. No studies have solely examined each of the four separate MBTI continuous scale scores and how they relate to vocational interests on the SCII using multivariate analyses.

CHAPTER III

PROCEDURES

Introduction

The following topics are presented in this chapter: Restatement of the problem, research design, method (setting, subjects, instruments, data collection) statistical analysis, variables, hypotheses, and limitations of the study.

Restatement of the Problem

The problem was to investigate the relationship between MBTI types and selected SCII scores and each of the four continuous scale scores on the MBTI and selected SCII scores. Three multivariate analyses and eleven t-tests were used to determine the relationship between the MBTI and Holland codes. The multivariate analyses consisted of canonical correlation, discriminant function, and Q factor analysis.

The MBTI continuous scale scores consist of Extraversion-Introversion (E-I), Sensing-Intuition (S-N), Thinking-Feeling (T-F), and Judging-Perceiving (J-P) scales, all of which purportedly measure personality dimensions. The SCII continuous scale scores consist of the General

Occupational Themes (GOT), Basic Interest Scales (BIS), and a subset of the Occupational Interest Scales (OIS). The OIS subset consisted of all (N = 74) pure, single-letter Holland codes (e.gs., Enterprising: Personnel Director, Female; Enterprising: Elected Public Official, Male). For both male and female subjects in this study, all OIS single-letter Holland codes (male and female) were used. The SCII continuous scale scores were converted to single-letter Holland codes as indicated in the SCII manual (see Hansen & Campbell, 1985). For the discriminant function analyses, a Holland code was assigned by taking the highest mean score from all of the Holland code scores on the GOT; BIS; and OIS subset, respectively.

Research Design

An ex post facto research design was used in this study. In ex post facto research, the researcher cannot directly control/manipulate independent variables (Kerlinger, 1973). MBTI scores of individuals are the independent variables. MBTI scores could not be controlled or assigned because they represent relatively intact personality dimensions. Three major weaknesses of ex post facto research are the inability to manipulate independent variables, the lack of power to randomize, and the risk of improper interpretation (Kerlinger, 1973). Causal statements, therefore, are not permissible on the basis of the experimental design alone. A further weakness is that

individuals in this study were not randomly selected: the subjects were all enrolled at a single state university. Generalizing to other populations, therefore, is limited by the characteristics of the sample.

Method

Setting

All subjects were enrolled in an undergraduate career development course entitled "EDCP 108 D: Career Planning and Decision-Making" at the University of Maryland at College Park during either the Fall, 1988 (N = 62; 33.3%); Spring, 1989 (N = 76; 40.9%) or Fall, 1989 (N = 48; 25.8%) semester. The course was offered through the Counseling and Personnel Services Department. The syllabus specified that students take the MBTI during the first class period and the SCII be taken in the "Testing Center" during the first week of classes. Students additionally completed the Career Development Center (CDC) form on the first day of class. The CDC provided this investigator with demographic information.

Subjects

The sample was an archival one taken from The University of Maryland Career Development Center. One hundred eighty-six subjects participated, of which 115 (61.8%) were female and 71 (38.2%) were male. The age range was 17-47 years (M = 19.7; SD = 2.71, positively skewed: 6.47). The overwhelming majority of the subjects were

between the ages of 18 and 21 years (89.3%). Only two subjects were older than thirty (see Table 3). The class standing composition consisted of 40 (21.5%) Freshmen; 77 (41.4%) Sophomores; 21 (11.3%) Juniors; 7 (3.8%) Seniors; 39 (21%) did not specify; and 2 (1.1%) subjects' data were missing (i.e., the CDC form was missing). Racially, 107 (57.5%) were Caucasian/White Americans; 23 (12.4%) were Black/African Americans; 7 (3.8%) were Oriental/Asian Americans; 3 (1.6%) were Spanish Surname; 2 (1.1%) were other (of which one person specified "Indian"); 42 (23.7%) of the subjects did not specify their race; and 2 (1.1%) persons' demographic data were missing (i.e., the CDC form was missing).

Instruments

The Strong-Campbell Interest Inventory

The Strong-Campbell Interest Inventory measures Holland types and codes via examining interests. It is comprehensive and thorough; exhibits good to excellent psychometric qualities including good predictive validity; and is frequently used by career counselors (see Hansen & Campbell, 1985). Reviews have been quite favorable. In the Mental Measurement Yearbook Layton (1985) recommended its use in both counseling and research. Likewise, Westbrook (1985) commented that it has been extensively researched (1,578 entries) and concluded: "This reviewer agrees with

Table 3

Ages of Individuals for the Entire Sample (N = 186).

AGE	FREQUENCY	PERCENT
17	2	1.1
18	44	23.7
19	72	38.7
20	32	17.2
21	18	9.7
22	7	3.8
23	4	2.2
24	2	1.1
25	1	0.5
26	2	1.1
33	1	0.5
47	1	0.5

others who have said the SCII is probably the best interest-inventory available" (p. 1483). However, Kline (1983) noted that criterion-keyed tests such as the Strong Interest Blank do not offer psychological knowledge or insight. The ensuing SCII information, including both the validity and reliability sections, was taken from the manual (Hansen & Campbell, 1985).

At present, the SCII (FORM T 325) contains 325 items to ascertain the person's interests that include

> . . .occupations, occupational activities, hobbies, leisure activities, school subjects, and types of people. The respondent is asked to indicate 'like', 'indifferent', or 'dislike' in response to the items; the answers are then analyzed by computer (the SCII cannot be scored by hand) to derive scores on 264 scales. (Hansen & Campbell, 1985, p. 1)
>
> The Strong gives the respondent five main types of information; first, scores on Six General Occupational Themes, which reflect the respondent's overall occupational orientation; second, scores on 23 Basic Interest Scales, which report consistency of interests or aversions in 23 specific areas, such as art, science, or public speaking; third, scores on 207 Occupational Scales, which indicate degree of similarity between the respondent's interests and the characteristic interests of women and men in a wide range of occupations; fourth, scores on two Special Scales that measure introversion-extraversion and degree of comfort in an academic environment; and fifth, 26 Administrative Indexes that help to identify invalid or unusual profiles. (p. 1)

All items are weighted +1, 0, and -1. The GOT, BIS, and OIS each have a mean of 50 and standard deviation of 10.

The manual (Hansen & Campbell, 1985) states that the principle use of the SCII is to aid an individual in making educational and career choices. The manual also reports that the SCII can aid in the counseling process by enhancing

communication between either client and counselor or student and parent. Finally, the SCII can reportedly help people understand why they are dissatisfied with their jobs. The SCII profile reporting form is laid out according to Holland codes, which correspond to Holland Types. Holland codes (R, I, A, S, E, C) are attached to each GOT, BIS, and OIS. All GOT and BIS are pure one letter Holland codes. OIS can be one, two, or three Holland codes (eg.: Psychologist: IAS).

Validity: General Occupational Themes

Several studies were cited in the manual that support the construct validity of the General Occupational Themes. For example, a study by Varca and Schaeffer (1982, cited in Hansen & Campbell, 1985) found that adolescents and adults chose leisure and avocational activities that matched General Occupational Theme Types. Furthermore, the avocational interests like the vocational interests did not change over time.

Validity: Basic Interest Scales

The scale has content validity (Hansen & Campbell, 1985) because each scale has a particular content area and the items correspondingly reflect this content: "For example, the Science scale contains items like Astronomer, Biologist, Chemist, Working in research laboratory" (p. 38).

The scale has concurrent validity (Hansen & Campbell, 1985) because people currently in a given

occupation score high on scales corresponding to that occupation and relatively lower on scales that are not related to their occupations. The concurrent validity was supported by data from 500 samples with an n ranging from seven to over 1,000 people. The median sample size was approximately 250 people (Hansen & Campbell, 1985).

Predictive validity is not as good as concurrent validity on the Basic Interest Scales (Hansen & Campbell, 1985).

> Nevertheless, there is considerable agreement between the scores earned by students and their eventual occupations. Because the nature of the scale does not permit detailed predictions, there is no way of tallying "hits" or "misses"; all one can say is that students with high scores on, for example, the Science scale tend to end up in occupations of a generally scientific character. (p. 40)

Validity: Occupational Scales

One way concurrent validity has been established is discriminating between Criterion (occupational) and Reference (Men or Women-in-General) Samples. The percent overlap statistic (Tilton, 1937, cited in Hansen & Campbell, 1985) is used to determine the degree of discrimination between these scales. The median overlap is 36 percent; the Criterion and Reference Samples are thus separated by close to two standard deviations. The best scale (female Physicist) has an overlap of 13 percent between the Criterion Sample and Women-in-General Sample. The poorest scales are male and female Optometrist, female Funeral Director, and female Purchasing Agent scales. Each of the

aforementioned scales have overlaps of 53 percent between the Women and Men-in-General Sample and the Criterion Sample. The wide range indicates that the scales' validities differ greatly.

According to the manual (Hansen & Campbell, 1985) mean scores of occupational samples on other occupational scales constitutes a second type of concurrent validity. Both SVIB and SCII Occupational Sample mean scores are normally distributed around the General Reference Sample mean with a range of three to four standard deviations.

The manual (Hansen & Campbell, 1985) also discussed how predictive validity distinguishes among people who enter a given occupation: Strong was able to show that five years after administering the Strong Vocational Interest Blank (SVIB) to Stanford University seniors that they generally exhibited the first three of the following characteristics and the fourth was "approximately true."

1. People continuing in a given occupation had higher interest scores on the scale for that occupation than for another occupation.

2. Interest scores on a scale were higher for those continuing in an occupation versus those who were in another occupation.

3. Interest scores on a scale were higher for people continuing in an occupation than for people who leave that occupation.

4. People who changed from one occupation to another would have a higher score on their most recent occupation scale versus their earlier occupation scale, before they changed occupations.

Strong (1955, cited in Hansen & Campbell, 1985) found results generally supportive of the above four propositions over an eighteen year time period with the same students and their peers (N = 524). Fifteen more studies since Strong's research assessed the degree to which earlier scores correspond to present occupations. The manual stated that the studies have found a

> . . . substantial relationship between high scores on the Occupational Scales and eventual occupations entered. Depending on how the hit rate is calculated, between one-half and two-thirds of all college students enter occupations that are predictable from their earlier scores. (Hansen & Campbell, 1985, p. 74)

Reliability: General Occupational Themes

Three samples have been tested twice over different time intervals to determine the stability of the SCII scales. The samples described below have provided data for the Basic Interest, Occupational, and Special Scales' reliability in addition to the General Occupational Themes (Hansen & Campbell, 1985).

The first sample consisted of 180 people (106 females and 74 males) at North Carolina State University comprised mostly of high school seniors or volunteer college students with an average age of 18.7 years. Average test-retest time was 14 days with a range of 11 to 22 days.

The median test-retest correlation was .91 (Hansen & Campbell, 1985).

A second sample was comprised of 102 people (35 women and 67 men) from University of Minnesota students; women in a career development course; and an Army Reserve unit. The age range was "mainly" (p. 31) 25 to 40 years. Test-retest time appears to be 30 days; it is called a thirty day sample in the Manual. The median test-retest correlation was .86 (Hansen & Campbell, 1985).

A third sample, called a three-year test-retest sample was comprised of 140 people (65 women and 75 men) who were employed full-time at both testing times. Their occupations ranged from semi-skilled to professional. The median test-retest correlation over a three year period was .81 (Hansen & Campbell, 1985).

All of the above samples had means of about 50, meaning they were "general samples" (Hansen & Campbell, 1985, p. 31). Internal-consistency reliability scores were computed on the six General Occupational Themes with results showing a high degree of internal consistency. On a sample of 1,445 males, coefficient alphas ranged from .90 to .95, with a median of .92. On a sample of 1,410 females, coefficient alphas ranged from .90 to .92, with a median of .91 (Hansen & Campbell, 1985).

Reliability: Basic Interest Scales

Basic Interest Scales evidence a high degree of stability according to the manual. Median test-retest correlations are .91 over two-weeks; .88 over thirty days; and .82 over three years (Hansen & Campbell, 1985).

The manual reported that internal consistency reliability scores were computed on The Basic Interest Scales with the results showing a high degree of internal consistency. On a sample of 1,455 males, coefficient alphas ranged from .77 to .96, with a median of 90. On a sample of 1,410 females, coefficient alphas ranged from .77 to .95, with a median of .90 (Hansen & Campbell, 1985).

Reliability: Occupational Scales

The manual reported that median test-retest correlations are .92 over two weeks; .89 over thirty days; and .87 over three years (Hansen & Campbell, 1985).

The Myers-Briggs Type Indicator

The Myers-Briggs Type Indicator (MBTI) is a rationally derived, forced choice, ipsatively scored, self-report inventory developed to measure attitude and function combinations as outlined by Carl Jung (1971). The Manual (Myers & McCaulley, 1985) states that the Myers-Briggs Type Indicator's purpose is to make Jung's theory of psychological types both understandable and useful in people's lives. It can be used in education, counseling, career guidance, situations requiring cooperation and teamwork,

and in communications. It is written at the seventh and eighth grade reading level and is appropriate for adults and high school students. It is published in three forms: Form F (166 items); Form G (126 items); and Form AV (500 items). Forms F and G contain research items. Form G is considered the standard form. Ongoing research is conducted with Form F. The MBTI is basically self-administering, as the instructions are given on the cover of the question booklets and response sheets. It can be machine or hand scored, yielding 16 types. The MBTI can yield dichotomous or continuous scores on each of four bipolar dimensions. Continuous scores indicate strength of typological preference.

The MBTI was developed in 1946 and most recently Form G was published in 1977. Its construction attempted to succeed in establishing items to reflect the Jungian typology of extraversion-introversion (E-I), sensing-intuition (S-N), and thinking-feeling (T-F); identify dominant and auxiliary functions via creating the judging-perceiving (J-P) scale; write, test, and weight items that would discriminate among types; gain precision so that individuals not strong in one preference direction could be correctly classified; and ascertain division points (Myers & McCaulley, 1985).

Questions are phrased in a forced choice format, offering choices between poles of a preference (Myers &

McCaulley, 1985). While the present scoring weights the unit items as a 2, 1, or 0, a study by Frye (1987) has concluded that the MBTI would be more valid, parsimonious, and useful if unit weights (1) and zeroes (0) were used. The weighted score totals are designated points. The pole with the highest points is the person's designated (dichotomous) classification (eg., for Extraverted). The strength of a preference is designated by a numerical value called a preference score. A preference score is derived from points calculated from individual questions.

> The formula for calculating preference scores from points is: For E, S, T, and J multiply 2 times (larger points minus smaller points) minus 1; for I, N, F, and P multiply 2 times (larger points minus smaller points) plus 1; for ties, the preference score will be I 01, N 01, F 01, or P 01. (Myers & McCaulley, 1985, p. 293)

For example, if there are 18 E points and 5 I points you subtract 5 from 18 which equals 13, times 2 which equals 26, minus 1 equals 25. The manual (Myers & McCaulley, 1985) states that preference scores can be treated as continuous scores when doing correlational research on the MBTI. Preference scores can be changed to continuous scores by subtracting E, S, T, or J preference scores from 100 and adding 100 to I, N, F, or P preference scores. A preference score of E 25 is thereby converted to an E-I continuous score of 75. The manual does not explain why preference scores are either added to or subtracted from 100 versus some other number. The ensuing reliability and validity

information in this section is taken from the latest published MBTI Manual (Myers & McCaulley, 1985).

Validity

Content validity was reportedly not taken into consideration as the importance of items was to ultimately separate opposing typologies. Many validity studies were detailed in the manual. Such studies included the topical headings of Comparisons of MBTI Continuous Scores with Other Scales; Comparison of the MBTI and Jungian Survey; Comparison of MBTI Types with Self-Estimates of Type; Studies of Behavioral Differences of Types; Studies of Creativity; and Introversion and the Preference for Privacy. In spite of many such positive validity studies, the construct validity of the MBTI remains suspect (see Appendix E).

Extraversion is reportedly correlated with other scales, ranging from -.77 to -.40. Numerous examples are listed such as extraversion as measured by instruments such as the MMPI, 16PF, and Maudsley and overreliance on the environment, as evidenced in measures of hypomania, lability, and dyscontrol (Myers & McCaulley, 1985). Significant correlations ranging from .40 to .75 on Introversion with other scales have been found. Examples of correlations include correlations with scales denoting reflective observation, lack of comfort in the environment (e.g. abasement) and intropunitiveness (Myers & McCaulley, 1985).

Significant correlations ranging from -.67 to -.40 on Sensing were given in the manual. Examples given include a practical outlook, economic interests, and a rule bound attitude (Myers & McCaulley, 1985). The manual gave significant correlations ranging from .40 to .62 for Intuition with personality scales. Examples in expected directions were with complexity, autonomy, theoretical, and academic interests (Myers & McCaulley, 1985).

Significant continuous score correlations with personality inventories ranging from -.40 to .57 with Thinking have been found. Examples in expected directions on personality inventories were with autonomy, abstract conceptualization, achievement, and theoretical (Myers & McCaulley, 1985).

Significant continuous score correlations ranging from .40 to .55 on Feeling were given in the manual. Examples of personality inventory scales in expected directions were with social service, concern for others, and nurturance (Myers & McCaulley, 1985).

Significant continuous score correlations ranging from -.40 to -.59 with Judging are presented in the manual. Examples of scales in expected directions on Personality Inventories were with order, endurance, stronger superego, and self-control.

Significant continuous score correlations on personality inventories with Perception have been found ranging from .40 to .57. Perception is reportedly related to such indices as change as challenge, blame avoidance, flexibility, and autonomy (Myers & McCaulley, 1985).

The MBTI scales correlate at statistically significant levels ($p < .05$) in expected directions with many other personality inventories. The manual lists the numerous correlations, but alpha error build-up has not been considered. It appears as though the inventory is measuring personality constructs, but how well it is doing this remains questionable (see Appendix E).

The MBTI Manual (Myers & McCaulley, 1985) also describes four psychometric "studies" using student samples in which the SCII General Occupational Themes (GOT) and the MBTI were examined. However, it is difficult to classify these studies as experimental research because an independent researcher could not replicate the studies based on what is conveyed in the manual. The first two samples studied used Lacy's data (1984, cited in Myers & McCaulley, 1985) of 912 males from Franklin and Marshall College constituting one sample and 848 females constituting a second sample. Both of these samples have been described previously. A third sample studied (Kauppi, 1982, cited in Myers & McCaulley, 1985) was comprised of Montgomery College Students from Rockville, Maryland selected from 11,000 full

time students, on the condition that they were residents from Montgomery County, under age 26, and had a grade point average of between 3.2 and 4.0. Two-hundred and forty-one students met these criteria, and 134 students participated. Sixty of the students were males and seventy-four were females. The fourth sample (Walsh, 1984, cited in Myers & McCaulley, 1985) consisted of male and female students at two Canadian Universities, Guelph and Waterloo, tested in April 1982 through May 1984. The total N size was 314. No other information was provided in the manual including the breakdown of male and female samples.

In all of these studies, individuals were placed within one of the sixteen MBTI dichotomous type combinations based on MBTI scores. In Lacy's (1984, cited in Myers & McCaulley, 1985) and Kauppi's (1982, cited in Myers & McCaulley, 1985) samples, students on each GOT; who scored more than one-half a standard deviation above the sample mean were deemed high scorers and those who scored more than one-half a standard deviation below the sample mean were deemed low scorers. Students scoring high or low on each GOT were compared to the total group type table using the Selection Ration Type Table Program (SRTT), which refers to computer software that ". . . compares two type distributions with each other and generates ratios and significance tests to compare each of the sixteen types and the type groupings" (Myers & McCaulley, 1985, p. 294).

No other information about the computer software was explained. How individuals in the Walsh (1984, cited in Myers & McCaulley, 1985, p. 308) unpublished raw data (p. 308) sample were designated high or low on the GOTS was also not explained.

The results supported predictions made in the MBTI Manual (Myers & McCaulley, 1985): Intuitive types were high on Artistic; Sensing and Judging types were higher on Conventional; Feeling types were higher on Social; Introverted and Intuitive and Intuitive and Thinking types were higher on Investigative Scales; and Sensing types, especially Extraverted, were higher on Enterprising. The manual also stated that the Realistic scale did not consistently correlate with any MBTI preference and that females evidenced a stronger relationship between Thinking and Realistic than men did.

It is hard to evaluate these studies on the MBTI and SCII. Neither the computer software nor how individuals in the Walsh (1984, cited in Myers & McCaulley, 1985) sample were placed in categories was explained well.

Finally, it is noteworthy that the manual listed dichotomous MBTI profiles of E-I, S-N, T-F, J-P and the sixteen possible types (e.g. ESFP) and occupations "coded by a system modified from the Dictionary of Occupational Titles" (Myers & McCaulley, 1985, p. 243). Percentages on

all of the aforementioned MBTI combinations for occupations were given. The population is taken from response sheets sent to the Center For Application of Psychological Type for scoring and scored in the 1970's to 1984. On the sheets, individuals write their occupations. The manual stated that samples are not randomly selected and people differ in precision as to how they designate their occupation. "Despite these limitations, the listings are consistent with the theory and common sense understanding of the occupation and the MBTI" (Myers & McCaulley, 1985, p. 243). Additional points worth mentioning (not in the manual) are that no data regarding satisfaction, efficacy or time spent within an occupation were gathered. The results are thus, at best, interesting, but certainly unscientific.

Reliability

Split half scores to yield internal consistency reliabilities of continuous scores were calculated on Forms F and G (Myers & McCaulley, 1985). Internal consistency coefficients were calculated by product-moment correlations of X and Y, corrected by the Spearman-Brown Prophecy formula. A variety of age groupings from age 9 to over 60 years were used. For Form F, a total N of 55,971 people were examined. Coefficients ranged from .83 (E-I) to .87 (J-P). For Form G, a total N of 32,671 people were examined. Scores ranged from .82 (E-I) to .86 (J-P).

College and university students reportedly have higher reliability than high school samples; there is also a slight tendency for higher aptitude students to have more consistent responses. Myers and McCaulley (1985) conclude that internal consistency for continuous scores of the four MBTI scales are acceptable for the majority of adult samples; they are adequate for younger and lower achieving populations.

Using split half reliabilities for type categories the phi and tetrachoric correlation coefficients have been calculated and corrected according to the Spearman-Brown prophecy formula. Subjects included 400 Massachusetts twelfth grade students and 400 college students tested from 1960 to 1976 using Form F. Tetrachoric estimates ranged from .66 to .92; phi estimates ranged from .49 to .79. The authors of the manual (Myers & McCaulley, 1985) point out that the phi is not appropriate because MBTI data are not true categories but occur as a result of scoring. Additionally, Myers and McCaulley (1985) say that the tetrachoric assumes a normal score distribution but the MBTI scores are usually not normally distributed.

Test-retest reliabilities were calculated using test-retest correlations of continuous scores and percentage of agreement for type categories (Myers & McCaulley, 1985). Eleven samples of test-retest product moment correlations

of continuous scores are reported in the manual, using form F and G. Populations ranged from 77 seventh grade students to 211 medical school students. Intervals ranged from one week (.86 - .89) to 4 years (.41 -.58). Ten samples of test agreement of type categories are reported in the manual, using Form F only. Populations ranged from 77 seventh grade students to 122 medical students. Intervals ranged from 5 weeks (percentage of agreement of scale scores range: .76 - .92) to 6 years (percentage of agreement of scale scores range: .83 to .90) (Myers & McCaulley, 1985).

In summary, several reliability studies have been done. The results appear consistent with what would be expected from relatively stable personality dispositions.

Data Collection

The archival data were collected at the Career Development Center of the University of Maryland where they are stored. The investigator and an assistant copied the MBTI (form G), SCII (form T325), and CDC form minus any personal identifying information.

The SCII Total Response and Infrequent Response validity indexes were used to screen out Invalid profiles, as indicated in the SCII Manual (Hansen & Campbell, 1985). All SCII forms were valid. MBTI answer sheets were checked to determine if they were completed properly. The lowest number of items answered was 119 of the possible 126 items. All of the MBTI answer sheets appeared to be completed

correctly, so MBTI scores from all 186 subjects were used. The investigator changed preference scores which were previously calculated on the MBTI answer sheets by the course instructors to continuous scores, following the directions outlined in the MBTI Manual (Myers & McCaulley, 1985).

Statistical Analysis

Eleven t-tests and three multivariate analyses (discriminant function analysis, canonical correlation analysis, and Q factor analysis) were performed in this study. Each of the three analyses is a multivariate analysis because it considers several predictor variables to determine relationships with several criterion variables.

A t-test determines whether two sample means are statistically different. MBTI types were tested by the eleven t-tests at a .05 significance level.

Discriminant function analysis is mainly used to predict group membership from a set or combination of predictor variables (Tabachnick & Fiddell, 1989). Discriminant function analysis identifies relationships between qualitative criterion variables and quantitative predictor variable (Kachigan, 1986). In this study the MBTI scores were used to predict Holland codes from SCII scores. The BMDP7M computer software program (Dixon, 1990) was used in this part of the study.

Canonical correlation analyzes the relationships between two sets of variables (Tabachnick & Fiddell, 1989).

MBTI scores represent one set of variables. Selected SCII scores represent the second set of variables. Each subject is measured on the two sets of variables to determine how the two sets relate to each other (Tabachnick & Fiddell, 1989). Canonical variates (linear combinations of variables, one combination on the independent variable side and a second combination on the dependent variable side) present a major task for the researcher to interpret (Tabachnick & Fiddell, 1989). The canonical weights are derived so that the correlation between the derived predictor variable and derived criterion variable is maximized (Kachigan, 1986). Assumptions include multivariate normality, linearity, and homoscedasticity (Tabachnick & Fiddell, 1989). The sample size should be large. A common rule of thumb is that N divided by the total number of variables should be greater than 10 (Marascuilo & Levin, 1983). For example, if there are 20 variables being investigated, there should be a sample size greater than 200 (i.e. 200 divided by 20 equals 10, which is too small a sample size). The SAS CANCORR (SAS Institute, 1988) computer software program was used to analyze the data.

In Q factor analysis, classes of people are identified (Gorsuch, 1983). People are factored in this type of analysis. Generally, many people are found to be related to more than one of the typological factors (Gorsuch, 1983). The choice of variables determines the type of relationships

that will be found among people (Cattell, 1978). The QUANAL (Van Tubergen, 1975) factor analytic program (which factors people as variables into clusters, with items comprising observations) was used to perform Q factor analyses. In this study, items were scored on designated MBTI and SCII scales.

Variables

The following is a list of the independent (predictor) dependent (criterion) variables used in the study. The abbreviations used were previously identified in Chapter one. Holland codes were identified from the SCII Manual (Hansen & Campbell, 1985).

Predictor Variables

X_1 = MBTI Extraversion-Introversion scale continuous score

X_2 = MBTI Sensing-Intuition scale continuous score

X_3 = MBTI Thinking-Feeling scale continuous score

X_4 = MBTI Judging-Perceiving scale continuous score

Criterion Variables	Holland Codes
X_5 = SCII GOT Realistic score	R
X_6 = SCII GOT Investigative score	I
X_7 = SCII GOT Artistic score	A
X_8 = SCII GOT Social score	S
X_9 = SCII GOT Enterprising score	E
X_{10} = SCII GOT Conventional score	C
X_{11} = SCII BIS Agriculture score	R
X_{12} = SCII BIS Nature score	R

X_{13}	=	SCII BIS	Adventure score	R
X_{14}	=	SCII BIS	Military Activities score	R
X_{15}	=	SCII BIS	Mechanical Activities score	R
X_{16}	=	SCII BIS	Science score	I
X_{17}	=	SCII BIS	Mathematics score	I
X_{18}	=	SCII BIS	Medical Science score	I
X_{19}	=	SCII BIS	Medical Service score	I
X_{20}	=	SCII BIS	Musical Dramatics score	A
X_{21}	=	SCII BIS	Art score	A
X_{22}	=	SCII BIS	Writing score	A
X_{23}	=	SCII BIS	Teaching score	S
X_{24}	=	SCII BIS	Social Service score	S
X_{25}	=	SCII BIS	Athletics score	S
X_{26}	=	SCII BIS	Domestic Arts score	S
X_{27}	=	SCII BIS	Religious Activities score	S
X_{28}	=	SCII BIS	Public Speaking score	E
X_{29}	=	SCII BIS	Law/Politics score	E
X_{30}	=	SCII BIS	Merchandising score	E
X_{31}	=	SCII BIS	Sales score	E
X_{32}	=	SCII BIS	Business Management score	E
X_{33}	=	SCII BIS	Office Practices score	C
X_{34}	=	SCII OIS	Air Force officer score, Female	R
X_{35}	=	SCII OIS	Air Force officer score, Male	R
X_{36}	=	SCII OIS	Police officer score, Female	R
X_{37}	=	SCII OIS	Police officer score, Male	R
X_{38}	=	SCII OIS	Bus Driver score, Female	R

X_{39}	=	SCII OIS	Bus Driver score, Male	R
X_{40}	=	SCII OIS	Horticultural worker score, Female	R
X_{41}	=	SCII OIS	Horticultural worker score, Male	R
X_{42}	=	SCII OIS	Mathematician score, Female	I
X_{43}	=	SCII OIS	Mathematician score, Male	I
X_{44}	=	SCII OIS	College Professor score, Female	I
X_{45}	=	SCII OIS	College Professor score, Male	I
X_{46}	=	SCII OIS	Art teacher score, Female	A
X_{47}	=	SCII OIS	Art teacher score, Male	A
X_{48}	=	SCII OIS	Artist, fine, Female	A
X_{49}	=	SCII OIS	Artist, fine, Male	A
X_{50}	=	SCII OIS	Artist, commercial, Female	A
X_{51}	=	SCII OIS	Artist, commercial, Male	A
X_{52}	=	SCII OIS	Photographer, Female	A
X_{53}	=	SCII OIS	Photographer, Male	A
X_{54}	=	SCII OIS	Musician, Female	A
X_{55}	=	SCII OIS	Musician, Male	A
X_{56}	=	SCII OIS	Advertising executive, Female	A
X_{57}	=	SCII OIS	Advertising executive, Male	A
X_{58}	=	SCII OIS	Broadcaster, Female	A
X_{59}	=	SCII OIS	Broadcaster, Male	A
X_{60}	=	SCII OIS	Public relations director, Female	A
X_{61}	=	SCII OIS	Public relations director, Male	A
X_{62}	=	SCII OIS	Lawyer, Female	A
X_{63}	=	SCII OIS	Lawyer, Male	A
X_{64}	=	SCII OIS	Reporter, Female	A

X_{65}	=	SCII OIS	Reporter, Male	A
X_{66}	=	SCII OIS	Librarian, Female	A
X_{67}	=	SCII OIS	Librarian, Male	A
X_{68}	=	SCII OIS	Guidance Counselor, Female	S
X_{69}	=	SCII OIS	Guidance Counselor, Male	S
X_{70}	=	SCII OIS	Social science teacher, Female	S
X_{71}	=	SCII OIS	Social science teacher, Male	S
X_{72}	=	SCII OIS	Elementary teacher, Female	S
X_{73}	=	SCII OIS	Elementary teacher, Male	S
X_{74}	=	SCII OIS	Special education teacher, Female	S
X_{75}	=	SCII OIS	Special education teacher, Male	S
X_{76}	=	SCII OIS	Realtor, Female	E
X_{77}	=	SCII OIS	Realtor, Male	E
X_{78}	=	SCII OIS	Florist, Female	E
X_{79}	=	SCII OIS	Florist, Male	E
X_{80}	=	SCII OIS	Accountant, Female	C
X_{81}	=	SCII OIS	Accountant, Male	C
X_{82}	=	SCII OIS	Banker, Female	C
X_{83}	=	SCII OIS	Banker, Male	C
X_{84}	=	SCII OIS	Air Force enlisted personnel, Male	R
X_{85}	=	SCII OIS	Farmer, Male	R
X_{86}	=	SCII OIS	Vocational/Agricultural teacher, Female	R
X_{87}	=	SCII OIS	Forester, Male	R
X_{88}	=	SCII OIS	Emergency medical technician, Male	R
X_{89}	=	SCII OIS	Carpenter, Male	R
X_{90}	=	SCII OIS	Electrician, Male	R

X_{91} = SCII OIS Chiropractor, Male I

X_{92} = SCII OIS Physician, Female I

X_{93} = SCII OIS Biologist, Male I

X_{94} = SCII OIS Geographer, Male I

X_{95} = SCII OIS Interior decorator, Male A

X_{96} = SCII OIS Flight attendant, Male A

X_{97} = SCII OIS Public Administrator, Female A

X_{98} = SCII OIS Personnel director, Female E

X_{99} = SCII OIS Elected public official, Male E

X^{100} = SCII OIS Chamber of Commerce executive, Male E

X_{101} = SCII OIS Restaurant manager, Male E

X_{102} = SCII OIS Travel agent, Male E

X_{103} = SCII OIS Funeral director, Male E

X_{104} = SCII OIS Beautician, Female E

X_{105} = SCII OIS Buyer, Male E

X_{106} = SCII OIS Secretary, Female C

X_{107} = SCII OIS Air Force enlisted personnel, Female C

X_{108} = X_{11} through X_{15} : R Holland Code Group from BIS

X_{109} = X_{16} through X_{19} : I Holland Code Group from BIS

X_{110} = X_{20} through X_{22} : A Holland Code Group from BIS

X_{111} = X_{23} through X_{27} : S Holland Code Group from BIS

X_{112} = X_{28} through X_{32} : E Holland Code Group from BIS

X_{113} = X_{33} : C Holland Code Group from BIS

X_{114} = X_{34} through X_{41}, X_{84} through X_{90} : R Holland Code Group from OIS

X_{115} = X_{42} through X_{45}, X_{92} through X_{93} : I Holland Code Group from OIS

X_{116} = X_{46} through X_{67}, X_{95} through X_{97} : A Holland Code Group from OIS

X_{117} = X_{68} through X_{75} : S Holland Code Group from OIS

X_{118} = X_{76} through X_{79}, X_{98} through X_{105} : E Holland Code Group from OIS

X_{119} = X_{80} through X_{83}, X_{106} through X_{107} : C Holland Code Group from OIS

Hypotheses

This exploratory investigation sought to determine the relationship between the MBTI and SCII. Carlson (1989a; 1989b) and Healy (1989a; 1989b) both have indicated a need for further concurrent validity research on the MBTI. Hypotheses are based on information presented in the MBTI Manual (Myers & McCaulley, 1985). The SCII manual (Hansen & Campbell, 1985) provided information to determine which SCII scores would be designated what Holland codes.

Derivation of Hypotheses

The MBTI Manual (Myers & McCaulley, 1985; pp. 20-29) described the sixteen MBTI Types and individuals' characteristics associated with types. From these descriptions, logical derivations of relatively high scores on certain Holland types or codes associated with each of the 16 MBTI Types were extracted. The MBTI Manual (Myers & McCaulley, 1985) also summarizes research on the MBTI and SCII GOT scales using unexplained computer software (Myers & McCaulley, 1985, p. 87). Finally the investigator previously summarized results of correlational studies (Myers & McCaulley, 1985, pp. 195-203) presented in the

MBTI Manual between MBTI dimensions and the SCII. Each of these results are presented below, beginning with type descriptions.

The ESTJ and ENTJ (Myers & McCaulley, 1985, pp. 20-22) Types are Extraverted Thinking Types. Both enjoy being executives. ESTJ types are practical, have a natural head for business, and like to organize and run things. ENTJ types are leaders, good at public speaking, intellectually inclined, tolerate theory, and are concerned with long range problems. The investigator has deduced from the MBTI Manual (Myers & McCaulley, 1985) descriptions that individuals who are these types would score relatively high on Holland's Enterprising Type or Code.

The ISTP and INTP Types (Myers & McCaulley, 1985, pp. 20-21, 23) are Introverted Thinking Types. They both rely on thinking and are decisive in ideas, but socially shy. ISTP types are interested in cause and effect and are good at applied science. INTP Types value facts in relation to theory, are good at pure science, are quiet, and do not like parties or small talk. This investigator has deduced from the MBTI Manual (Myers & McCaulley, 1985) descriptions that individuals who are these types would score relatively high on Holland's Investigative Type or Code.

The ESFJ and ENFJ Types (Myers & McCaulley, 1985, pp. 20-21, 24) are Extraverted Feeling Types. Both are warm, personal, friendly, and value others' opinions.

ESFJ Types are popular, practical, enjoy material possessions, and do not like abstract thinking. ENFJ Types are interested in possibilities, feel real concern for others, lead group discussions, and speak well. This investigator has deduced from the MBTI Manual (Myers & McCaulley, 1985) descriptions that individuals who are these types would score relatively high on Holland's Social Type or Code.

The ISFP and INFP Types (Myers & McCaulley, 1985, pp. 20-21, 25) are Introverted Feeling Types. Both are idealists who want their work to have a purpose beyond their paycheck such as human understanding or happiness or health or perfecting a job. The ISFP Types work well at jobs that require devotion. They can closely observe and monitor things for lengthy time periods. INFP Types are interested in possibilities for people and like books, language and enjoy counseling and teaching. This investigator has deduced from the MBTI Manual (Myers & McCaulley, 1985) description that individuals who are these types would score relatively high on Holland's Social Types or Codes.

The ESTP and ESFP (Myers & McCaulley, 1985, pp. 20, 26) Types are Extraverted Sensing Types. Both may be good at machinery and handling of tools and materials for craft or artistic purposes. They enjoy material possessions, products of the amusement industry, and benefit from on the job training and experience rather than written tests. ESTP types like mechanical things and sports. ESFP types are

outgoing and friendly and best in situations requiring common sense and practical ability with things and people. This investigator has deduced that individuals who are these types would score relatively high on Holland's Realistic Types or Codes.

The ISTJ and ISFJ (Myers & Mccaulley, 1985, pp. 20, 27) Types are Introverted Sensing Types. Both like to work with facts and are thorough and patient with detail and routine. ISTJ Types are serious, quiet, orderly, dependable, and organized. ISFJ Types are thorough, accurate, loyal, conscientious, friendly, and concerned with how other people feel. This investigator has deduced that individuals who are these types would score relatively high on Holland's Conventional Type or Code.

The ENTP and ENFP (Myers & McCaulley, 1985, pp. 21, 28) Types are Extraverted Intuitive Types. Both are enthusiastic innovators who dislike routine. ENTP types may be inventors or scientists. ENFP types are enthusiastic and imaginative, may be scientists, artists, teachers, sales people, advertisers, and counselors. ENTP Types would score relatively high on Enterprising or Investigative Holland Types or Codes. ENFP Types would score relatively high on Social, Artistic, Enterprising, or Investigative Holland Types or Codes. This investigator has deduced from the MBTI Manual (Myers & McCaulley, 1985) description that

individuals who are these types would score relatively low on Realistic and Conventional Holland types or codes.

The INTJ and INFJ (Myers & McCaulley, 1985, pp. 21, 29) Types are Introverted Intuitive Types. Both are original and innovators with ideas. INTJ Types are individual, independent, logical, and determined. INFJ types are concerned for others, sympathetic towards others, may focus on human welfare and are likely to be honored for convictions on how to serve the common good. INTJ Types would score relatively high on Investigative Holland Types or Codes. INFJ Types would score relatively high on Social Holland Types or Codes. This investigator has deduced from the MBTI Manual (Myers & McCaulley, 1985) description that individuals who are these types would also score relatively high on Artistic Holland types or codes.

The second way in which hypotheses were determined was from studies from the MBTI Manual (Myers & McCaulley, 1985) comparing the SCII, GOT, and MBTI dichotomous scores. The MBTI Manual presents results of studies by Lacy (1984, cited in Myers & McCaulley, 1985), Walsh (1984, cited in Myers & McCaulley, 1985), and Kauppi (1982, cited in Myers & McCaulley, 1985):

> As predicted, N types scored higher on artistic, SJ types on conventional, F types on social, and IN and NT on investigative scales. Sensing types, especially extroverts with sensing, scored higher on enterprising. The pattern for realistic is less clear. . . (Myers & McCaulley, 1985, p. 87)

The third way in which hypotheses were determined was from correlational studies using MBTI continuous scores and SCII scores. Numerous correlations were significant at $p < .05$, $p < .01$, and $p < .001$. However, the studies did not appear to account for experiment-wise error. Additionally, the correlations were generally only moderate. Therefore, findings were dubious and difficult to interpret.

However, consistent statistically significant findings emerged between the MBTI and Holland codes. MBTI I scores were positively associated with SCII Introversion and Investigative code scores and negatively associated with Social and Enterprising code scores. The finding of MBTI I scores being negatively correlated with Social code scores appears to contradict the deduction made by the investigator based on the MBTI Manual (Myers & McCaulley, 1985) that INFJ types would score relatively high on Social types or codes. However, INFJ types, while being less sociable less able to easily communicate than ENFJ types, would show their feeling function in their dealings with others (Myers & McCaulley, 1985) and thereby be concerned about others' welfare according to the theory behind the MBTI. Concern for the welfare of others would attract INFJ types to Social Holland code vocations.

MBTI N scores were positively associated with SCII Investigative and Artistic code scores and negatively associated with Enterprising and Conventional code scores.

MBTI F scores were positively associated with Artistic and Social SCII code scores and negatively associated with Investigative scale scores. And finally, MBTI P scores were positively associated with Artistic code scores and negatively associated with Investigative and Conventional code scores. Overall, the MBTI N code scores appeared to be the most discriminating among occupational interests on the SCII.

Specific Research Hypotheses (H_1 - H_{21})

H_1: Extraverted Thinking Types (ESTJ, ENTJ): MBTI E-I, T-F, and J-P scale scores are negatively associated with SCII Enterprising code scores.

H_2: Introverted Thinking Types (ISTP, INTP): MBTI E-I and J-P scale scores are positively associated with SCII Investigative code scores. MBTI T-F scales are negatively associated with SCII Investigative code scores.

H_3: Extraverted Feeling Types (ESFJ, ENFJ): MBTI E-I and J-P scale scores are negatively associated with SCII Social code scores. MBTI T-F scale scores are positively associated with SCII Social code scores.

H_4: Introverted Feeling Types (ISFP, INFP): MBTI E-I, T-F, and J-P scale scores are positively associated with SCII Social code scores.

H_5: Extraverted Sensing Types (ESTP, ESFP): MBTI E-I and S-N scale scores are negatively associated with SCII Realistic code scores. MBTI J-P scores are positively associated with SCII Realistic code scores.

H_6: Introverted Sensing Types (ISTJ, ISFJ): MBTI E-I and J-P scale scores are positively associated with SCII conventional code scores. MBTI S-N and J-P scale scores are negatively associated with SCII Conventional code scores.

H_7: Extraverted Intuitive Types (ENTJ, ENFJ): MBTI E-I scale scores are negatively associated with SCII Investigative and Enterprising code scores and are positively associated with SCII Realistic and Conventional code scores. MBTI S-N and J-P scale scores are positively associated with SCII Investigative and Enterprising code scores and are negatively associated with Realistic and Conventional code scores.

H_8: Introverted Intuitive Types (INTJ, INFJ): MBTI E-I and S-N scale scores are positively associated with SCII Artistic code scores. MBTI J-P scale scores are negatively associated with SCII Artistic code scores.

H_9: There is a positive relationship between MBTI E-I scale scores and SCII Investigative code scores.

H_{10}: There is a negative relationship between MBTI E-I scale scores and SCII Enterprising code scores.

H_{11}: There is a negative relationship between the MBTI E-I scale scores and SCII Social code scores.

H_{12}: There is a positive relationship between MBTI S-N scale scores and SCII Investigative code scores.

H_{13}: There is a positive relationship between MBTI S-N scale scores and SCII Artistic code scores.

H_{14}: There is a negative relationship between MBTI S-N scale scores and Enterprising code scores.

H_{15}: There is a negative relationship between MBTI S-N scale scores and Conventional code scores.

H_{16}: There is a positive relationship between MBTI T-F scale scores and SCII Artistic code scores.

H_{17}: There is a positive relationship between MBTI T-F scale scores and SCII Social code scores.

H_{18}: There is a negative relationship between MBTI T-F scale scores and SCII Investigative scale scores.

H_{19}: There is a positive relationship between MBTI J-P scale scores and SCII Artistic code scores.

H_{20}: There is a negative relationship between MBTI J-P scale scores and SCII Investigative code scores.

H_{21}: There is a negative relationship between MBTI J-P scale scores and SCII Conventional code scores.

Limitations of the Study

Listed below are limitations that apply to this study. These limitations are important in interpreting results (see Campbell & Stanley, 1963):

1. The independent predictor variables, MBTI continuous scale scores, could not be manipulated by the experimenter. MBTI scores represent personality dimensions of people. The inability to manipulate the independent variable represents an internal validity threat. Since internal validity has not been established, causal statements cannot be inferred from the data alone. However, relationships between the independent and dependent variables can be shown.
2. The sample was not randomly selected, meaning that external validity has been threatened. Generalizing to other populations is limited by characteristics of individuals in the sample.
3. Factor analyses have shown that the construct validity of the MBTI is suspect. While the MBTI does not measure Jung's types, some constructs have been identified through factor analysis. For example, the E-I scale has been found to be a measure of sociability (i.e. Extraversion on

the MBTI has been found to be a measure of sociability). Therefore, if relationships are found, they need to be interpreted in the context of past research findings.

4. The investigator did not score the MBTI answer sheets. The investigator changed MBTI preference scores which were previously calculated on the MBTI answer sheets by course instructors to continuous scores. The course instructors could have made errors in calculating preference scores.

Summary

The present study used an ex post facto research design in examining relationships between the MBTI and SCII. The setting of the investigation occurred at the University of Maryland at College Park. The sample was comprised of 186 college students enrolled in a career development course at the University of Maryland. Demographic characteristics were described. The instruments used included the MBTI (form G) and SCII (form T325). Descriptive information on the instruments including development, scoring, validity, and reliability was reviewed. Finally, data collection procedures, statistical analysis, specific research hypotheses including their derivations, and limitations of the study were delineated.

CHAPTER IV

RESULTS OF THE INVESTIGATION

Introduction

The results of the investigation are presented in four major sections. The first section contains relevant descriptive univariate statistics. The second section contains a summary of the results of the discriminant function analysis. The third section summarizes results of the canonical correlation analysis. Finally, the fourth section is comprised of a summary of the results of the Q-factor analysis.

Descriptive Univariate Statistics

The four MBTI predictor variables are presented according to dichotmous bipolar classififcation for the entire sample of 186 people (see Table 4). Almost two-thirds of the sample were classified as Extraversion (E), fifty-five percent of the subjects were Sensing (S), fifty-three percent were Feeling (F), and fifty-three percent were Perceiving (P). It should be noted that normative data are not available. Therfore, it is impossible to tell if this sample is similar to or different from other college samples. (It is also therefore impossible to tell if the

Table 4

Descriptive Statistics: Numbers and Percentages of People on the MBTI Scales According to Dichotomous Bipolar Classification for the Entire Sample (N = 186).

MBTI Dichotomous Bipolar Scale	N	Percentage
Extraversion	117	62.9
Introversion	69	37.1
Sensing	103	55.4
Intuition	83	44.6
Thinking	87	46.8
Feeling	99	53.2
Judging	87	46.8
Perceiving	99	53.2

gender differences found on the subsequent pages are representative of the general population).

Table 5 is comprised of the four MBTI predictor variables according to dichotomous bipolar classifications for females. Almost two-thirds of the 115 females were classified as E, fifty-seven percent were S, sixty-one percent were F, and fifty-three percent were J.

The four MBTI predictor variables are shown in Table 6 according to dichotomous bipolar classification for the 71 males in the sample. Fifty-nine percent of the males were classified under E, fifty-four percent were S, fifty-nine percent were T, and sixty-two percent were P.

Table 5

Descriptive Statistics: Numbers and Percentages of People on the MBTI Scales According to Dichotomous Bipolar Classification for Females (N = 115).

MBTI Dichotomous Bipolar Scale	N	Percentage
Extraversion	75	65.2
Introversion	40	34.8
Sensing	65	56.5
Intuition	50	43.5
Thinking	45	39.1
Feeling	70	60.9
Judging	60	52.2
Perceiving	55	47.8

Table 6

Descriptive Statistics: Numbers and Percentages of People on the MBTI Scales According to Dichotomous Bipolar Classification for Males (N = 71).

MBTI Dichotomous Bipolar Scale	N	Percentage
Extraversion	42	59.2
Introversion	29	40.8
Sensing	38	53.5
Intuition	33	46.5
Thinking	42	59.2
Feeling	29	40.8
Judging	27	38.0
Perceiving	44	62.0

The means, standard deviations, minimum values, and maximum values on both the MBTI and SCII for the entire sample of 186 subjects are presented in Table 7. The mean values for the MBTI scales ranged from 94.1 on the E-I scale to 102.1 on the J-P scale. Standard deviations ranged from 23.0 to 27.8; minimum values ranged from 35 to 47; and maximum values ranged from 141 to 161 on the MBTI. The SCII GOT criterion variables mean score values ranged from 40.8 to 49.7; standard deviation values ranged from 9.4 to 10.2; minimum values ranged from 22 to 31; and maximum values ranged from 64 to 72. The SCII BIS criterion variable mean score values ranged from 40.3 to 52.3; standard deviations scores ranged from 8.2 to 11.2; minimum values ranged from 23 to 41; and maximum values ranged from 64 to 78. The SCII OIS criterion variable mean score values ranged from 5.8 to 42.9; standard deviation values ranged from 8.8 to 15.7; minimum values ranged from -9 to 21; and maximum values ranged from 51 to 72.

The mean, standard deviation, minimum and maximum values on the MBTI and SCII scales for the entire sample of 186 subjects covered a wide range of the possible scores. The only surprising score was the relatively low mean score value of 5.8 on variable SCII OIS Art teacher score, female. Individuals interests in this sample appeared to be quite different from female Art teacher's interests.

Table 7

Means, Standard Deviations, Minimum Values, and Maximum Values on the Myers-Briggs Type Indicator (MBTI) and Strong Campbell Interest Inventory (SCII) Obtained by the Entire Sample (N = 186).

Variable	M	SD	MV	MXV
MBTI Scales				
Extraversion-Introversion	94.1	25.8	47	153
Sensing-Intuition	96.2	25.7	35	151
Thinking-Feeling	99.5	23.0	41	141
Judging-Perceiving	102.1	27.8	45	161
SCII General Occupational Themes				
Realistic	41.3	9.4	29	65
Investigative	40.8	9.9	23	64
Artistic	45.4	9.8	25	66
Social	46.6	10.2	22	69
Enterprising	49.7	10.0	31	72
Conventional	45.4	9.6	24	69
SCII Basic Interest Scales				
Agriculture	42.9	8.2	31	68
Nature	40.3	10.3	23	66

(table continues)

Variable	M	SD	MV	MXV
SCII Basic Interest Scales				
Adventure	52.3	11.2	30	71
Military Activities	47.1	8.4	41	73
Mechanical Activities	43.5	9.4	32	68
Science	42.5	9.0	31	67
Mathematics	45.8	9.7	32	67
Medical Science	42.6	9.6	30	66
Medical Service	46.0	8.4	34	69
Musical Dramatics	47.2	8.9	28	68
Art	47.3	9.8	27	65
Writing	43.5	10.3	27	64
Teaching	46.0	10.8	26	68
Social Service	50.4	10.1	28	72
Athletics	50.0	10.4	33	69
Domestic Arts	48.5	9.0	29	66
Religious Activities	43.6	9.7	33	68
Public Speaking	45.9	10.0	29	70
Law/Politics	46.2	9.9	30	69
Merchandising	49.7	9.7	28	70
Sales	52.1	10.1	36	78
Business Management	47.3	10.2	26	70
Office Practices	48.0	8.3	36	78

(table continues)

Variable	M	SD	MV	MXV
Air Force officer, F	32.2	11.7	10	65
Air Force officer, M	21.2	13.1	-6	57
Police officer, F	36.5	12.8	12	72
Police officer, M	28.1	13.0	1	59
Bus Driver, F	37.9	9.6	13	62
Bus Driver, M	40.6	8.8	20	59
Horticultural worker, F	30.5	9.5	5	54
Horticultural worker, M	26.6	11.2	-3	55
Mathematician, F	12.3	13.4	-9	52
Mathematician, M	15.8	12.3	-9	54
College Professor, F	27.5	9.8	6	61
College Professor, M	28.5	9.7	5	63
Art teacher, F	5.8	15.5	-9	60
Art teacher, M	25.3	14.0	-9	66
Artist, fine, F	27.1	11.4	-3	58
Artist, fine, M	26.9	12.6	-3	62
Artist, commercial, F	18.1	15.2	-9	54
Artist, commercial, M	30.8	11.6	5	57
Photographer, F	29.9	11.0	3	59
Photographer, M	32.0	11.2	7	58

(table continues)

Variable	M	SD	MV	MXV
SCII Occupational Interest Scales				
Musician, F	27.9	12.4	-5	61
Musician, M	35.5	10.6	9	64
Advertising executive, F	36.5	9.3	13	68
Advertising executive, M	37.2	11.2	10	63
Broadcaster, F	37.2	9.8	14	61
Broadcaster, M	41.5	9.2	18	65
Public relations director, F	22.7	12.7	-5	63
Public relations director, M	28.3	12.9	-8	65
Lawyer, F	28.7	10.8	0	55
Lawyer, M	26.9	10.9	3	56
Reporter, F	20.3	13.0	-9	51
Reporter, M	27.6	11.6	1	55
Librarian, F	17.3	13.1	-8	58
Librarian, M	33.8	11.4	6	58
Guidance Counselor, F	26.7	11.9	1	57
Guidance Counselor, M	32.0	11.6	7	62
Social science teacher, F	24.6	11.9	2	58
Social science teacher, M	32.5	11.2	4	60
Elementary teacher, F	30.5	10.0	8	62
Elementary teacher, M	26.3	13.6	-6	64
Special education teacher, F	29.5	12.4	5	59

(table continues)

Variable	M	SD	MV	MXV
SCII Occupational Interest Scales				
Special education teacher, M	26.3	15.7	-3	70
Realtor, F	26.5	13.6	-4	62
Realtor, M	33.1	12.0	8	65
Florist, F	40.8	10.9	9	65
Florist, M	40.3	11.0	15	67
Accountant, F	32.0	11.5	3	64
Accountant, M	24.7	11.5	0	59
Banker, F	41.2	10.3	10	65
Banker, M	30.0	11.7	3	62
Air Force enlisted personnel, M	30.2	10.8	5	63
Farmer, M	30.8	9.9	10	53
Vocational/Agricultural teacher, F	26.6	9.1	-3	57
Forester, M	17.2	10.3	-6	46
Emergency medical technician, M	26.8	10.4	1	52
Carpenter, M	22.5	12.5	-5	65
Electrician, M	24.3	12.1	-8	59
Chiropracter, M	23.8	12.7	-9	57
Physician, F	16.3	13.5	-9	55
Biologist, M	19.9	11.9	-6	56
Geographer, M	20.4	10.3	0	52
Interior decorator, M	38.9	10.7	15	62

(table continues)

Variable	M	SD	MV	MXV
SCII Occupational Interest Scales				
Flight attendant, M	41.0	9.7	16	63
Public Administrator, F	25.6	11.8	-4	61
Personnel director, F	31.8	13.5	1	62
Elected public official, M	28.2	11.0	5	59
Chamber of Commerce executive, M	24.1	12.9	-6	55
Restaurant manager, M	41.9	11.8	12	66
Travel agent, M	45.2	10.1	21	68
Funeral director, M	37.1	10.5	12	57
Beautician, F	40.5	10.1	11	60
Buyer, M	42.9	13.4	10	71
Secretary, F	37.1	9.5	12	64
Air Force enlisted personnel, F	36.1	10.3	14	72

Note. M = Mean; SD = Standard Deviation; MV = Minimum Value; MXV = Maximum Value; F = female; M = male.

Table 8 is comprised of the means, standard deviations, minimum values, and maximum values of the 115 females in this study on the MBTI and SCII dimensions. The mean values for the MBTI scales ranged from 93.3 on the E-I scale to 104.2 on the T-F scale. Standard deviations ranged from 22.4 to 26.5; minimum values ranged from 35 to 49; and maximum values ranged from 141 to 157 on the MBTI. The SCII GOT criterion variable mean score values ranged from 37.3 to 48.5; standard deviation values ranged from 7.2 to 10.3; minimum values ranged from 22 to 31; and maximum values ranged from 62 to 72. The SCII BIS criterion value mean score values ranged from 39.7 to 52.4; standard deviation values ranged from 6.5 to 11.3; minimum values ranged from 23 to 41; and maximum values ranged from 63 to 78. The SCII OIS criterion variable mean score values ranged from 8.0 to 44.5; standard deviation scores ranged from 6.5 to 11.3; minimum values ranged from -9 to 24; and maximum values ranged from 41 to 72.

The mean, standard deviation, minimum and maximum values on the MBTI and SCII scales for the female sample of 115 subjects covered a wide range of possible scores. The only surprising scores were the relatively low mean score values on variables SCII OIS Mathematician score, female, of 8.3 and SCII OIS Art teacher score, female, of 8.0. The interests of the 115 females in this sample appeared to be

Table 8

Means, Standard Deviations, Minimum Values, and Maximum Values on the Myers-Briggs Type Indicator (MBTI) and Strong Campbell Interest Inventory (SCII) Obtained by Females (N = 115).

Variable	M	SD	MV	MXV
MBTI Scales				
Extraversion-Introversion	93.3	25.3	49	145
Sensing-Intuition	95.8	26.3	35	151
Thinking-Feeling	104.2	22.4	47	141
Judging-Perceiving	96.6	26.5	45	157
SCII General Occupational Themes				
Realistic	37.3	7.2	29	63
Investigative	39.1	9.1	23	62
Artistic	46.1	9.3	25	66
Social	47.2	10.3	22	69
Enterprising	48.5	9.4	31	72
Conventional	43.9	9.1	24	69
SCII Basic Interest Scales				
Agriculture	41.4	8.3	31	68
Nature	40.4	10.1	23	66

(table continues)

Variable	M	SD	MV	MXV
Adventure	47.6	9.9	30	71
Military Activities	44.8	6.5	41	70
Mechanical Activities	39.7	7.3	32	68
Science	40.5	8.2	31	67
Mathematics	44.2	9.8	32	63
Medical Science	41.3	9.2	30	66
Medical Service	45.7	8.7	34	69
Musical Dramatics	48.2	8.6	28	68
Art	49.1	9.4	27	65
Writing	44.6	10.5	27	64
Teaching	46.6	11.3	26	68
Social Service	52.4	10.1	28	72
Athletics	45.9	9.0	33	67
Domestic Arts	50.7	8.5	31	66
Religious Activities	44.3	10.0	33	68
Public Speaking	44.6	9.8	29	68
Law/Politics	44.7	9.8	30	67
Merchandising	49.6	9.4	28	68
Sales	51.0	9.3	36	78
Business Management	46.1	9.6	27	68
Office Practices	48.5	8.6	36	78

(table continues)

Variable	M	SD	MV	MXV
SCII Occupational Interest Scales				
Air Force officer, F	26.5	8.4	10	53
Air Force officer, M	14.2	9.1	-6	49
Police officer, F	31.7	11.1	12	62
Police officer, M	22.9	10.5	1	55
Bus Driver, F	34.7	8.7	13	54
Bus Driver, M	38.4	8.2	20	59
Horticultural worker, F	29.6	9.9	5	54
Horticultural worker, M	26.5	11.3	1	55
Mathematician, F	8.3	13.1	-9	41
Mathematician, M	16.1	11.8	-9	47
College Professor, F	26.8	10.1	6	53
College Professor, M	29.4	9.5	12	57
Art teacher, F	8.0	16.3	-9	60
Art teacher, M	30.2	12.9	3	66
Artist, fine, F	28.3	10.8	4	54
Artist, fine, M	30.1	11.6	4	55
Artist, commercial, F	19.6	16.0	-9	54
Artist, commercial, M	33.8	11.0	11	57
Photographer, F	30.4	11.2	3	58
Photographer, M	32.5	11.2	7	58

(table continues)

Variable	M	SD	MV	MXV
SCII Occupational Interest Scales				
Musician, F	30.5	11.2	5	56
Musician, M	38.0	9.7	17	60
Advertising executive, F	38.1	9.5	17	68
Advertising executive, M	39.9	10.9	12	63
Broadcaster, F	38.3	10.2	14	61
Broadcaster, M	43.9	8.6	19	65
Public relations director, F	23.6	13.2	-1	63
Public relations director, M	31.2	12.5	0	65
Lawyer, F	26.8	11.1	0	52
Lawyer, M	26.8	11.2	3	56
Reporter, F	20.9	13.9	-9	51
Reporter, M	30.4	10.6	1	53
Librarian, F	18.7	12.8	-4	58
Librarian, M	38.4	9.0	18	58
Guidance Counselor, F	29.3	12.0	5	57
Guidance Counselor, M	35.8	11.2	16	62
Social science teacher, F	25.4	12.1	6	58
Social science teacher, M	34.1	11.2	10	60
Elementary teacher, F	33.5	9.7	12	62
Elementary teacher, M	27.7	13.4	-5	64
Special education teacher, F	32.0	12.6	5	59

(table continues)

Variable	M	SD	MV	MXV
SCII Occupational Interest Scales				
Special education teacher, M	28.7	16.0	-3	70
Realtor, F	25.8	13.5	-4	62
Realtor, M	31.3	11.1	8	63
Florist, F	42.8	11.3	9	65
Florist, M	42.6	11.2	15	67
Accountant, F	28.6	11.0	3	64
Accountant, M	20.8	10.2	0	50
Banker, F	41.6	10.7	10	65
Banker, M	28.3	11.0	3	54
Air Force enlisted personnel, M	25.9	9.1	5	63
Farmer, M	28.9	9.6	10	53
Vocational/Agricultural teacher, F	25.3	8.8	-3	43
Forester, M	14.8	10.1	-6	44
Emergency medical technician, M	23.5	9.1	1	47
Carpenter, M	17.8	10.4	-5	65
Electrician, M	19.5	10.1	-8	53
Chiropracter, M	23.4	12.1	-9	56
Physician, F	14.1	13.6	-7	55
Biologist, M	20.6	11.8	-4	56
Geographer, M	20.5	10.4	0	51
Interior decorator, M	43.8	9.2	20	62

(table continues)

Variable	M	SD	MV	MXV
SCII Occupational Interest Scales				
Flight attendant, M	42.8	9.4	17	63
Public Administrator, F	23.5	12.0	-4	61
Personnel director, F	30.8	13.2	1	61
Elected public official, M	28.5	10.8	9	59
Chamber of Commerce executive, M	23.3	12.4	-6	55
Restaurant manager, M	41.5	11.7	12	66
Travel agent, M	47.8	9.5	24	68
Funeral director, M	35.6	10.1	12	56
Beautician, F	42.0	10.0	17	60
Buyer, M	44.5	13.7	12	71
Secretary, F	38.3	9.8	12	64
Air Force enlisted personnel, F	35.0	10.2	14	72

Note. M = Mean; SD = Standard Deviation; MV = Minimum Value; MXV = Maximum Value; F = female; M = male.

quite different from both female Art teacher's interests and female Mathematician's interests.

Table 9 is comprised of the means, standard deviations, minimum values, and maximum values of the 71 males in this study on the MBTI and SCII dimensions. The mean values for the MBTI scales ranged from 92 on the T-F scale to 111.1 on the J-P scale. Standard deviations ranged from 22.1 to 27.8; minimum values ranged from 41 to 57; and maximum values ranged from 149 to 161 on the MBTI. The SCII GOT criterion variable mean score values ranged from 43.5 to 51.7; standard deviation values ranged from 9.1 to 10.6; minimum values ranged from 25 to 31; and maximum values ranged from 64 to 72. The SCII BIS criterion value mean score values ranged from 40.2 to 59.9; standard deviation values ranged from 7.2 to 11.0; minimum values ranged from 23 to 41; and maximum values ranged from 64 to 76. The SCII OIS criterion variable mean score values ranged from 2.2 to 44.3; standard deviation scores ranged from 7.9 to 14.5; minimum values ranged from -9 to 25; and maximum values ranged from 38 to 72.

The mean, standard deviation, minimum and maximum values on the MBTI and SCII scales for the male sample of 71 subjects covered a wide range of possible scores. The only surprising score was the relatively low mean score on SCII

Table 9

Means, Standard Deviations, Minimum Values, and Maximum Values on the Myers-Briggs Type Indicator (MBTI) and Strong Campbell Interest Inventory (SCII) Obtained by Males (N = 71).

Variable	M	SD	MV	MXV
MBTI Scales				
Extraversion-Introversion	95.4	26.8	47	153
Sensing-Intuition	97.0	24.9	45	149
Thinking-Feeling	92.0	22.1	41	133
Judging-Perceiving	111.1	27.8	57	161
SCII General Occupational Themes				
Realistic	47.7	9.1	30	65
Investigative	43.5	10.5	25	64
Artistic	44.5	10.5	26	65
Social	45.8	10.1	25	66
Enterprising	51.7	10.6	31	72
Conventional	47.7	9.9	28	69
SCII Basic Interest Scales				
Agriculture	45.3	7.5	31	68
Nature	40.2	10.6	23	64

(table continues)

Variable	M	SD	MV	MXV
SCII Basic Interest Scales				
Adventure	59.9	8.9	32	71
Military Activities	50.8	9.8	41	73
Mechanical Activities	49.7	9.2	34	66
Science	45.8	9.4	31	66
Mathematics	48.3	9.1	32	67
Medical Science	44.6	10.0	30	66
Medical Service	46.5	7.9	34	64
Musical Dramatics	45.5	9.2	28	64
Art	44.4	9.8	27	64
Writing	41.7	9.9	27	64
Teaching	44.9	9.9	26	66
Social Service	47.2	9.2	32	70
Athletics	56.6	9.0	33	69
Domestic Arts	45.0	8.6	29	64
Religious Activities	42.3	9.2	33	68
Public Speaking	48.0	10.1	29	70
Law/Politics	48.8	9.7	30	69
Merchandising	50.0	10.1	30	70
Sales	54.0	10.9	36	76
Business Management	49.2	11.0	26	70
Office Practices	47.2	7.7	36	73

(table continues)

Variable	M	SD	MV	MXV
SCII Occupational Interest Scales				
Air Force officer, F	41.6	10.0	25	65
Air Force officer, M	32.5	10.5	1	50
Police officer, F	44.3	11.7	12	72
Police officer, M	36.5	12.2	6	59
Bus Driver, F	43.0	8.9	19	62
Bus Driver, M	44.3	8.5	25	58
Horticultural worker, F	32.0	8.7	12	50
Horticultural worker, M	26.7	11.2	-3	49
Mathematician, F	18.7	11.5	-6	52
Mathematician, M	15.4	13.0	-8	54
College Professor, F	28.6	9.3	12	61
College Professor, M	27.1	10.0	5	63
Art teacher, F	2.2	13.4	-9	38
Art teacher, M	17.5	12.1	-9	44
Artist, fine, F	25.2	12.1	-3	58
Artist, fine, M	21.7	12.4	-3	62
Artist, commercial, F	15.6	13.6	-9	48
Artist, commercial, M	25.8	10.8	5	56
Photographer, F	29.0	10.7	7	59
Photographer, M	31.4	11.2	7	55

(table continues)

Variable	M	SD	MV	MXV
SCII Occupational Interest Scales				
Musician, F	23.8	13.2	-5	61
Musician, M	31.5	10.9	9	64
Advertising executive, F	33.9	8.5	13	49
Advertising executive, M	33.0	10.5	10	57
Broadcaster, F	35.4	9.0	15	57
Broadcaster, M	37.7	9.0	18	58
Public relations director, F	21.2	11.9	-5	47
Public relations director, M	23.7	12.3	-8	49
Lawyer, F	31.8	9.5	13	55
Lawyer, M	26.9	10.5	8	55
Reporter, F	19.4	11.5	-3	47
Reporter, M	23.2	11.6	1	55
Librarian, F	15.1	13.3	-8	45
Librarian, M	26.3	10.9	6	56
Guidance Counselor, F	22.7	10.8	1	52
Guidance Counselor, M	25.9	9.6	7	56
Social science teacher, F	23.2	11.5	2	52
Social science teacher, M	29.9	10.7	4	58
Elementary teacher, F	25.5	8.4	8	48
Elementary teacher, M	24.0	13.7	-6	55
Special education teacher, F	25.5	10.9	7	48

(table continues)

Variable	M	SD	MV	MXV
SCII Occupational Interest Scales				
Special education teacher, M	22.4	14.5	-1	54
Realtor, F	27.7	13.9	-1	62
Realtor, M	35.9	12.9	10	65
Florist, F	37.6	9.5	19	59
Florist, M	36.5	9.7	20	58
Accountant, F	37.5	10.1	14	62
Accountant, M	30.8	10.7	6	59
Banker, F	40.5	9.7	15	58
Banker, M	32.7	12.4	13	62
Air Force enlisted personnel, M	37.2	9.5	19	57
Farmer, M	33.8	9.6	13	53
Vocational/Agricultural teacher, F	28.8	9.3	5	57
Forester, M	21.0	9.5	-2	46
Emergency medical technician, M	32.3	10.0	10	52
Carpenter, M	30.1	11.8	1	56
Electrician, M	32.0	11.0	6	59
Chiropracter, M	24.5	13.7	-3	57
Physician, F	19.9	12.6	-9	49
Biologist, M	18.6	12.0	-6	49
Geographer, M	20.3	10.3	2	52
Interior decorator, M	31.1	7.9	15	50

(table continues)

Variable	M	SD	MV	MXV
SCII Occupational Interest Scales				
Flight attendant, M	38.0	9.4	16	58
Public Administrator, F	29.1	10.8	8	52
Personnel director, F	33.3	14.0	3	62
Elected public official, M	27.7	11.4	5	51
Chamber of Commerce executive, M	25.2	13.7	4	53
Restaurant manager, M	42.4	12.0	13	66
Travel agent, M	41.0	9.6	21	63
Funeral director, M	39.5	10.7	13	57
Beautician, F	38.2	9.9	11	55
Buyer, M	40.4	12.5	10	71
Secretary, F	35.1	8.7	17	54
Air Force enlisted personnel, F	38.0	10.2	15	62

Note. M = Mean; SD = Standard Deviation; MV = Minimum Value; MXV = Maximum Value; F = female; M = male.

OIS Art teacher score, female of 2.2. The interests of the 71 males in this sample appeared to be quite different from female Art teacher's interests.

T-tests

T-tests determine whether there are differences between two group means. A .05 significance level, one-tailed test was used to test the first eight hypotheses. The first eight hypotheses were rationally derived from descriptions of the MBTI types presented in the Manual (Myers & McCaulley, 1985).

The MBTI types were tested using the SAS (1985) General Linear Model Procedure. The MBTI dichotomous type combinations were contrasted with their opposite type on each of the eleven t-tests. For example, Hypothesis one tested whether Extraverted Thinking Types (ENTJ, ESTJ) tended to score higher on the SCII GOT E code than Introverted Feeling Types (INFP, ISFP). Holland codes were measured by SCII GOT scores on each of the eleven t-tests which tested the first eight hypotheses.

Hypothesis one was tested resulting in nonsignificance, $t\ (32) = 1.49$, $p > .05$. The results did not support the hypothesis that Extraverted Thinking Types (ESTJ, ENTJ) tended to have higher SCII E code scores.

Hypothesis two, which stated that Introverted Thinking Types (ISTP, INTP) tended to have higher SCII I code scores, was tested using the SCII GOT. Results showed

that t (36) = .1, p > .05. The results did not support the hypothesis that Introverted Thinking Types tended to have higher SCII I code scores.

Hypothesis three, which stated that Extraverted Feeling Types (ESFJ, ENFJ) tended to have higher SCII GOT S code scores was tested using the SCII GOT. Results showed that t (36) = 2.52, p < .05. The results supported the hypothesis that Extraverted Feeling Types tended to have higher SCII S code scores.

Hypothesis four, which stated that Introverted Feeling Types (ISFP, INFP) tended to have higher SCII S code scores was tested using the SCII GOT. The results showed that t (32) = 1.64, p > .05. The results did not support the hypothesis that Introverted Feeling Types tended to have higher SCII S code scores.

Hypothesis five, which stated that Extraverted Sensing Types (ESTP, ESFP) tended to have higher SCII R code scores, was tested using the SCII GOT. The results of the t-test showed that t (39) = 1.44, p > .05. The results did not support the hypothesis that Extraverted Sensing Types tended to have higher SCII R code scores.

Hypothesis six, which stated that Introverted Sensing Types (ISTJ, ISFJ) tended to have higher SCII C code scores, was tested using the SCII GOT. Results of the t-test produced significant results, t (71) = 2.57, p < .05.

The results supported the hypothesis that Introverted Sensing Types tend to have higher SCII C code scores.

Hypothesis seven was tested using four t-tests. The first t-test tested whether Extraverted Intuitive Types (ENTJ, ENFJ) scored higher on SCII I and E codes and lower on SCII R and C codes. Extraverted Intuitive Types were; not found to score higher in SCII GOT I codes, $t\ (71) = 1.31$, $p > .05$; found to score higher on SCII GOT E codes, $t\ (71) = 2.22$, $p < .05$; not found to score lower on SCII GOT R codes, $t\ (71) = 1.13$, $p > .05$; and found to score lower on SCII GOT C codes, $t\ (71) = 2.57$, $p < .05$. Two of the four tests using Extraverted Intuitive Types were found to be significant in the hypothesized direction.

Hypothesis eight was the final hypothesis tested by a t-test. Introverted Intuitive Types (INTJ, INFJ) were hypothesized to score higher on SCII A codes. The SCII GOT was used to measure SCII A codes. Results supported hypothesis eight, $t\ (39) = 4.50$, $p < .05$.

T-test Summary

The eight MBTI types were tested to determine whether they could predict Holland codes based on rationally derived hypotheses from the MBTI Manual (Myers & McCaulley, 1985). T-tests were used to test the eight hypotheses. Eleven t-tests resulted in six nonsignificant results and five significant results.

Discriminant Function Analysis

Discriminant function analysis is used to predict group membership based on a set of predictor variables. The goal in this part of the study was to predict Holland code membership from MBTI scores. The BMDP7M program was used to analyze the data (Dixon, 1990). The analyses used all 186 subjects and used a .05 significance level for variable inclusion.

Forward variable selection and stepwise discriminant analysis are two types of discriminant function analyses. Both have the goal of coming up with the "best" set of predictors of the criteria. First, a forward selection procedure was done in which all predictor variables were considered, one at a time. The forward selection allowed the researcher to identify the single "best" overall predictor and examine which predictors could group or classify Holland codes at a statistically significant level. Next, a stepwise discriminant analysis was done in which variables originally included in the model would be excluded if they no longer contributed at a significant level (had an F-statistic less than 4.0 to allow for a liberal inclusion or deletion of predictor variables). The stepwise discriminant analysis proceeded by taking the best overall predictor and determining what variables

accounted for the greatest degree of additional variance. As more variables are brought into the model, variables previously used can be left out.

The predictor variables were comprised of the four MBTI variables: E-I, S-N, T-F, and J-P. The predictor variables were used in three separate analyses. In the first analysis, the SCII General Occupational Themes (GOT R, GOT I, GOT A, GOT S, GOT E, and GOT C) were used to create the grouping variable. A Holland code for each subject was assigned to their highest GOT score. There were no ties. Table 10 shows that 15 subjects were assigned to the R Holland code group, 15 subjects were assigned to the I Holland code group, 36 subjects were assigned to the A Holland code group, 38 subjects were assigned to the S Holland code group, 57 subjects were assigned to the E Holland code group, and 25 subjects were assigned to the C Holland code group. Individuals assigned to the E Holland code group outnumbered the R Holland code group and the I Holland code group by nearly four to one.

A second analysis was done using the Basic Interest Scales (BIS) to form the grouping variables. The twenty-three BIS scales are comprised of five scales that have an R Holland code (Agriculture, Nature, Adventure, Military Activities, and Mechanical Activities score); four scales that have an I Holland code (Science, Mathematics, Medical

Table 10

The Means of the Myers-Briggs Type Indicator (MBTI) Variables for Each of the Holland Code Groups Based on the General Occupational Themes (GOT) (N = 186).

	Holland Code Group						
VARIABLE	R	I	A	S	E	C	All
E-I	106.6	102.9	100.7	89.7	87.0	94.8	94.1
S-N	93.8	111.9	112.9	94.6	90.8	79.0	96.2
T-F	100.9	86.9	102.1	107.4	97.1	96.0	99.5
J-P	107.0	107.9	105.1	98.8	105.8	87.8	102.1
	Holland Code Group *n* size						
	15	15	36	38	57	25	86

Note. R = Realistic; I = Investigative; A = Artistic; S = Social; E = Enterprising; C = Conventional; E-I = Extraversion-Introversion; S-N = Sensing-Intuition; T-F = Thinking-Feeling; J-P = Judging-Perceiving.

Science, and Medical Service score); three scales that have an A Holland code (Musical Dramatics, Art, and Writing score); five scales that have an S Holland code (Teaching, Social Service, Athletics, Domestic Arts, and Religious Activities score); five scales that have an E Holland code (Public Speaking, Law/Politics, Merchandising, Sales, and Business Management score); and one scale has a C Holland code (Office Practices score). A Holland code for each subject was given using the following procedure. First, a mean score was determined for the variables comprising each Holland code. Each subject, therefore, had a mean score for each Holland code. Each subject was then assigned to the Holland code group for which the subject had the highest mean score. For example, the variables BIS Agriculture, BIS Nature, BIS Adventure, BIS Military Activities, and BIS Mechanical Activities comprise the Realistic Holland code. These variables have been renamed R Holland code group from BIS. If the variables making up this code had the highest mean score, a Holland code of Realistic would be assigned to a subject for the BIS. There were no ties. Table 11 shows that 22 subjects were assigned to the R Holland code group, 20 subjects were assigned to the I Holland code group, 35 subjects were assigned to the A Holland code group, 32 subjects were assigned to the S Holland code group, 37 subjects were assigned to the E Holland code group, 40 subjects were assigned to the C Holland code group.

Table 11

The Means of the Myers-Briggs Type Indicator (MBTI) Variables for Each of the Holland Code Groups Based on the Basic Interest Scales (BIS) (N = 186).

	Holland Code Group						
VARIABLE	R	I	A	S	E	C	All
E-I	103.0	97.8	102.1	88.3	82.8	95.4	94.1
S-N	95.4	104.3	112.1	95.9	92.0	83.0	96.2
T-F	102.7	89.5	100.8	106.7	91.5	103.3	99.5
J-P	111.3	104.0	103.7	104.8	103.3	91.4	102.1
	Holland Code Group *n* size						
	22	20	35	32	37	40	186

Note. R = Realistic; I = Investigative; A = Artistic; S = Social; E = Enterprising; C = Conventional; E-I = Extraversion-Introversion; S-N = Sensing-Intuition; T-F = Thinking-Feeling; J-P = Judging-Perceiving.

Individuals assigned to the C Holland code group outnumbered the I Holland code group by two to one.

A final analysis used the pure, one-letter Occupational Interest Scale (OIS) as the grouping variables. The seventy-four OIS used in this study were comprised of fifteen scales with an R Holland code; eight scales with an I Holland code; twenty-five scales with an A Holland code; twelve scales with an E Holland code; and six scales with a C Holland code. A Holland code for each subject was as signed using the following procedure. First, a mean score was determined for the variables comprising each Holland code. Each subject, therefore, had a mean score for each Holland code. Each subject was then assigned to the Holland code group for which the subject had the highest mean score. There were no ties. This procedure was done in exactly the same manner as the BIS Holland codes were produced except that the OIS were used. Table 12 shows that 25 subjects were assigned to the R Holland code group, 13 subjects were assigned to the I Holland code group, 22 subjects were assigned to the A Holland code group, 20 subjects were assigned to the S Holland code group, 69 subjects were assigned to the E Holland code group, and 37 subjects were assigned to the C Holland code group. Individuals assigned to the E Holland code group outnumbered those in the I Holland code group by more than five to one.

Table 12

The Means of the MBTI Variables for Each of the Holland Code Groups Based on Occupational Interest Scales (N = 186).

	Holland Code Group						
VARIABLE	R	I	A	S	E	C	All
E-I	102.9	106.2	101.5	98.3	80.6	102.4	94.1
S-N	96.5	111.2	122.1	92.2	96.8	76.5	96.2
T-F	101.6	88.4	100.5	108.3	102.8	90.5	99.5
J-P	110.8	104.7	110.5	87.7	105.9	90.9	102.1
	Holland Code Group *n* size						
	25	13	22	20	69	37	186

Note. R = Realistic; I = Investigative; A = Artistic; S = Social; E = Enterprising; C = Conventional; E-I = Extraversion-Introversion; S-N = Sensing-Intuition; T-F = Thinking-Feeling; J-P = Judging-Perceiving.

Forward Selection

The first analysis examined whether the four MBTI variables (E-I, S-N, T-F, J-P) could predict Holland codes using GOT scores. First, each of the four predictor variables were included individually in a discriminant model. Variable S-N was significant, $F(5, 180) = 8.32$, $p < .05$. Variable E-I was significant, $F(5, 180) = 2.74$, $p < .05$. Variable T-F was not significant, $F(5, 180) = 2.20$, $p > .05$. Variable J-P, was not significant, $F(5, 180) = 1.99$, $p > .05$. The means of variables S-N and E-I differed across the Holland code groups ($p < .05$). Therefore, individually they have some predictive ability among the Holland codes.

Scores were designated as being high if they were ten points above the mean and low if they were ten points below the mean. High MBTI scores on S-N (Intuition) were associated with GOT I and GOT A versus low scores on S-N (Sensing), which were associated with GOT C. High MBTI scores on E-I (Introversion) were positively associated with GOT R and GOT I in contrast to low scores on E-I (Extraversion), which were associated with GOT E and GOT S.

The forward variable selection discriminant analysis examined the extent to which any of the remaining predictor variables added predictive power above and beyond the best predictor variable, S-N. With S-N already included, E-I

was entered next since it added the most predictive power. E-I was significant, $F(5, 179) = 3.76$, $p = .003$. With both S-N and E-I already included, T-F was the next best predictor. T-F was significant, $F(5, 718) = 2.29$, $p = .048$. Finally, with E-I, S-N, and T-F already included, J-P was added. J-P was not significant, $F(5, 177) = 1.63$, $p = .154$. Therefore, variables E-I, S-N, and T-F together are statistically significant predictors of the GOT. The inclusion of variable J-P does not add predictive power.

The classification matrices showed that cases were misclassified most often in categories adjacent to the Holland code on Holland's Hexagon. Overall, variable S-N alone correctly classified 25.3% of the total number of cases; variables E-I and S-N together correctly classified 28% of the total number of cases; and variables E-I, S-N, and T-F correctly classified 32.8% of the total number of cases (see Table 13). Table 13 shows that when S-N, E-I, and T-F were used as the predictor variables, seven out of the actual fifteen GOT R cases or 46.7% were correctly classified; five out of the actual fifteen GOT I cases or 33.3% were correctly classified; eleven out of the actual thirty-six GOT A cases or 30.6% were correctly classified; thirteen out of the actual thirty-eight GOT S cases or 34.2% were correctly classified; fourteen out of the actual fifty-seven GOT E cases or 24.6% were correctly classified; and

Table 13

Forward Variable Selection Discriminant Function Analysis Classification Using Sensing-Intuition, Extraversion-Introversion, and Thinking-Feeling to Discriminate Among Holland Codes Derived From the General Occupational Themes (GOT) (N = 186).

		Holland Code Group Classifications					
Actual Group	Percent Correct	R	I	A	S	E	C
GOT R	46.7	7	2	2	2	0	2
GOT I	33.3	0	5	7	1	1	1
GOT A	30.6	6	10	11	5	4	0
GOT S	34.2	4	5	5	13	4	7
GOT E	24.6	4	6	4	11	14	18
GOT C	44.0	4	3	1	4	2	11
TOTAL	32.8	25	31	30	36	25	39

Note. Correctly classified cases are offset and lie upon the diagonal. Cases adjacent to one another in any direction lie adjacent to one another on Holland's Hexagonal Model. R = Realistic; I = Investigative; A = Artistic; S = Social; E = Enterprising; C = Conventional.

eleven out of the actual twenty-five GOT C cases or 44% were correctly classified. The inclusion of variable J-P to variables E-I, S-N, and T-F correctly classified 33.9% of the total number of cases. The fact that misclassifications occurred most often in categories adjacent to Holland"s Hexagon suggests that the low percentage of correctly classified cases could be due to the use of only one Holland code. Use of a two or three letter codes would be more precise and may dramatically increase the percentage of correctly classified cases.

The classification matrix may be inflated in its estimation of correct classifications because the same data are being classified that are being used to build the model: the model is tailored very closely to that set of data. Therefore, it may not perform as well on a different set of data. One way to reduce that problem is the jackknifed classification. Therefore, a jackknifed classification was performed in this investigation. A jackknifed classification is a cross-validating mathematical procedure which uses all the data to estimate the discriminate function except the case being classified (Dixon, 1990). Variable S-N correctly classified 25.3% of the total number of cases; variables E-I and S-N correctly classified 23.7% of the total number of cases; variables E-I, S-N, and T-F correctly classified 29% of the total number of cases (see Table 14).

Table 14

Forward Variable Selection Discriminant Function Analysis Jackknifed Classification Using Sensing-Intuition, Extraversion-Introversion, and Thinking-Feeling to Discriminate Among Holland Codes Derived From the General Occupational Themes (GOT) (N = 186).

		Holland Code Group Classifications					
Actual Group	Percent Correct	R	I	A	S	E	C
GOT R	26.7	4	3	3	2	0	3
GOT I	20.0	1	3	8	1	1	1
GOT A	27.8	6	10	10	6	4	0
GOT S	34.2	4	5	5	13	4	7
GOT E	24.6	4	6	4	11	14	18
GOT C	40.0	4	3	1	5	2	10
TOTAL	29.0	23	30	31	38	25	39

Note. Correctly classified cases are offset and lie upon the diagonal. Cases adjacent to one another in any direction lie adjacent to one another on Holland's Hexagonal Model. R = Realistic; I = Investigative; A = Artistic; S = Social; E = Enterprising; C = Conventional.

Table 14 shows that when S-N, E-I, and T-F were used as the predictor variables using a jackknifed classification, four out of the actual fifteen GOT R cases or 26.7% were correctly classified; three out of the actual fifteen GOT I cases or 20% were correctly classified; ten out of the actual thirty-six GOT A cases or 27.8% were correctly classified; thirteen out of the actual thirty-eight GOT S cases or 34.2% were correctly classified; fourteen out of the actual fifty-seven GOT E cases or 24.6% were correctly classified; and ten out of the actual twenty-five GOT C cases or 40% were correctly classified. Adding J-P to variables S-N, E-I, and T-F correctly classified only 28.5% of the total number of cases.

The second analysis examined whether the four MBTI variables (E-I, S-N, T-F, and J-P) could predict Holland codes using BIS scores. First, each of the four predictor variables were included individually in a discriminant model. Variable S-N was significant, $F(5, 180) = 6.13$, $p < .05$. Variable E-I was significant, $F(5, 180) = 3.23$, $p < .05$. Variable T-F was significant, $F(5, 180) = 2.71$, $p < .05$. Variable J-P was not significant, $F(5, 180) = 1.82$, $p > .05$. The means of variables E-I, S-N, and T-F differed across the Holland code groups ($p < .05$). Therefore, E-I, S-N, and T-F have some predictive ability among the BIS Holland codes.

Scores were designated as being high if they were ten points above the mean and low if they were ten points below the mean. High MBTI scores on S-N (Intuition) were associated with A Holland Code Group from BIS and I Holland Code Group from the BIS versus low scores on S-N (Sensing), which were associated with C Holland code group from BIS. High MBTI scores on E-I (Introversion) were positively associated with R Holland code group from BIS and A Holland code group from BIS while low scores on E-I (Extraversion) were associated with E Holland code group from BIS and S Holland code group from BIS. High scores on T-F (Feeling) were associated with E Holland code group from BIS versus low scores on T-F (Thinking), which were associated with I Holland code group from BIS.

The forward variable selection discriminant analysis examined the extent to which any of the remaining predictor variables added predictive power above and beyond the best predictor variable (S-N). With S-N already included, E-I was placed in next since it added the most predictive power. E-I was significant, $F(5, 179) = 3.97$. With both S-N and E-I already included, T-F was the next best predictor. T-F was significant, $F(5, 178) = 3.61$. Finally, with E-I, S-N, and T-F already included, J-P was added. J-P was not significant, $F(5, 177) = 1.52$, $p = .1858$. Therefore, variables E-I, S-N, and T-F together are statistically significant

predictors in the forward variable selection model using the BIS. The inclusion of variable J-P does not add predictive power. Perhaps one reason for J-P not adding predictive power independent of S-N once S-N was already put into the discriminant function model is that the past research has found J-P and S-N on the MBTI to be correlated (see Sipps & DiCaudo, 1988).

The classification matrices showed that cases were misclassified most often in categories adjacent to the Holland's Hexagonal Model. Overall, variable S-N alone correctly classified 26.3% of the total number of cases; variables E-I and S-N correctly classified 33.3% of the total number of cases; and variables E-I, S-N, and T-F correctly classified 31.7% of the total number of cases (see Table 15). Table 15 shows that when S-N, E-I, and T-F were used as the predictor variables, five out of the actual twenty-two BIS R cases or 22.7% were correctly classified; eight out of the actual twenty BIS I cases or 40% were correctly classified; ten out of the actual thirty-five BIS A cases or 28.6% were correctly classified; six out of the actual thirty-two BIS S cases or 18.8% were correctly classified; fifteen out of the actual thirty-seven BIS E cases or 40.5% were correctly classified; and fifteen out of the actual forty BIS C cases or 37.5% were correctly classified.

Table 15

Forward Variable Selection Discriminant Function Analysis Classification Using Sensing-Intuition, Extraversion-Introversion, and Thinking-Feeling to Discriminate Among Holland Codes Derived From the Basic Interest Scales (BIS) (N = 186).

Actual Group	Percent Correct	Holland Code Group Classifications					
		R	I	A	S	E	C
BIS R	22.7	5	3	3	5	0	6
BIS I	40.0	0	8	4	4	2	2
BIS A	28.6	4	8	10	4	5	4
BIS S	18.8	2	3	5	6	6	10
BIS E	40.5	3	6	0	6	15	7
BIS C	37.5	6	3	2	8	6	15
TOTAL	31.7	20	31	24	33	34	44

Note. Correctly classified cases are offset and lie upon the diagonal. Cases adjacent to one another in any direction lie adjacent to one another on Holland's Hexagonal Model. R = Realistic; I = Investigative; A = Artistic; S = Social; E = Enterprising; C = Conventional.

The more conservative jackknife classification results show that variable S-N correctly classified 26.3% of the total number of cases; variables E-I and S-N correctly classified 30.1% of the total number of cases (see Table 16); and variables E-I, S-N, and T-F correctly classified 26.3% of the total number of cases. Table 16 shows that when S-N and E-I were used as the predictor variables using a jackknifed classification six out of the actual twenty-two BIS R cases or 27.3% were correctly classified; two out of the actual twenty BIS I cases or 10% were correctly classified; eightteen out of the actual thirty-five BIS A cases or 51.4% were correctly classified; two out of the actual thirty-two BIS S cases or 6.3% were correctly classified; thirteen out of the actual thirty-seven BIS E cases or 35.1% were correctly classified; and fifteen out of the actual forty BIS C cases or 40% were correctly classified.

The third and final analysis examined whether the four MBTI variables (E-I, S-N, T-F, and J-P) could predict Holland codes using OIS scores. First, each of the four predictor variables were included individually in a discriminant model. Variable S-N was significant, $F(5, 180) = 12.91$, $p < .05$. Variable E-I was significant, $F(5, 180) = 7.16$, $p < .05$. Variable J-P was significant, $F(5, 180) = 3.69$, $p < .05$. Variable T-F was significant, $F(5, 180) = 2.78$, $p < .05$. The means of variables E-I, S-N, T-F, and J-P all differed across the Holland code groups ($p < .05$).

Table 16

Forward Variable Selection Discriminant Function Analysis Jackknifed Classification Using Sensing-Intuition and Extraversion-Introversion to Discriminate Among Holland Codes Derived From the Basic Interest Scales (BIS) (N = 186).

		Holland Code Group Classifications					
Actual Group	Percent Correct	R	I	A	S	E	C
BIS R	27.3	6	1	5	3	1	6
BIS I	10.0	1	2	7	1	4	5
BIS A	51.4	3	3	18	1	7	3
BIS S	6.3	1	3	7	2	11	8
BIS E	35.1	5	1	1	10	13	7
BIS C	37.5	5	2	5	3	10	15
TOTAL	30.1	21	12	43	20	46	44

Note. Correctly classified cases are offset and lie upon the diagonal. Cases adjacent to one another in any direction lie adjacent to one another on Holland's Hexagonal Model. R = Realistic; I = Investigative; A = Artistic; S = Social; E = Enterprising; C = Conventional.

Therefore, individually they have some predictive ability among the Holland codes.

Scores were designated as being high if they were ten points above the mean and low if they were ten points below the mean. High MBTI scores on S-N (Intuition) were associated with OIS A Holland code group and OIS I Holland code group versus low scores on S-N (Sensing), which were associated with OIS C Holland code group. High MBTI scores on E-I Introversion were associated with OIS I Holland code group versus low scores on E-I (Extraversion) which were associated with OIS E Holland code group. High scores on J-P (Perceiving) were associated with OIS R Holland code group while low scores were associated with OIS S Holland code group. Finally, high scores on T-F (Feeling) were associated with OIS S Holland code group versus low scores on T-F (Thinking) which were associated with OIS I Holland code group.

The forward variable selection discriminant analysis examined the extent to which any of the remaining predictor variables added predictive power above and beyond the best predictor variable, S-N. With S-N already included, E-I was placed in next since it added the most predictive power. E-I was significant, $F(5, 179) = 7.37$. With both S-N and E-I already included, T-F was entered next because it was the next best additive predictor. T-F was not significant,

$F(5, 178) = 2.13$. Therefore, variables E-I and S-N are statistically significant predictors in the forward variable selection model of the OIS groups.

The classification matrices showed that cases were misclassified most often in categories adjacent to the Holland code on Holland's Hexagon. Correctly classified cases lie on the diagonal of the classification matrix. Many of the misclassified cases occur one cell to the left or right of the diagonal. Overall, variable S-N correctly classified 28.5% of the number of cases; variables S-N and E-I correctly classified 38.7% of the total number of cases (see Table 17); variables S-N, E-I, and T-F correctly classified 37.1% of the total number of cases; and variables S-N, E-I, T-F, and J-P correctly classified 38.2% of the total number of cases. Table 17 shows that when S-N and E-I were used as the predictor variables, four out of the actual twenty-seven OIS R cases or 16.0% were correctly classified; one out of the actual thirteen OIS I cases or 7.7% were correctly classified; eight out of the actual twenty-two OIS A cases or 36.4% were correctly classified; zero out of the actual twenty OIS S cases or 0% were correctly classified; thirty-nine out of the actual sixty-nine OIS E cases or 56.5% were correctly classified; and twenty out of the actual thirty-seven cases or 54.1% were correctly classified.

Table 17

Forward Variable Selection Discriminant Function Analysis Classification Using Sensing-Intuition and Extraversion-Introversion to Discriminate Among Holland Codes Derived From the Occupational Interest Scales (OIS) (N = 186).

		Holland Code Group Classifications					
Actual Group	Percent Correct	R	I	A	S	E	C
OIS R	16.0	4	2	3	0	8	8
OIS I	7.7	0	1	6	1	3	2
OIS A	36.4	0	9	8	0	5	0
OIS S	0.0	2	3	3	0	5	7
OIS E	56.5	5	2	9	1	39	13
OIS C	54.1	5	2	2	1	7	20
TOTAL	38.7	16	19	31	3	67	50

Note. Correctly classified cases are offset and lie upon the diagonal. Cases adjacent to one another in any direction lie adjacent to one another on Holland's Hexagonal Model. R = Realistic; I = Investigative; A = Artistic; S = Social; E = Enterprising; C = Conventional.

The jackknife classification showed that variable S-N correctly classified 28.5% of the total number of cases; variables S-N and E-I correctly classified 36.6% of the total number of cases (see Table 18); variables S-N, E-I, and T-F correctly classified 31.7% of the total number of cases; and variables S-N, E-I, T-F, and J-P correctly classified 32.3% of the total number of cases. Table 18 shows that when S-N and E-I were used as predictor variables using a jackknifed classification, two out of the actual twenty-five OIS R cases or 8% were correctly classified; zero out of the actual thirteen OIS I cases or 0% were correctly classified; seven out of the actual twenty-two OIS A cases or 31.8% were correctly classified; zero out of the actual twenty OIS S cases or 0% were correctly classified; thirty-nine out of the actual sixty-nine OIS E cases or 56.5% were correctly classified; and twenty out of the actual thirty-seven OIS C cases or 54.1% were correctly classified.

Stepwise Discriminant Analysis

The stepwise discriminant analysis also started with the best overall predictor and then determined what variables gave the most amount of predictive information. However, variables originally included in the model could be excluded if they no longer contributed at a significant level when the next best predictor variable was considered.

Table 18

Forward Variable Selection Discriminant Function Analysis Jackknifed Classification Using Sensing-Intuition and Extraversion-Introversion to Discriminate Among Holland Codes Derived From the Occupational Interest Scales (OIS) (N = 186).

		Holland Code Group Classifications					
Actual Group	Percent Correct	R	I	A	S	E	C
OIS R	8.0	2	2	3	0	8	10
OIS I	0.0	0	0	7	1	3	2
OIS A	31.8	0	10	7	0	5	0
OIS S	0.0	2	3	3	0	5	7
OIS E	56.5	5	2	9	1	39	13
OIS C	54.1	5	2	2	1	7	20
TOTAL	36.6	14	19	31	3	67	52

Note. Correctly classified cases are offset and lie upon the diagonal. Cases adjacent to one another in any direction lie adjacent to one another on Holland's Hexagonal Model. R = Realistic; I = Investigative; A = Artistic; S = Social; E = Enterprising; C = Conventional.

Across the GOT, BIS, and OIS, the S-N predictor variable was identified as the best overall predictor and it has been found to be significant as an individual predictor of Holland codes at the .05 significance level. (S-N alone predicts Holland codes considerably better than chance, which is 16.7% of the time). The only variable to be included in the model as an additional predictor variable was E-I in the analysis that examined the OIS to form Holland codes. When the OIS were used as grouping variables, both S- N and E-I were statistically significant variables in the stepwise discriminant analysis, $F(10, 358) = 10.02$, $p < .05$. The classification matrices and jackknifed classification matrices percentages of correctly classified Holland codes were identical to the forward variable selection discriminant analysis when the same variables were considered in the model.

Discriminant Function Analysis Summary

The discriminant function analysis supported the General Hypothesis that there is a relationship between MBTI scores and Holland codes and that MBTI scores can predict Holland codes. However, the best predictor model could only correctly classify 38.7% of the Holland codes (E-I and S-N in predicting OIS), which is poor.

The relationships between MBTI variables and Holland code groups were noted previously, but were not statistically tested. Therefore, those relationships will not be considered further with respect to hypothesis testing.

Across all three of the forward stepwise analyses, S-N had the most predictive power. Both S-N and E-I were significant in all three of the analyses. T-F was a significant individual predictor only using the BIS to form Holland codes and J-P was a significant individual predictor only using the OIS to form Holland codes.

After S-N was consistently placed in first as a significant predictor variable in all three forward variable selection stepwise procedures, E-I was placed in next and was significant across all three analyses. T-F was significant as a predictor above and beyond S-N and E-I in two of the three analyses in which the GOT and BIS were used as the grouping variables for Holland codes. Only E-I was added in the model as a significant predictor variable in the stepwise discriminant analysis when the OIS were used as the grouping variables for Holland codes.

The best discriminant function model using the GOT to form Holland codes included S-N, E-I, and T-F as significant predictor variables. Likewise, when the BIS were used to form Holland codes, S-N, E-I, and T-F were included in the best discriminant model. Finally, when the OIS were

used to form Holland codes, the most powerful discriminant function model included S-N and E-I. Therefore, S-N and E-I were consistent and significant predictors of Holland codes. Combining the GOT, BIS, and OIS in a discriminant function model and assigning up to a three letter Holland code may be worthy due to the fact that misclassified cases were most often in categories adjacent to Holland's Hexagonal Model. For example, if GOT, BIS, and OIS were the same, you could give a person an identical three letter Holland code versus if only the GOT and BIS were the same for a person (e.g. EEE vs EEC).

Canonical Correlation Analysis

Canonical correlation analysis is considered to be the most general of all multivariate analyses; other multivariate analyses are specialized examples of it (Tabachnick & Fiddell, 1989). There does not appear to be a consensus among researchers as to how to interpret canonical correlations (see Harris, 1989). Harris (1989) advocated interpreting canonical variate coefficients. Interpretation of structural coefficients, the most often advocated method among researchers for reasons such as their higher stability, results in multiple univariate analyses (Harris, 1989). Harris (1989) wrote that the relative magnitude structure coefficient ". . . loadings are simply a very indirect, roundabout way of imposing a univariate

solution on a multivariate problem" (p. 33). Similarly, he wrote that cross-structure correlations do not provide ". . . an interpretation of the c.v. per se, but an indication of how this c.v. relates to the other set of original variables" (p. 34).

Three canonical correlation analyses were performed in the present study (see also Appendix C) using the SAS CANCORR procedure (1988). Alpha was set at .05. In each analysis, the four MBTI scales were compared with either the six GOT, twenty-three BIS, or the seventy-four selected OIS, or the GOT, BIS, and OIS combined. Because there is a recommendation of 10 subjects for every variable when performing canonical correlation analysis (Tabachnick & Fiddell, 1989; Marasciulo & Levin, 1983), all analyses were done using the combined male and female samples of 186 subjects. It should be noted that this recommendation has not been met; the actual ratio is 186/107 (i.e, less than two subjects for every variable) in this investigation. Since the predictor and criterion variables are not measured in the same units, standardized scores were presented and interpreted.

The first step in the overall canonical correlation analyses tested the assumption of multivariate normality. The assumption of multivariate normality was tested using the SAS macro MNORM (Steiner, 1989). First, each of the 107

variables were tested to determine if they were univariately normal. Evidence of lack of univariate normality in any component provides evidence that it is not multivariate normal. However, if all components are univariate normal, multivariate normality is not guaranteed. After assessing univariate normality, several multivariate tests were done to further test for multivariate normality.

Each of the four MBTI predictor variables and 103 SCII criterion variables were first examined to determine if they had a univariate normal distribution. Stem and leaf diagrams, Normal Probability Plots, Lilliefors' test of normality, skewness, and kurtosis were analyzed. Most of the measures were not univariate normal according to Lilliefors' test ($p < .01$). However, stem and leaf diagrams and normal probability plots indicated that the departures from normality were not very severe. The largest departures from normality showed up on five of the SCII BIS in skewness and kurtosis. The BIS Adventure score had a kurtosis of -1.13. The BIS Mathematics score had a kurtosis of -1.18. The BIS Writing scale had a kurtosis of -1.00. The BIS Athletics scale had a kurtosis of -1.27. Finally, the BIS Office Practices had a skewness of 1.03.

Multivariate tests of normality examined from the SAS macro MNORM (Steiner, 1989) program included the Kolmogorov-Smirnov (K-S) test and Royston's H statistic. The null hypothesis in each of these statistics is that the

data are multivariate normal. The .05 level of significance was used. Additionally, chi-square plots were examined for each combination of variables.

The four MBTI predictor variables (E-I, S-N, T-F, and J-P were tested first. The K-S p-value was .61 and Royston's H statistic p-value was .77. The chi-square plot supported that these variables are multivariate normal. The four predictor variables thus met the assumption of multivariate normality on all three procedures.

The six SCII GOT (GOT R, GOT I, GOT A, GOT S, GOT E, GOT C) criterion variables were tested next. The K - S p-value was .44 and Royston's H statistic p-value was .84. The chi-square plot supported that these variables are multivariate normal. The six GOT criterion variables thus met the assumption of multivariate normality on all three procedures.

The twenty-three SCII BIS criterion variables were additionally tested. The K - S p-value was .77 and Royston's H statistic was .98. The chi-square plot supported that these variables are multivariate normal. The twenty-three BIS criterion variables thus met the assumption of multivariate normality on all three procedures.

The seventy-four SCII OIS were also tested to determine if they were multivariate normal. The K - S p-value was .86 and Royston's H statistic p-value was .98. The chi-square plot supported that these variables are

multivariate normal. The seventy-four criterion variables thus met the assumption of multivariate normality on all three procedures.

The combination of the four MBTI predictor variables and six SCII GOT criterion variables were tested next to determine if their distribution was multivariate normal. The probability value for the K - S statistic was .55 and Royston's H statistic p-value was .92. The chi-square plot supported that these variables are multivariate normal. The four MBTI variables and six SCII GOT variables in combination thus met the assumption of multivariate normality on all three procedures.

The combination of the four MBTI predictor variables and twenty-three SCII BIS criterion variables were examined to determine if they were multivariate normal. The probability level for the K - S statistic was .66 and the probability value for Royston's H statistic was .99. The chi-square plot supported that these variables are multivariate normal. The four MBTI variables and twenty-three SCII BIS variables in combination thus met the assumption of multivariate normality on all three procedures.

The combination of the four MBTI predictor variables and seventy-four SCII OIS criterion variables was tested next. The probability level for the K - S statistic was .68

multivariate normal. The four MBTI variables and seventy-four SCII OIS variables in combination thus met the assumption of multivariate normality on all three procedures.

The multivariate tests for normality indicate that the sets of variables examined were all multivariate normal. The chi-square plots tend to support the assumption of multivariate normality. Multivariate normality is therefore not an unreasonable assumption. As a result, hypothesis tests about canonical correlations can be assumed to be fairly accurate.

The first canonical correlation analysis (see Table 19) examined the relationship between the four MBTI variables and the six SCII GOT score variables. The *F* statistics below are approximations given by the CANCORR procedure which gives better small sample results than the X^2 approximation (SAS Institute, 1985). According to Wilks' lambda criterion *F* (24,615.20) is equal to 8.42, *p* < .01), there is an overall significant relationship between the MBTI and SCII GOT variable sets.

The first canonical correlation was .57 (32% of variance); the second was .51 (26% of variance); the third was .43 (19% of variance); and the fourth was .29 (8% of variance). Therefore, the first canonical correlation is significantly greater than 0. With the first canonical

Table 19.

Standardized Canonical Correlation Coefficients, Structure Coefficients, Cross-Structure Correlations, Canonical Correlations, Percents of Variance, and Redundancies Between Myers-Briggs Type Indicator (MBTI) and Strong Campbell Interest Inventory General Occupational Themes (SCII GOT) Variables and Their Corresponding Canonical Variates

MBTI Set	First Canonical Variate			Second Canonical Variate			Third Canonical Variate			Fourth Canonical Variate		
	Coeff	Struct	Cross Struct	Coeff	Struct	Cross Struct	Coeff	Struct	Cross Struct	Coeff	Struct	Cross Struct
E-I	.3821	.2474	.1406	-.8886	-.9488	-.4877	-.1528	-.1519	-.0656	.3142	.1247	.0360
S-N	.9043	.8951	.5088	.1298	.2681	.1378	.1107	.3068	.1325	-.6725	-.1811	-.0524
T-F	.2962	.3799	.2160	.2724	.4478	.2302	-.8035	-.6431	-.2777	.5061	.4915	.1421
J-P	-.0462	.3584	.2037	.0006	.2718	.1398	.6810	.6257	.2702	.9262	.6373	.1843
% of Var.	.2838			.3116			.2305			.1704	Total = 1.00	
Redundancy	.0917			.0824			.0430			.0145	Total = .2316	

(table continues)

SCII	First Canonical Variate			Second Canonical Variate			Third Canonical Variate			Fourth Canonical Variate		
GOT Set			Cross			Cross			Cross			Cross
	Coeff	Struct	Struct	Coeff	Struct	Struct	Coeff	Struct	Struct	Coeff	Struct	Struct
R	.0020	.1903	.1082	-.1469	-.1173	-.0603	.4641	.6013	.2597	.9425	.2017	.0583
I	.3011	.3999	.2273	-.2815	-.1592	-.0819	.6448	.4403	.1901	-.9956	-.6001	.1735
A	.7419	.8259	.4695	.1609	.2615	.1344	-.3793	-.0819	-.0354	-.0569	-.1599	-.0462
S	-.1192	.0789	.0448	.5789	.6102	.3137	-.4629	-.1833	-.0792	.1199	-.2933	-.0848
E	-.1489	-.3574	-.2032	.7739	.6656	.3422	.7610	.4639	.2003	-.1926	-.2430	-.0703
C	-.4649	-.4790	-.2723	-.4982	-.0561	-.0288	-.5753	.0554	.0239	-.3914	-.4899	-.1417
% of Var.	.2069			.1543			.1357			.1352	Total = .6322	
Redundancy	.0669			.0408			.0253			.0113	Total = .1443	
Can. Corr.	.568429			.514075			.431871			.289128		

Note. Coeff = Standardized Canonical Correlation Coefficient; Struct = Structural Coefficient; Cross Struct = Cross-Structure Correlation; E-I = Extraversion-Introversion; S-N = Sensing-Intuition; T-F = Thinking-Feeling; J-P = Judging-Perceiving; R = Realistic; I = Investigative; A = Artistic; S = Social; E = Enterprising; C = Conventional; Can. Corr. = Canonical Correlation; % of Var. = Percent of Variance.

correlation removed, F (15,489.02) is equal to 7.92 ($p < .01$). This indicates that at least the second and possibly the third and fourth canonical correlations are significantly greater than 0. With the first and second canonical correlation removed, F (8,356) is equal to 7.04 ($p < .01$). This means that at least the third and possibly the fourth canonical correlations are significantly greater than 0. With the first, second, and third canonical correlation removed, F (3,179) is equal to 5.44 ($p < .01$). The fourth canonical correlation is therefore significantly greater than 0. All four pairs of canonical variates, therefore, accounted for statistically significant relationships between the two sets of variables.

The next step in the analysis was to interpret the cross-structure canonical variates. Cross-structure canonical variates give the proportion of variance that a variable from one instrument explains for the canonical variables of the other instrument of the same variate. Canonical variates were interpreted by examining the correlation between each canonical variate and the original variables of the opposite set. The MBTI variable Intuition accounted for the most variance in the SCII canonical variables ($r^2 = .26$). In the SCII set, the GOT Artistic score was the most highly correlated ($r^2 = .22$). The predictor variable might best be named Intuition. The criterion variable appears to measure Artistic interest. The second

variate was highest on Extraversion (r^2 = .24) in the MBTI set. Enterprising (r^2 = .12) and Social (r^2 = .10) SCII GOT were highest. Here, the predictor variate might best be considered to be a measure of sociability (see Appendix B). The criterion variable might best be considered a measure of Social and Enterprising interests (or a measure of working with people). The third and fourth variates were not interpreted due to the low correlations.

The canonical structure coefficients were interpreted next. The canonical structure coefficient represents the proportion of variance that a variable from one instrument explains for all variables of the same instrument and their own canonical variates. With a cutoff of .3 (.09 for r^2), the variables in the MBTI set that were correlated with the first canonical composite were S-N, T-F, and J-P. Among the SCII GOT variable Holland codes, I, A, E, and C correlated with the GOT set. The first pair of canonical variates indicate that those high on Intuition (r^2 = .81), Feeling (r^2 = .14), and Perceiving (r^2 = .13) also have relatively high Holland GOT codes of Artistic (r^2 = .69) and Investigative (r^2 = .16) and low Holland codes on Conventional and Enterprising (r^2 = .13).

The second canonical variate was comprised of E-I and T-F variables in the MBTI set. The SCII GOT set was made up of E and C Holland code variables. The second pair of canonical variates show that Extraversion (r^2 = .90) and

Feeling (r^2 = .20) are associated with Holland GOT codes of Enterprising (r^2 = .45) and Social (r^2 = .37).

The third canonical variate consisted of S-N, T-F, and J-P variables in the MBTI set. The SCII GOT set composition included R, E, and I Holland code variables. The canonical variates here show that those high on Thinking (r^2 = .41), Perceiving (r^2 = .40), and Intuition (r^2 = .10) have high Holland code scores on Realistic (r^2 = .36), Enterprising (r^2 = .21), and Investigative (r^2 = .19).

The fourth canonical variate consisted of J-P and T-F MBTI set variables. The SCII GOT set consisted of I and C Holland code variables. The results show that those high on Perceiving (r^2 = .41) and Feeling (r^2 = .24) had low Investigative (r^2 = .36) and Conventional (r^2 = .24) Holland codes.

The average proportion of variance in the variables in one set reproducible from the variables in the other set, referred to as a redundancy coefficient (Thompson, 1984), was examined next. For the first variate, about 9% of the MBTI variance was explained by the SCII variables and 7% of the SCII variance was accounted for by the MBTI variables. About 8% of the MBTI variance was explained by SCII GOT variables and 4% of the GOT variance was accounted for by MBTI variables for the second variate. The third canonical variate redundancy results showed that about 4% of the MBTI variance was explained by the SCII variables and close to 3%

of the SCII variance was explained by MBTI set variables. For the fourth canonical variate, about 1% of MBTI variance accounted for by the SCII variables and 3% of the SCII variance was explained by the variables in the MBTI set. Overall, the SCII explained more MBTI variance (23%) than vice-versa (14%). The results indicate that there is not a considerable degree of redundancy. The MBTI and SCII GOT variables are thus different, but related.

Percent of variance refers to how much of the total variance of an instrument the canonical variate variables of that set account for. The first canonical variate variables accounted for about 28% of the total MBTI variance; the second, 31%; the third, 23%; and the fourth accounted for about 17% of the total MBTI variance. The variables of the first canonical variate explained about 21% of the SCII GOT; the second, 15%; the third, 14%; and the fourth explained about 14% of the total SCII GOT variance.

In summary, the relationships between the four MBTI variables and the six SCII GOT score variables were researched using canonical correlation analysis. All four pairs of canonical variates accounted for significant relationships between the two sets of variables. Cross-structure canonical variates and canonical structure coefficients were interpreted. Finally, redundancy coefficients and percent of variance statistics were reported.

The second canonical correlation analysis (see Table 20) determined the relationship between the 4 MBTI variables and 23 SCII BIS score variables. According to Wilks' lambda criterion (F [92,631.8] = 3.67, $p < .01$), there is an overall significant relationship between the MBTI and SCII BIS variable sets.

The first canonical correlation was .66 (43% of variance); the second was .61 (37% of variance); the third was .60 (36% of variance); and the fourth was .45 (20% of variance). A series of Wilks' Lambda tests were made to determine the statistical significance of the canonical correlation ($p < .01$ for each test). All four pairs of canonical variates thus accounted for statistically significant relationships between the two sets of variables.

The cross-structure variate interpretation results yielded three significant relationships at .30 or above (r^2 of .09 or greater). The MBTI variable, Feeling (r^2 = .29) accounted for the most variance in the SCII canonical variables. In the SCII set, the BIS of Adventure (R; r^2 = .13) and Athletics (S; r^2 = .12) were negatively correlated and Domestic Arts (S; r^2 = .11), Social Service (S; r^2 = .10), Art (A; r^2 = .09) and Religious Activities (S; r^2 = .09) were all positively correlated with the MBTI canonical variables. The predictor variable might best be named Feeling. The criterion variable appears to measure

Table 20.

Standardized Canonical Correlation Coefficients, Structural Coefficients, Cross-Structure Correlations, Canonical Correlations, Percents of Variance, and Redundancies Between Myers-Briggs Type Indicator (MBTI) and Strong Campbell Interest Inventory Basic Interest Scales (SCII BIS) Variables and Their Corresponding Canonical Variates.

MBTI Set	First Canonical Variate			Second Canonical Variate			Third Canonical Variate			Fourth Canonical Variate		
	Coeff	Struct	Cross Struct	Coeff	Struct	Cross Struct	Coeff	Struct	Cross Struct	Coeff	Struct	Cross Struct
E-I	-.1086	-.1647	-.1082	-.9653	-.9605	-.5865	-.0391	-.1721	-.1026	-.3356	-.1437	-.0643
S-N	.2571	.1146	.0753	-.2939	-.1138	-.0695	.8452	.9708	.5789	.6576	.1773	.0794
T-F	.8712	.8250	.5420	-.0655	.0827	.0505	.0104	.1875	.1118	-.5481	-.5266	-.2357
J-P	-.6486	-.3606	-.2369	.1976	.2267	.1384	.2626	.6654	.3968	-.8917	-.6130	.2743
% of Var.	.2127			.2485			.3625			.1763	Total = 1.00	
Redundancy	.0918			.0926			.1289			.0353	Total = .3487	

(table continues)

SCII	First Canonical Variate			Second Canonical Variate			Third Canonical Variate			Fourth Canonical Variate		
BIS Set	Coeff	Struct	Cross Struct	Coeff	Struct	Cross Struct	Coeff	Struct	Cross Struct	Coeff	Struct	Cross Struct
Agr.	.2024	-.1293	-.0849	.1883	.0101	.0062	-.0644	.2609	.1556	-.0122	-.135	-.1636
Nature	.0061	.2345	.1540	-.2489	-.2262	-.1381	.1938	.4466	.2663	-.1061	-.1265	-.0566
Adventure	-.2297	-.5508	-.3618	.1376	.2378	.1452	.4803	.5196	.3099	-.4649	-.2349	-.1052
Mil. Act.	.1072	-.1864	-.1225	-.2345	.0119	.0072	-.1351	-.0480	-.0287	.0075	.0088	.0039
Mech. Act.	-.2666	-.3900	-.2562	-.0492	-.0745	-.0455	.0075	.3446	.2055	-.2773	-.0181	-.0081
Science	.2378	-.1947	-.1279	-.0612	-.3623	-.2212	.4702	.2487	.1483	.7891	.3985	.1784
Math.	-.3702	-.3670	-.2411	-.1719	-.0944	-.0576	-.0851	-.0651	-.0388	.2069	.3648	.1633
Med. Sci.	-.1011	-.0874	-.0574	-.0496	-.1584	-.0967	-.3725	.1802	.1075	-.1255	.1879	.0839
Med. Serv.	.1186	.0565	.0371	.0879	.0152	.0093	-.0121	.0015	.0009	-.2313	-.0386	-.0173
Mus./Dram.	.0789	.3990	.2622	-.1355	-.1296	-.0791	.4536	.6398	.3815	-.2306	.0335	.0150
Art	.2038	.4533	.2978	-.1007	-.1830	-.1118	.0227	.6051	.3608	.3336	.0687	.0307
Writing	-.1643	.2301	.1512	-.2626	-.1248	-.0762	.1335	.5238	.3124	.2991	.2688	.1203

(table continues)

SCII	First Canonical Variate			Second Canonical Variate			Third Canonical Variate			Fourth Canonical Variate		
BIS Set			Cross			Cross			Cross			Cross
	Coeff	Struct	Struct	Coeff	Struct	Struct	Coeff	Struct	Struct	Coeff	Struct	Struct
Teaching	.0090	.2877	.1890	-.0611	.1078	.0658	.0221	.1984	.1183	-.1060	.0715	.0320
Soc. Serv.	.2143	.4862	.3194	.3415	.4188	.2557	.1673	.2191	.1307	.0317	.0655	.0293
Athletics	-.3623	-.5218	-.3428	.1360	.3291	.2009	-.1049	.1170	.0698	-.0565	-.2466	-.1104
Dom. Arts	.1156	.5048	.3316	.1623	.1113	.0680	-.0787	.1300	.0775	-.0924	-.0689	-.0308
Rel. Act.	.2453	.4489	.2949	-.0474	.0237	.0144	-.2044	-.0982	-.0585	.1889	.2396	.1072
Pub. Sp.	.1651	-.0795	-.0522	.7618	.5777	.3527	.2139	.2857	.1704	-.0382	.4287	.1919
Law/Pol.	-.4767	-.3025	-.1987	-.4283	.3736	.2281	-.2411	.1233	.0735	.3580	.4562	.2042
Merch.	.1332	.0686	.0450	-.0178	.5752	.3512	.0106	.1090	.0650	-.5645	.1641	.0734
Sales	-.2553	-.1621	-.1065	-.0081	.6465	.3947	.1595	-.0447	-.0267	.5024	.2464	.1103
Bus. Mgmt.	.4036	-.0475	-.0312	.4905	.6783	.4142	-.0546	-.0373	-.0223	.5094	.3474	.1555
Office Pr.	-.0235	.1369	.0899	-.0920	.0401	.0245	-.3613	-.4880	-.2910	-.2035	.0641	.0287

(table continues)

SCII	First Canonical Variate			Second Canonical Variate			Third Canonical Variate			Fourth Canonical Variate		
BIS Set	Coeff	Struct	Cross Struct	Coeff	Struct	Cross Struct	Coeff	Struct	Cross Struct	Coeff	Struct	Cross Struct
% of Var.	.1026			.1016			.0993			.0586	Total = .3622	
Redundancy	.0443			.0379			.0353			.0117	Total = .1292	
Can. Corr.	.656982			.610582			.596355			.447567		

Note. Coeff = Standardized Canonical Correlation Coefficient; Struct = Structural Coefficient; Cross Struct = Cross-Structure Correlation; E-I = Extraversion-Introversion; S-N = Sensing-Intuition; T-F = Thinking-Feeling; J-P = Judging-Perceiving; % of Var. = Percents of Variance; Agr. = Agriculture; Mil. Act. = Military Activities; Mech. Act. = Mechanical Activities; Math. = Mathematics; Med. Sci. =Medical Science; Med. Serv. = Medical Service; Mus./Dram. = Musical Dramatics; Soc. Serv. = Social Service; Dom. Arts = Domestic Arts; Rel. Act. = Religious Activities; Pub. Sp. = Public Speaking; Law/Pol. = Law/Politics; Merch. = Merchandising; Bus. Mgmt. = Business Management; Office Prac. = Office Practices; Can. Corr. = Canonical Correlation.

Realistic, Artistic, and Social interests. The second variate MBTI set was again highest on Extraversion (r^2 = .34). The SCII BIS of Business Management (r^2 = .17), Sales (r^2 = .16), Public Speaking (r^2 = .12) and Merchandising (r^2 = .12) were all positively correlated with the MBTI canonical variables. All of these BIS were Enterprising codes. The predictor variable could again best be considered to be a measure of Sociability or influencing people (see Appendix B). The criterion variable, again, appears to be a measure of Enterprising interests. The third variate MBTI set was highest on Intuition (r^2 = .34) and Perceiving (r^2 = .16). The SCII set BIS of Music/Dramatics (A; r^2 = .15), Art (A; r^2 = .13); Writing (A); and Adventure (R) were all positively correlated. The predictor variable construct might best be termed Impulsivity and Intuition or spontaneity (see Appendix D). The criterion variate appears to be a measure of Realistic and Artistic interests. The fourth variate was not interpreted due to the low correlations.

Canonical structure coefficients were again interpreted with .3 being the cutoff for significance (.09 for r^2). MBTI variables in the first canonical composite that were significant included T-F and J-P. SCII BIS variables that were significant comprised all of the Holland codes except Conventional. Those high on the MBTI scales of Feeling (r^2 = .68) and Judging (r^2 = .13) were low on SCII

BIS of Adventure (R; r^2 = .30), Athletics (S; r^2 = .27), Mechanical Activities (R; r^2 = .15), Mathematics (I; r^2 = .13) and Law/Politics (E: r^2 = .09) and high on Social Service (S; r^2 = .24), Art (A; r^2 = .21), Religious Activities (S; r^2 = .20), and Music/Dramatics (A; r^2 = .16).

The second canonical variate consisted of the E-I variable in the MBTI set and E, S, and I Holland codes. Those high on Extraversion (r^2 = .92) were high on SCII BIS of Business Management (E; r^2 = .46), Sales (E; r^2 = .42), Public Speaking (E; r^2 = .33), Merchandising (E; r^2 = .33), Social Service (S; r^2 = .18), Law/Politics (E; r^2 = .14), and Athletics (E; r^2 = .11) and low on SCII BIS of Science (I; r^2 = .13).

The third canonical variate was made up of S-N and J-P variables in the MBTI set. The SCII BIS set consisted of R, A, and C Holland code variables. The canonical variates show that high MBTI scores on Intuition (r^2 = .94) and Perceiving (r^2 = .44; i.e., impulsivity) were associated with high SCII BIS of Music/Dramatics (A; r^2 = .41), Art (A; r^2 = .37), Writing (A; r^2 = .27), Adventure (R; r^2 = .27), Nature (R; r^2 = .20), and Mechanical Activities (R; r^2 = .12) and low on SCII BIS of Office Practices (C; r^2 = .24).

The fourth canonical variate was comprised of T-F and J-P variables in the MBTI set. Holland code variables of R, I, and E were significant in the SCII BIS set. High MBTI scores on Judging (r^2 = .40) and Thinking (r^2 = .28)

were associated with high SCII BIS of Law/Politics (E; r^2 = .21), Public Speaking (E; r^2 = .18), Science (I; r^2 = .16), Mathematics (I; r^2 = .13), and Business Management (E; r^2 = .12) and low SCII BIS of Agriculture (R; r^2 = -.13).

The redundancy coefficient on the first variate showed that about 9% of the MBTI variance was explained by the SCII BIS variables and approximately 4% of the SCII BIS variance was accounted for by the MBTI variables. For the second variate, 9% of the MBTI variance was accounted for by the SCII BIS variables and almost 4% of the SCII BIS variance was accounted for by the MBTI variables. About 13% of the MBTI variance was explained by the SCII BIS variables and almost 4% of the SCII BIS variance was explained by the MBTI variables for the third variate. On the fourth variate, about 4% of the MBTI variance was accounted for by the SCII BIS variables while about 1% of the SCII BIS variance was explained by the MBTI variables. Again, overall, the SCII accounted for more MBTI variance (35%) than the MBTI explained for the SCII (13%). The results indicate again that there is not a considerable degree of redundancy. Therefore, the MBTI and SCII BIS are different, but related to one another.

The percent of variance statistic for the first canonical variate variables showed that they accounted for about 21% of the total MBTI variance; the second, 25%; the third, 36%; and the fourth accounted for almost 18% of the

total MBTI variance. The variables of the first canonical variate explained about 10% of the SCII BIS variance; the second, 10%; the third, almost 10%; and the fourth explained almost 6% of the total SCII BIS variance.

In summary, the relationships between the four MBTI variables and the twenty-three SCII BIS variables were researched using canonical correlation analysis. All four pairs of canonical variates accounted for significant relationships between the two sets of variables. Cross-structure canonical variates and canonical structure coefficients were interpreted. Finally, redundancy coefficients and percent of variance statistics were reported.

The third canonical correlation analysis (see Table 21) examined the relationship between the four MBTI variables and 74 (pure Holland code) OIS score variables. The variable size did not suggest that this analysis was appropriate. However, the analysis was done in this exploratory investigation. According to Wilks' lambda criterion (F [296,434.403] = 2.69, $p < .01$), there is an overall significant relationship between the MBTI and SCII (selected) OIS variable sets. All four individual canonical correlation pairs were additionally found to be significant ($p < .01$). All four pairs of these canonical variates thus accounted for statistically significant relationships between the two sets of variables.

Table 21.

Standardized Canonical Correlation Coefficients, Structural Coefficients, Cross-Structure Correlations, Canonical Correlations, Percents of Variance, and Redundancies Between Myers-Briggs Type Indicator (MBTI) and Strong Campbell Interest Inventory Occupational Interest Scale (SCII OIS) Variables and Their Corresponding Canonical Variates.

MBTI Set	First Canonical Variate			Second Canonical Variate			Third Canonical Variate			Fourth Canonical Variate		
	Coeff	Struct	Cross Struct	Coeff	Struct	Cross Struct	Coeff	Struct	Cross Struct	Coeff	Struct	Cross Struct
E-I	.3096	.2527	.2164	-.8070	-.9014	-.7540	.4205	.2925	.2254	.3656	.1950	.1408
S-N	1.0001	.9115	.7083	.2015	.4001	.3347	.0902	.0953	.0734	-.5003	.0015	.0011
T-F	-.2204	-.1065	-.0912	.2720	.4704	.3935	.9655	.8659	.6673	.0948	.1327	.0958
J-P	-.0396	.3362	.2878	.1467	.4364	.3651	-.2549	-.1272	-.0980	1.1116	.8248	-.5957
% of Var.	.2548			.3461			.2151			.1840	Total = 1.00	
Redundancy	.1867			.2422			.1278			.0960	Total = .6527	

(table continues)

SCII	First Canonical Variate			Second Canonical Variate			Third Canonical Variate			Fourth Canonical Variate		
OIS Set			Cross			Cross			Cross			Cross
	Coeff	Struct	Struct	Coeff	Struct	Struct	Coeff	Struct	Struct	Coeff	Struct	Struct
A.F. o., F	-.1205	.0050	.0043	-.3975	-.1885	-.1577	-.4713	-.3829	-.2951	-.6569	.2424	.1750
A.F. o., M	-.1954	-.0539	-.0462	.6350	-.1111	-.0929	.1583	-.4751	-.3661	-.3339	.2354	.1700
Pol. o., F	-.1172	-.0355	-.0304	.2512	.1240	.1037	.6984	-.3872	-.2984	-.1540	.3296	.2380
Pol. o., M	-.0114	-.1199	-.1027	-.1554	.0621	.0519	-.4220	-.4182	-.3223	.3600	.4320	.3120
Bus Dr., F	-.8165	-.2511	-.2150	.3867	-.1118	-.0935	.2841	-.1122	-.0865	-.3500	.4519	.3264
Bus Dr., M	-.0470	-.2987	-.2557	-.1647	-.0630	-.0527	.0404	-.2037	-.1570	-.1665	.3702	.2673
Hor. w., F	.1381	.1235	.1057	.2293	-.2645	-.2213	.9759	.2962	.2283	.2216	.2359	.1704
Hor. w., M	-.2536	.1554	.1330	-.1006	-.1731	-.1448	-.3057	.2913	.2245	-.1354	-.1776	.1283
Math., F	-.2376	.2273	.1946	1.0021	-.5101	-.4267	-.1646	-.0926	-.0713	.8123	.1019	.0736
Math., M	-.2654	.2024	.1733	-.4102	-.5729	-.4792	.5038	.2728	.2102	1.0221	.0868	.0627
Col. P., F	-.2419	.2935	.2513	.2462	-.4862	-.4067	-.6465	.1704	.1313	-.0406	-.0058	-.0042
Col. P., M	.5674	.4475	.3831	-.0928	-.2987	-.2499	-.2951	.2094	.1614	-.6917	-.1566	-.1131

(table continues)

SCII	First Canonical Variate			Second Canonical Variate			Third Canonical Variate			Fourth Canonical Variate		
OIS Set			Cross			Cross			Cross			Cross
	Coeff	Struct	Struct	Coeff	Struct	Struct	Coeff	Struct	Struct	Coeff	Struct	Struct
Art te., F	-.3036	.4020	.3442	.0572	.2139	.1789	-.3264	.3550	.2736	.4845	-.0345	-.0249
Art te., M	.0804	.3516	.3010	.9141	.2427	.2030	.9529	.5674	.4373	1.1868	-.0964	-.0697
Art. f., F	-.3170	.4168	.3568	.7253	-.1364	-.1141	.5312	.2141	.1650	.7528	.1460	.1055
Art. f., M	-.0152	.3561	.3048	-.7951	-.1229	-.1028	.5960	.4307	.3320	-1.2388	.0247	.0179
Art. c., F	-.4307	.5432	.4650	.1780	.0845	.0707	-.4126	.2821	.2174	-.6101	.0902	.0652
Art. c., M	.6755	.4231	.3622	.4135	.0385	.0322	-.1256	.4014	.3094	-.1560	.0259	.0187
Phot., F	.2808	.6348	.5435	-.7885	.0622	.0520	-.3013	.2181	.1681	-.2832	.0678	.0490
Phot., M	.2846	.5913	.5061	.4756	.1729	.1446	-.0889	.1384	.1067	.6709	.1019	.0736
Mus., F	.8478	.4477	.3832	-.3695	-.1487	-.1244	-.0997	.5271	.4062	-1.1808	.0119	.0086
Mus., M	-.1376	.4561	.3904	-.1000	-.0064	-.0053	.0037	.4913	.3787	.1864	.0509	.0368
Ad. Ex., F	.3728	.2485	.2127	.4246	.3601	.3012	-.0726	.0817	.0630	.3789	-.0444	-.0320
Ad. Ex., M	-.1667	.3981	.3408	-.5241	.2696	.2255	-.2392	.2836	.2186	-.1452	-.0964	-.0696

(table continues)

SCII	First Canonical Variate			Second Canonical Variate			Third Canonical Variate			Fourth Canonical Variate		
OIS Set			Cross			Cross			Cross			Cross
	Coeff	Struct	Struct	Coeff	Struct	Struct	Coeff	Struct	Struct	Coeff	Struct	Struct
Brcstr., F	.3106	.1583	.1355	1.0637	.5018	.4198	.2085	-.0426	-.0329	-.5494	-.1417	-.1024
Brcstr., M	-.3282	.1763	.1509	-.8916	.2512	.2101	-.2091	.1783	.1374	.0441	-.0997	-.0720
P.r.di., F	-.0174	.2353	.2014	-.7158	.3497	.2926	-.0455	-.1382	-.1065	.0256	-.2349	-.1696
P.r.di., M	-.4976	.1287	.1102	-.2219	.3485	.2915	.1851	.0253	.0195	.3234	-.2572	-.1858
Lawyer, F	.2119	.3532	.3024	.4419	.0261	.0218	-.0676	-.4236	-.3265	1.1788	.0277	.0200
Lawyer, M	-.0759	.3452	.2955	.2395	.2598	.2174	-.0563	-.2150	-.1657	-.0833	-.0806	-.0582
Rpter., F	.3677	.4878	.4176	-.0744	.1886	.1577	.1020	.0576	.0444	-.4661	-.1071	-.0773
Rpter., M	.1736	.3413	.2922	.2385	-.0604	-.0506	-.1283	.3629	.2797	.3331	-.0862	-.0623
Librn., F	.6519	.4417	.3781	-.5728	-.2143	-.1792	.4168	.3140	.2420	.3923	-.2595	-.1874
Librn., M	-.0278	.3081	.2637	.7882	-.0405	-.0339	.4886	.4877	.3758	-1.0666	-.2998	-.2165
G.Coun., F	.3001	-.0543	-.0464	.9550	.4713	.3943	.9713	.1061	.0818	-.3374	-.4098	-.2960

(table continues)

SCII	First Canonical Variate			Second Canonical Variate			Third Canonical Variate			Fourth Canonical Variate		
OIS Set			Cross			Cross			Cross			Cross
	Coeff	Struct	Struct	Coeff	Struct	Struct	Coeff	Struct	Struct	Coeff	Struct	Struct
G.Coun., M	-.4231	-.0043	-.0037	-.8001	.3811	.3188	-.8615	.2212	.1705	-.5231	-.3696	-.2670
S.Sc.t., F	-.4688	.0195	.0167	-.9884	.2306	.1929	-.0746	-.1096	-.0845	-.8873	-.3615	-.2611
S.Sc.t., M	-.3895	-.0380	-.0325	.5140	.3641	.3045	-.6575	.0633	.0488	.6124	-.2190	-.1582
Elem.t., F	-.5989	-.3455	-.2958	-.3558	-.0438	-.0366	.2610	.5726	.4413	.8909	-.0981	-.0709
Elem.t., M	.1488	.0251	.0215	-.0188	-.0391	-.0327	.0669	.4366	.3365	-.9212	.0005	.0004
S.ed.t., F	.6058	-.1158	-.0992	.4845	.2276	.1904	-.2693	.3455	.2662	-.4384	-.2437	-.1760
S.ed.t., M	.6157	.0949	.0812	-.0035	.3091	.2585	.2133	.2580	.1989	1.1596	-.1389	-.1004
Realtor, F	-.6435	-.2221	-.1901	-.9423	.4532	.3791	-.6815	-.4373	-.3370	-.3875	-.2128	.1537
Realtor, M	.4579	-.1039	-.0890	.4163	.4620	.3865	-.0580	-.5305	-.4088	.2983	-.0613	-.0443
Florist, F	.4252	-.2636	-.2257	-.2236	.1058	.0885	.4221	.2673	.2060	.5454	.0959	.0693
Florist, M	.3693	-.2290	-.1960	-.0639	.2108	.1764	-.4268	.0542	.0417	-.0976	-.0250	-.0181

(table continues)

SCII	First Canonical Variate			Second Canonical Variate			Third Canonical Variate			Fourth Canonical Variate		
OIS Set			Cross			Cross			Cross			Cross
	Coeff	Struct	Struct	Coeff	Struct	Struct	Coeff	Struct	Struct	Coeff	Struct	Struct
Acctnt., F	-.2084	-.3323	-.2845	-.1265	-.3409	-.2861	.4452	-.4186	-.3226	-.5474	.1135	.0820
Acctnt., M	.1931	-.2562	-.2193	.0754	-.1264	-.1057	-.5576	-.6517	-.5023	.3642	.0994	.0718
Banker, F	.3916	-.5783	-.4951	-.4606	-.0563	-.0471	.4159	-.2099	-.1618	-.2235	-.0386	-.0279
Banker, M	-.3905	-.2150	-.1841	-.5386	.2144	.1794	-.1775	-.5388	-.4153	.0534	-.1002	-.0724
AF e.p., M	-.3852	-.2171	-.1859	.0325	-.2206	-.1845	.2301	-.2057	-.1585	-.0012	.4572	.3302
Farmer, M	1.1531	-.2961	-.2535	-.1391	-.3177	-.2657	-.8249	-.2634	-.2030	-.2773	.2579	.1863
V/A. t., F	.0400	-.1369	-.1172	.1216	-.0946	-.0791	.0948	.0762	.0587	-.2994	.1478	.1068
Frster., M	.1274	.0926	.0793	.0422	-.4265	-.3568	-.0707	.0728	.0561	-.2930	.2322	.1677
Em.m.t., M	-.0226	-.2140	-.1832	-.2732	-.1940	-.1623	-.0852	-.2720	-.2096	-.0188	.3143	.2270
Crpntr., M	.2050	.1234	.1057	-.4490	-.1624	-.1359	.1579	-.0787	-.0606	.7505	.4848	.3501
Electr., M	.0922	-.0551	-.0472	-.3644	-.2894	-.2421	-.0520	-.1956	-.1507	-.2653	.4640	.3351

(table continues)

SCII	First Canonical Variate			Second Canonical Variate			Third Canonical Variate			Fourth Canonical Variate		
OIS Set			Cross			Cross			Cross			Cross
	Coeff	Struct	Struct	Coeff	Struct	Struct	Coeff	Struct	Struct	Coeff	Struct	Struct
Chiro., M	-.1154	.3697	.3165	.0916	.0442	.0370	-.2846	.0002	.0002	-.2851	.0361	.0261
Physic. F	.7821	.3667	.3140	-.4417	-.4063	-.3399	.4652	.0534	.0411	.2938	.0674	.0486
Biol., M	-.8973	.2952	.2528	-.0396	-.4285	-.3584	-.5309	.3020	.2327	.6454	.0220	.0159
Geog., M	-.0354	.4000	.3425	.1029	-.4125	-.3450	-.1649	.1706	.1315	.2250	-.0492	-.0355
In.dec., M	-.4963	.0416	.0356	.3186	.2803	.2344	.2932	.4051	.3122	-.5639	-.1915	-.1383
Fl.att., M	.0885	.2095	.1793	-.0343	.5365	.4487	-.1701	.1317	.1015	.9424	-.0360	-.0260
Pub.Ad., F	.3189	.2014	.1724	.3916	.0558	.0467	.1863	-.4140	-.3191	-.0957	-.1571	-.1135
Pers.d., F	.3055	-.1421	-.1217	.3269	.4665	.3902	.3060	-.3984	-.3071	.3459	-.2306	-.1665
El.p.o., M	-.2021	.0608	.0521	-.3358	.3917	.3277	1.0555	-.3304	-.2546	.2474	.2034	-.1469
C.C.ex., M	.1344	-.1021	-.0874	.0497	.4868	.4072	-.2435	-.4406	-.3395	-1.0768	-.2385	-.1723
R. man., M	.3944	-.3216	-.2753	.4668	.3582	.2996	-.0411	-.3621	-.2790	.3488	.1231	.0889

(table continues)

SCII	First Canonical Variate			Second Canonical Variate			Third Canonical Variate			Fourth Canonical Variate		
OIS Set			Cross			Cross			Cross			Cross
	Coeff	Struct	Struct	Coeff	Struct	Struct	Coeff	Struct	Struct	Coeff	Struct	Struct
Trvl.a., M	.1465	-.3404	-.2914	-.3463	.3190	.2668	.4308	-.0188	-.0145	.4285	-.1337	-.0965
Fu.dir., M	-.3230	-.5503	-.4711	.0497	.1292	.1081	.7137	-.3348	-.2580	.7447	.0890	.0643
Btcian., F	-.3996	-.3940	-.3373	.2522	-.0660	-.0552	-.5777	.2235	.1722	-.3264	.1962	.1417
Buyer, M	-.2761	-.3004	-.2572	.2723	.3706	.3100	-.6511	-.2502	-.1929	-.7762	-.0796	-.0575
Secy., F	-.1747	-.6128	-.5246	.9081	.0655	.0548	-.3920	.0513	.0395	.4338	-.0541	-.0391
AF e.p., M	.4669	-.4414	-.3779	.0320	-.1711	-.1431	.3231	-.0068	-.0053	.2130	.2409	.1740
% of Var.	.0964			.0809			.0976			.0435	Total = .3184	
Redundancy	.0707			.0566			.0580			.0227	Total = .2079	
Can. Corr.	.856085			.836494			.770684			.722273		

(table continues)

Note. E-I = Extraversion-Introversion, S-N = Sensing-Intuition; T-F = Thinking-feeling; J-P = Judging-Perceiving; % of Var. = percent of Variance; F = female; M = male; A.F. o. = Air Force officer; Pol. o. = Police officer; Bus Dr. = Bus Driver; Hor. w. = Horticultural worker; Math. = Mathematician; Col. P. = College Professor; Art te. = Art teacher; Art. f. = Artist, fine; Art. c. = Artist, commercial; Phot. = Photographer; Mus. = Musician; Ad. Ex. = Advertising Executive; Brcstr. = Broadcaster; P.r.di. = Public relations director; Rpter. = Reporter; Librn. = Librarian; G. Coun. = Guidance counselor; S.Sc.t. = Social Science teacher; Elem. te. = Elementary teacher; S.ed.t. = Special education teacher; Acctn. = Accountant; AF e.p. = Air Force enlisted personnel; V/A. t. = Vocational/Agriculturalteacher; Frster. = Forester; Em.m.t. = Emergency medical technician; Crpntr. = Carpenter; Electr. = Electrician; Chiro. = Chiropractor; Physic. = Physician; Biol. = Biologist; Geog. = Geographer; In. dec. = Interior decorator; Fl.att. = Flight attendant; Pub.Ad. = Public Administrator; Pers.d. = Personnel director; El.p.o. = Elected public official; R.man. = Restaurant manager; Trvl.a. = Travel agent; Fu.dir. = Funeral director; Btcian. = Beautician; Secy. = Secretary.

Cross structure correlations were analyzed. When comparing the correlations between the individual MBTI variables and the first canonical variable of the SCII OIS, the only MBTI variable larger than .3 (.09 for r^2) was Intuition (r^2 = .61). For the SCII OIS set, high positive correlations were on Photographer, Female (A; r^2 = .26), Photographer, Male (A; r^2 = .26), Artist, commercial, Female (A; r^2 = .22), Reporter, Female (A; r^2 = .17), Musician, Male (A; r^2 = .3904), Musician, Female (A; r^2 = .15), College Professor, Male (I; r^2 = .15), as well as eleven more occupations. High negative correlations in the SCII OIS set were on Secretary, Female (C; r^2 = .28), Banker, Female (C; r^2 = .25), Funeral director, Male (E; r^2 = .22), Air Force enlisted personnel, Female (C; r^2 = .14), Beautician, Female (E; r^2 = .11), and Elementary teacher, Female (S; r^2 = .09). The predictor variable might best be called Intuition. The criterion variable appears to measure Investigative and Artistic interests.

The second cross-structure variate was highest on Extraversion (r^2 = .57), followed by Feeling (r^2 = .16), Perceiving (r^2 = .13), and Intuition (r^2 = .11) in the MBTI set. The corresponding SCII OIS set had high positive correlations on Flight attendant, Male (A; r^2 = .20), Broadcaster, Female (A; r^2 = .18), Chamber of Commerce executive, Male (E; r^2 = .17), Guidance counselor, Female (S; r^2 = .16), Personnel director, Female (E; r^2 = .15),

Realtor, Male (E; r^2 = .15), Realtor, Female (E; r^2 = .14), Elected public official, Male (E; r^2 = .11), Guidance counselor, Male (S; r^2 = .10), Social Science teacher, Male (S; r^2 = .09), Advertising executive, Female (A; r^2 = .09) and Restaurant manager, Male (E; r^2 = .09). High negative correlations are on Mathematician, Male (I; r^2 = .23), Mathematician, Female (I; r^2 = .18), College Professor, Female (I; r^2 = .17), Biologist, Male (I; r^2 = .13), Forester, Male (R; r^2 = .13), Geographer, Male (I; r^2 = .12), and Physician, Female (I; r^2 = .12). The predictor variable might best be considered to be a measure of Extraversion, Intuition, Feeling, and Perceiving. The criterion variable appears to measure Artistic, Social, and Enterprising interests.

The third cross-structure variate was high on Feeling (r^2 = .45) in the MBTI set. The SCII OIS set had high positive correlations on Elementary teacher, Female (S; r^2 = .20), Art Teacher, Male (A; r^2 = .19), Musician, Female (A; r^2 = .17), Musician, Male (A; r^2 = .14), Librarian, Male (A; r^2 = .14), Elementary teacher, Male (S; r^2 = .11), Artist, fine, Female (A; r^2 = .11), Artist, commercial, Male (A; r^2 = .11), Interior decorator, Male (A; r^2 = .10), and Artist, commercial, Male (A; r^2 = .10). High negative correlations in the SCII OIS set were on Accountant, Male (C; r^2 = .25), Banker, Male (C; r^2 = .17), Realtor, Male (E; r^2 = .17), Forester, Male (R; r^2 = .13), Chamber of Commerce

executive, Male (E; r^2 = .12), Realtor, Female (E; r^2 = .11), Accountant, Female (C; r^2 = .10), Lawyer, Female (A; r^2 = .11), Police officer, Male (R; r^2 = .11), Public administrator, Female (A; r^2 = .10), Personnel director, Female (E; r^2 = .09), Police officer, Female, (R; r^2 = .09), and Air Force officer, Female (R; r^2 = .09). The predictor variable seems to be a measure of Feeling. The criterion variable appears to be measuring Social and Artistic interests.

The fourth cross-structure canonical variate in the MBTI variable set was high on Perceiving (r^2 = .36). High positive correlations in the SCII OIS were on Carpenter, Male (R; r^2 = .12), Electrician, Male (R; r^2 = .11), Air Force enlisted personnel, Male (R; r^2 = .11), Bus driver, Female (R; r^2 = .11), and Police officer, Male (R; r^2 = .10). A high negative correlation in the SCII OIS was on Guidance counselor, Female (S; r^2 = .09). The predictor variable might best be termed Impulsivity (see Appendix B). The criterion variable seems to be a measure of Realistic interests.

The first canonical structure coefficient consisted of S-N and J-P variables in the MBTI set. The SCII OIS set consisted of all Holland codes except R. The first pair of canonical variates show that high Intuition (r^2 = .83) and Perceiving (r^2 = .11) MBTI scores are positively associated with SCII OIS of Photographer, Female (A; r^2 = .40),

Photographer, Male (A; r^2 = .35), Artist, commercial, Female (A; r^2 = .30), Reporter, Female (A; r^2 = .24), Professor, Male (I; r^2 = .20), Musician, Male (A; r^2 = .21), Musician, Female (A; r^2 = .20), Librarian, Female (A; r^2 = .20), Artist, commercial, Male (A; r^2 = .18), Artist, Fine, Female (A; r^2 = .17), Art teacher, Female (A; r^2 = .16), Geographer, Male (I; r^2 = .16), Advertising executive, Male (A; r^2 = .16), Chiropractor, Male (I; r^2 = .14), Physician, Female (I; r^2 = .13), Artist, Fine, Male (A; r^2 = .13), Lawyer, Female (A; r^2 = .12), Art teacher, Male (A; r^2 = .12), Lawyer, Male (A; r^2 = .12), Reporter, Male (A; r^2 = .12), Librarian, Male (A; r^2 = .09), and Biologist, Male (I; r^2 = .09) and negatively associated with Secretary, Female (C; r^2 = .38), Banker, Female (C; r^2 = .33), Funeral director, Male (E; r^2 = .30), Air Force enlisted personnel, Female (C; r^2 = .20), Beautician, Female (E; r^2 = .16), Elementary teacher, Female (S; r^2 = .12), Travel Agent, Male (E; r^2 = .12), Accountant, Female (C; r^2 = .11), Restaurant manager, Male (E; r^2 = .10), and Buyer, Male (E; r^2 = .09).

The second canonical structure coefficient consisted of all four MBTI set variables and all six Holland codes. MBTI scores of Extraversion (r^2 = .81), Feeling (r^2 = .17), Perceiving (r^2 = .19), and Intuition (r^2 = .16) are positively associated with SCII OIS of Flight attendant, Male (A; r^2 = .29), Broadcaster, Female (A; r^2 = .25), Chamber of Commerce executive, Male (E; r^2 = .24), Guidance

counselor, Female (S; r^2 = .17), Personnel director, Female (E; r^2 = .22), Realtor, Male (E; r^2 = .21), Realtor, Female (E; r^2 = .20), Guidance counselor, Male (S; r^2 = .15), Buyer, Male (E; r^2 = .14), Social science teacher, Male (S; r^2 = .13), Advertising executive, Female (A; r^2 = .13), Public relations director, Female (A; r^2 = .12), Public relations director, Male (A; r^2 = .12), Travel Agent, Male (E; r^2 = .10), and Special education teacher, Male (S; r^2 = .10), and negatively associated with Mathematician, Male (I; r^2 = .33), Mathematician, Female (I; r^2 = .26), College professor, Female (I; r^2 = .24), Biologist, Male (I; r^2 = .18), Forester, Male (R; r^2 = .18), Geographer, Male (I; r^2 = .17), Physician, Female (I; r^2 = .17), Accountant, Female (C; r^2 = .12), Farmer, Male (R; r^2 = .10), and College professor, Male (I; r^2 = .09).

The third canonical structure coefficient consisted of the T-F MBTI set variable and all six Holland codes in the SCII OIS set. The MBTI Feeling (r^2 = .75) variable is positively associated with SCII OIS of Elementary teacher, Female (S; r^2 = .33), Art teacher, Male (A; r^2 = .32), Musician, Female (A; r^2 = .28), Musician, Male (A; r^2 = .24), Librarian, Male (A; r^2 = .24), Elementary teacher, Male (S; r^2 = .19), Artist Fine, Male (A; r^2 = .19), Artist, commercial, Male (A; r^2 = .16), Reporter, Male (A; r^2 = .13), Art teacher, Female (A; r^2 = .13), Special education teacher, Female (S; r^2 = .12), and Biologist, Male (I; r^2 =

.09), and negatively associated with SCII OIS of Accountant, Male (C; r^2 = .42), Banker, Male (C; r^2 = .29), Realtor, Male (E; r^2 = .28), Air Force officer, Male (R; r^2 = .23), Chamber of Commerce executive, Male (E; r^2 = .18), Realtor, Female (E; r^2 = .19), Lawyer, Female (A; r^2 = .18), Police officer, Male (R; r^2 = .18), Public administrator, Female (A; r^2 = .17), Personnel director, Female (E; r^2 = .16), Police Officer, Male (R; r^2 = .15), Air Force Officer, Female (R; r^2 = .15), Restaurant manager, Male (E; r^2 = .13), Funeral director, Male (E; r^2 = .11), and Elected public official, Male (E; r^2 = .11).

The fourth canonical structure coefficient consisted of the J-P MBTI set variable and R, A, and S Holland codes in the SCII OIS set. The MBTI Perceiving (r^2 = .68) variable is positively associated with the SCII OIS of Carpenter, Male (R; r^2 = .24), Electrician, Male (R; r^2 = .22), Air Force enlisted personnel, Male (R; r^2 = .21), Bus Driver, Female (R; r^2 = .20), Police officer, Male (R; r^2 = .19), Bus driver, Male (R; r^2 = .14), Police officer, Female (R; r^2 = .11), and Emergency medical technician, Male (R; r^2 = .10) and negatively associated with SCII OIS of Guidance counselor, Female (S; r^2 = .17), Guidance counselor, Male (S; r^2 = .14), Social science teacher, Female (S; r^2 = .13), and Librarian, Male (S; r^2 = .09).

The redundancy coefficient on the first variate showed that about 19% of the MBTI variance was accounted for

by the SCII OIS variables and 71% of the SCII (pure) OIS variance was accounted for by the MBTI variables. For the second variate, 24% of the MBTI variance was explained by the SCII OIS variables and almost 6% of the SCII OIS variance was explained by the MBTI variables. Almost 13% of the MBTI variance was accounted for by the SCII OIS variables and almost 6% of the SCII OIS variance was accounted for by the MBTI variables for the third variate. On the fourth variate, almost 10% of the MBTI variance was explained by the SCII OIS variables while about 2% of the SCII OIS variance was explained by MBTI variables. Overall, the SCII OIS accounted for more MBTI variance (65%) than the MBTI explained for the SCII (21%).

The percent of variance statistic for the first canonical variate variables showed that they accounted for about 26% of the total MBTI variance; the second, 35%; the third, 22%; and the fourth accounted for about 18% of the total MBTI variance. The variables of the first canonical variate explained about 10% of the total SCII OIS variance; the second, 8%; the third, almost 10%; and the fourth explained about 4% of the total SCII sampled OIS variance.

In summary, the relationships between the four MBTI variables and seventy-one OIS variables were investigated using canonical correlation analysis. All four pairs of canonical variates accounted for significant relationships between the two sets of variables. Cross-structure canonical

variates and canonical structure coefficients and percent of variance statistics were reported.

Canonical Correlation Analysis Summary

The canonical correlation analyses supported the general hypothesis that there is a relationship between the MBTI and SCII. The Wilks' Lambda criterion showed that across all analyses, the four pairs of canonical variates accounted for statistically significant relationships between the two sets of variables. However, the relationships appeared to be only moderate, at best. Since the canonical correlation analyses did not test directly for the dichotomous type classifications, Hypotheses 1 - 8 were not discussed.

The results indicated that Intuition was consistently and positively associated with A (supporting H_{13}) and I (supporting H_{12}) Holland codes and negatively associated with the C (supporting H_{15}) Holland code. Feeling on the MBTI was consistently positively associated with A (supporting H_{16}) and S (supporting H_{17}) Holland codes. Thinking was positively and consistently associated with R, I (supporting H_{18}) and E Holland codes. Extraversion on the MBTI was consistently positively associated with E (supporting H_{10}) and S (supporting H_{11}) Holland codes and negatively associated with I (supporting H_9) Holland codes. Perceiving

was positively associated with the R and A (supporting H_{19}) Holland code. Finally, judging was associated with the C (supporting H_{21}) Holland code. The results supported 11 of the 13 Hypotheses (H_9 - H_{21}) that were directly tested by the canonical correlations. Only hypotheses 14 and 20 were not supported. Interestingly, H_{20}, which was derived from research, was not consistent with one hypothesis (H_2) derived solely from the MBTI Manual's Type descriptions.

Q-factor Analysis

Quanal varimax (orthogonal) and oblimax (oblique) rotations were attempted. Eigenvalues 1 - 4 did not successfully produce types in the Quanal (Van Tubergen, 1975) program for either analysis. (Eigenvalue refers to the equivalent number of variables which the factor represents [Kachigan, 1986]). An eigenvalue of 5 ran successfully for both orthogonal and oblique rotations. The oblique rotation produced 3 types. Type 1 consisted of 177 subjects, but the second and third types had only five and four subjects, respectively. Therefore, it was not considered. The varimax orthogonal rotation produced 5 types (see Table 22). Table 22 shows that the orthogonal varimax rotation eigenvalue of five produced a first type with 66 subjects; a second type with 57 subjects; a third type with only 4 subjects; a fourth type with 29 subjects; and a fifth type with 36 subjects. This Q-factor analysis

Table 22

N sizes for Orthogonal Varimax Rotation, Eigenvalue = 5

Quanal Types	N
Type 1	66
Type 2	57
Type 3	4
Type 4	29
Type 5	36

was able to be interpreted. However, this investigator decided that hypotheses would not be tested using Type 3 due to its low numerical size of four.

The correlations between the five types were first investigated. Table 23 shows that there is a considerable

Table 23

Correlations Between Types

Type	1	2	3	4	5
1	1.000				
2	0.723	1.000			
3	0.777	0.740	1.000		
4	0.817	0.769	0.782	1.000	
5	0.664	0.691	0.757	0.804	1.000

degree of positive association between the types. The correlations between types ranged from .664 between types one and five to .804 between types four and five.

The type Z scores were analyzed next (see Table 24). The Quanal statistical software program output (Van Tubergen, 1975) shows the Z scores for all five types. Interpretations as to whether a subject's Z score was high relative to other subjects' scores was done subjectively by the investigator. An ordinal measure was always used, sometimes in combination with an interval measure. For example, the predictor variable J-P was deemed to be very high on the pole of Judging for Type three. The investigator examined the order, magnitude of distance and the overall variability of the five types on this variable. Type three had the lowest score on J-P compared to all the other types on this variable (i.e., Type 3 was ranked number 1 on Judging relative to the other types). The magnitude of 1.9 for type three was a Z score of 1.6 from the nearest type (i.e., Type 1, Z score = 3.5) on this variable. Additionally, all of the other four type Z scores on J-P fell within a range of .6 (3.5 - 4.1). Therefore, the magnitude of 1.6 was nearly three times higher than the varaiblility range of the other variables.

Relative to other subjects' scores, type one individuals were very high on the MBTI Extraversion

Table 24

Z Scores For All 5 Types.

Variable	Type 1	Type 2	Type 3	Type 4	Type 5
MBTI Predictor Variables					
Extraversion-Introversion	2.1	4.1	4.1	3.0	4.3
Sensing-Intuition	3.4	2.7	2.1	3.5	4.7
Thinking-Feeling	3.4	3.0	4.3	4.5	3.6
Judging-Perceiving	3.5	3.7	1.9	4.1	4.0
SCII GOT Criterion Variables					
Realistic	0.1	0.7	0.0	-0.1	0.3
Investigative	0.2	0.4	0.2	-0.3	0.6
Artistic	0.6	0.1	0.6	0.5	0.9
Social	0.9	0.4	1.4	0.2	0.5
Enterprising	1.2	0.8	0.5	0.6	0.1
Conventional	0.7	0.9	0.7	0.0	0.1
SCII BIS Criterion Variables					
Agriculture	0.2	0.6	0.3	0.3	0.5
Nature	0.0	0.2	0.3	0.0	0.6
Adventure	1.0	1.3	0.2	0.4	0.9
Military Activities	0.6	1.0	0.6	0.4	0.3

(table continues)

Variable	Type 1	Type 2	Type 3	Type 4	Type 5
Mechanical Activities	0.2	0.8	0.1	0.0	0.5
Science	0.2	0.6	0.3	-0.1	0.6
Mathematics	0.4	0.9	0.6	0.1	0.4
Medical Science	0.3	0.5	0.7	-0.1	0.6
Medical Service	0.5	0.7	1.0	0.2	0.6
Musical Dramatics	0.6	0.3	0.8	0.7	0.9
Art	0.6	0.3	0.6	0.8	0.9
Writing	0.6	0.0	0.8	0.3	0.8
Teaching	0.7	0.3	1.4	0.2	0.6
Social Service	1.1	0.5	1.4	0.7	0.7
Athletics	0.8	1.2	0.5	0.3	0.5
Domestic Arts	0.7	0.6	1.3	0.7	0.7
Religious Activities	0.5	0.3	1.3	0.2	0.3
Public Speaking	1.1	0.3	0.5	0.2	0.3
Law/Politics	1.1	0.5	0.4	0.1	0.3
Merchandising	1.2	0.7	0.5	0.7	0.2
Sales	1.3	1.0	0.7	1.0	0.1
Business Management	1.1	0.7	0.5	0.4	0.0
Office Practices	0.6	0.9	1.3	0.5	0.4
SCII OIS Criterion Variables					
Air Force officer, F	0.4	0.5	-0.7	-0.7	-0.4

(table continues)

Variable	Type 1	Type 2	Type 3	Type 4	Type 5
SCII OIS Criterion Variables					
Air Force officer, M	-0.9	-0.1	-1.4	-1.5	-1.2
Police officer, F	0.1	0.6	-0.3	-0.6	-0.3
Police officer, M	-0.5	0.2	-0.8	-0.9	-0.9
Bus Driver, F	-0.4	0.8	-0.1	0.1	-0.2
Bus Driver, M	-0.1	0.9	-0.2	0.4	-0.2
Horticultural worker, F	-1.0	0.1	-0.4	-0.2	-0.1
Horticultural worker, M	-1.3	-0.3	-0.9	-0.2	-0.3
Mathamatician, F	-2.0	-0.8	-1.4	-1.9	-0.8
Mathamatician, M	-1.9	-0.9	-0.9	-1.1	-0.5
College Professor, F	-1.0	-0.3	-0.2	-0.7	0.1
College Professor, M	-0.8	-0.5	-0.1	-0.5	0.2
Art teacher, F	-1.8	-2.3	-2.0	-1.6	-1.0
Art teacher, M	-0.8	-1.4	-0.5	0.0	0.0
Artist, fine, F	-1.1	-0.7	-0.8	0.1	0.0
Artist, fine, M	-1.1	-0.9	-0.6	0.2	0.1
Artist, commercial, F	-1.4	-1.5	-1.8	-0.5	-0.2
Artist, commercial, M	-0.7	-0.8	-0.4	0.4	0.2
Photographer, F	-0.6	-0.7	-0.8	0.0	0.2
Photographer, M	-0.4	-0.6	-1.0	0.1	0.3
Musician, F	-1.1	-0.8	0.0	-0.1	0.4
Musician, M	-0.5	-0.4	0.1	0.5	0.6

(table continues)

Variable	Type 1	Type 2	Type 3	Type 4	Type 5
SCII OIS Criterion Variables					
Advertising executive, F	0.2	-0.4	-0.4	0.5	0.0
Advertising executive, M	0.1	-0.6	0.1	0.5	0.4
Broadcaster, F	0.5	-0.5	-0.1	0.2	-0.1
Broadcaster, M	0.4	-0.2	0.3	0.9	0.3
Public relations director, F	-0.1	-1.5	-1.2	-0.7	-0.8
Public relations director, M	0.2	-1.3	-0.5	-0.2	-0.5
Lawyer, F	-0.2	-0.6	-1.2	-0.5	-0.3
Lawyer, M	-0.1	-1.0	-0.8	-0.7	-0.3
Reporter, F	-0.5	-1.6	-1.0	-1.0	-0.3
Reporter, M	-0.6	-1.1	-0.2	-0.2	0.2
Librarian, F	-1.1	-1.6	-0.9	-1.3	-0.3
Librarian, M	-0.2	-0.8	0.3	0.2	0.4
Guidance Counselor, F	0.0	-1.1	0.2	-0.8	-0.8
Guidance Counselor, M	0.2	-0.8	0.5	-0.4	-0.3
Social science teacher, F	0.0	-1.1	-0.2	-1.2	-0.8
Social science teacher, M	0.3	-0.8	0.3	-0.5	-0.4
Elementary teacher, F	-0.5	-0.4	0.8	-0.2	-0.5
Elementary teacher, M	-0.8	-0.6	0.4	-0.9	-0.3
Special education teacher, F	-0.2	-0.7	1.1	-0.7	-0.5
Special education teacher, M	-0.3	-1.0	0.5	-1.0	-0.4
Realtor, F	0.3	-0.7	-0.8	-0.8	-1.5

(table continues)

Variable	Type 1	Type 2	Type 3	Type 4	Type 5
SCII OIS Criterion Variables					
Realtor, M	0.5	-0.2	-0.8	-0.4	-1.0
Florist, F	0.0	0.3	0.3	1.1	-0.3
Florist, M	0.2	0.2	-0.1	0.9	-0.5
Accountant, F	-0.5	0.6	-0.3	-0.4	-0.8
Accountant, M	-0.5	-0.1	-1.0	-0.9	-1.4
Banker, F	0.4	0.6	0.7	0.6	-0.7
Banker, M	0.2	-0.4	-0.9	-0.3	-1.2
Air Force enlisted personnel, M	-0.9	0.5	-0.7	-0.4	-0.8
Farmer, M	-0.7	0.3	-0.7	-0.1	-0.8
Vocational/Agricultural teacher, F	-1.0	-0.2	-0.3	-0.6	-0.6
Forester, M	-1.7	-0.7	-1.3	-1.2	-0.8
Emergency medical technician, M	-0.9	0.2	-0.7	-0.8	-0.8
Carpenter, M	-1.4	-0.1	-1.3	-0.9	-0.7
Electrician, M	-1.3	0.2	-1.3	-0.8	-0.9
Chiropractor, M	-1.0	-0.8	-1.0	-0.9	-0.2
Physician, F	-1.7	-0.8	-1.3	-1.7	-0.3
Biologist, M	-1.6	-0.9	-0.7	-0.9	-0.1
Geographer, M	-1.3	-0.9	-0.9	-1.0	-0.2
Interior decorator, M	0.2	-0.4	0.2	0.9	0.1
Flight attendant, M	0.5	-0.2	0.2	0.4	0.3
Public Administrator, F	-0.1	-0.8	-1.4	-0.8	-0.7

(table continues)

Variable	Type 1	Type 2	Type 3	Type 4	Type 5
SCII OIS Criterion Variables					
Personnel director, F	0.6	-0.4	-0.6	-0.6	-1.0
Elected public official, M	0.3	-0.9	-0.8	-0.6	-0.8
Chamber of Commerce executive, M	0.2	-1.1	-1.4	-0.7	-1.5
Restaurant manager, M	0.5	0.5	-0.1	0.8	-0.7
Travel agent, M	0.8	0.3	0.6	1.0	-0.2
Funeral director, M	0.1	0.5	0.0	0.2	-0.9
Beautician, F	-0.2	0.6	0.5	0.8	-0.3
Buyer, M	0.9	0.3	-0.1	1.0	-0.7
Secretary, F	0.1	0.2	0.7	0.3	-0.7
Air Force enlisted personnel, F	-0.3	0.6	0.4	-0.1	-0.63

Note. MBTI = Myers-Briggs Type Indicator; SCII = Strong Campbell Interest Inventory; GOT = General Occupational Themes; BIS = Basic Interest Scales; OIS = Occupational Interest Scales; F = female; M = male.

dimension and moderately high on the MBTI Feeling dimension. Type one was highest on Enterprising Holland codes and lowest on Investigative and Artistic Holland codes.

Type two was moderately high on MBTI Feeling and Sensing dimensions. The Realistic and Conventional Holland codes were highest. The Artistic code scores were lowest.

Type three was very high on MBTI Judging and high on MBTI Sensing dimensions. Type three was also high on Social Holland codes and low on Artistic Holland codes.

Type four was high on MBTI Extraversion and Feeling dimensions. The highest Holland codes were Enterprising codes. The lowest Holland codes were the Investigative codes.

Type five was very high on MBTI Intuition dimension and moderately high on the MBTI Introversion dimension. The Highest Holland codes were consistently Artistic and Investigative and the lowest Holland code scores were consistently Enterprising and Conventional.

Q-factor Analysis Summary

The types were not put into dichotomous type classifications since the types are ipsatively formed. Therefore, hypotheses 1 - 8 were not applicable to this analysis. Type 3 results were not considered in testing Hypotheses below due to the low N size (N = 4).
Overall, the results supported the general hypothesis that there is a relationship between the MBTI and SCII.

Extraversion on the MBTI was positively associated with Enterprising Holland codes (supporting H_{10}) and negatively associated with Investigative (supporting H_9) and Artistic Holland codes. High MBTI Sensing and Judging scorers were negatively associated with Artistic Holland code scores, supporting both H_{15} and H_{19}. MBTI Extraversion and Feeling dimensions were negatively associated with Investigative Holland codes, supporting H_9 and H_{18}. High MBTI Intuition scores were positively associated with Investigative (supporting H_{12}) and Artistic (supporting H_{13}) and lowest on Enterprising (supporting H_{14}) and Conventional codes (supporting H_{15}). The Q-factor Analysis results supported 8 of the 13 possible Hypotheses concerning the scale dimensions. In no instance did any of the results refute any of the hypotheses.

Summary of T-tests, Discriminant Function Analysis, Canonical Correlation Analysis, and Q-factor Analysis Hypothesis Testing Results

The present investigation looked at the relationship between the MBTI and SCII using eleven t-tests and three multivariate analyses. Table 25 summarizes the results of the t-tests, discriminant function analysis, canonical correlation analysis, and Q-factor analysis with respect to each of the hypotheses that were statistically tested in this study.

Table 25

Results of the Study with Respect to Each of the Statistical Analyses

Hypothesis	T	DFA	CCA	QFA
1	0	x	x	x
2	0	x	x	x
3	+	x	x	x
4	0	x	x	x
5	0	x	x	x
6	+	x	x	x
7a	0	x	x	x
7b	+	x	x	x
7c	0	x	x	x
7d	+	x	x	x
8	+	x	x	x
9	x	x	+	+
10	x	x	+	+
11	x	x	+	x
12	x	x	+	+
13	x	x	+	+
14	x	x	0	+
15	x	x	+	+
16	x	x	+	x

(table continues)

Hypothesis	T	DFA	CCA	QFA
17	x	x	+	x
18	x	x	+	+
19	x	x	+	+
20	x	x	0	x
21	x	x	+	x

Note. + = supported; 0 = not supported; x = not examined. T = t-test; DFA = Discriminant Function Analysis; CCA = Canonical Correlation Analysis; QFA = Q-factor Analysis.

There were twenty-one hypotheses derived from the MBTI Manual (Myers & McCaulley, 1985). The first eight hypotheses were tested by utilizing eleven t-tests. Five of the t-tests were significant. Six t-tests produced nonsignificant results. Three hypotheses were supported, four hypotheses were not supported, and one hypothesis produced mixed results.

The canonical correlation analysis supported eleven hypotheses while not supporting two hypotheses. The Q-factor analysis supported nine of the thirteen hypotheses. In no instance did the Q-factor analysis provide evidence against any hypotheses. The canonical correlation analysis, Q-factor analysis, and t-test results combined show that twenty three times the hypotheses were supported and five hypotheses were not supported, and one hypothesis (H_7) produced mixed results.

CHAPTER V

SUMMARY

A review of the Myers-Briggs Type Indicator (MBTI) literature indicates a need for more research on the MBTI (Carlson, 1989a; 1989b; Healy 1989a; 1989b). The instrument is being used in career counseling routinely even though few research investigations have either pointed to the efficacy of the MBTI or shown that it is strongly related to an established vocational criterion test, the Strong-Campbell Interest Inventory (SCII) (Healy, 1989b).

Previous research has directly examined the relationship between the SCII and MBTI (Dillon & Weissman, 1987; Gryskiewicz and Vaught, 1975, cited in Myers & McCaulley, 1985; Kauppi, 1981; Lacy, 1984, cited in Myers & McCaulley, 1985; Moore, 1983; Nelson, 1987; and Velsor & Campbell, 1984, cited in Myers & McCaulley, 1985). For example, Nelson (1987) investigated only two of the MBTI scales--Sensing-Intuition (S-N) and Thinking-Feeling (T-F)--and their relationship to the SCII using multivariate analysis of variance and discriminant function analysis. Kauppi (1981) examined all four MBTI scales and their relationship to the SCII General Occupational Themes (GOT) using multiple regression analyses, but he included sex,

the Rod-and-Frame Test, and Embedded Figures test in the regression equations. No studies to date have only researched the relationship between continuous score on each of the four MBTI scales and how they relate to interest preferences as measured by SCII continuous score scales. The present study empirically examined how each of the four MBTI continuous scale scores in combination and separately related to Holland codes as measured by selected SCII continuous scale scores. Examining relationships in this way is more thorough and precise than in previous investigations because continuous score combinations and separate MBTI scores on each of the four dimensions were researched using multivariate analyses.

This investigation used multivariate analyses to determine the extent to which the MBTI was related to Holland codes. Holland codes, which were measured by the SCII, comprise an established vocational criterion.

Procedures

An ex post facto research design was used in this study. The sample was archival taken from the University of Maryland Career Development Center. One hundred eighty-six subjects participated of which 115 were female and 71 were male.

Instrumentation consisted of the MBTI and SCII. Statistical analyses included eleven t-tests, three

multivariate approaches, Discriminant function analyses, canonical correlation, and Q-factor analyses.

Results

Eleven t-tests determined whether MBTI types could predict Holland codes. Holland codes were measured by the SCII GOT. Hypotheses were rationally derived by the investigator based on type descriptions in the MBTI Manual (Myers & McCaulley, 1985). Eight hypotheses about MBTI types were tested. Three hypotheses were supported, four hypotheses were not supported, and one hypothesis produced mixed results.

Extraverted Feeling Types were found to have higher SCII GOT S code scores (supporting Hypothesis three), Introverted Sensing types were found to have higher SCII GOT C code scores (supporting Hypothesis six), and Introverted Intuitive types were found to have higher SCII GOT A code scores (supporting Hypothesis eight). Hypothesis seven was partially supported by two statistically significant results: Intuitive Types were found to have higher SCII GOT E code and lower SCII GOT C code scores.

The discriminant function analysis showed that there is a relationship between MBTI scores and Holland codes and that MBTI scores can predict Holland codes. However, only about 30% of the Holland codes could be correctly classified. The best discriminant function analysis model could

correctly classify only 38.7% of the Holland codes. In all three forward stepwise analyses, S-N had the most predictive power. Both S-N and Extraversion-Introversion (E-I) were significant in all three of the analyses. T-F was a significant individual predictor using the BIS to designate Holland codes. Judging-Perceiving (J-P) was a significant individual predictor using the Occupational Interest Scale (OIS) to form Holland codes.

After S-N was consistently placed in first as a significant predictor variable in all three forward variable selection stepwise procedures, E-I was placed next and was significant across all three analyses. T-F was significant as a predictor above and beyond S-N and E-I in two of the three analyses in which the GOT and Basic Interest Scale (BIS) were used as the grouping variables for Holland codes. Only E-I was placed in the model as a significant predictor variable after S-N in the stepwise discriminant analysis when the OIS were used as the grouping variables for Holland codes.

The best discriminant function model using the GOT to form Holland codes included S-N, E-I, and T-F as significant predictor variables. When the BIS were used to form Holland codes, S-N, E-I, and T-F were also included in the best discriminant model. Finally, when the OIS were used to form Holland codes, the most powerful discriminant function model included both S-N and E-I.

The canonical correlation analysis results showed that Intuition was consistently and positively associated with Artistic (A) and Investigative (I) Holland codes. Intuition was also found to be negatively associated with the Conventional (C) Holland code. Feeling was found to be consistently and positively associated with A and Social (S) Holland codes. Thinking was positively and consistently associated with Realistic (R), I, and Enterprising (E) Holland codes. Extraversion was consistently and positively associated with E and S Holland codes. Extraversion was also found to be negatively associated consistently with I Holland codes. Perceiving was positively associated with the R and A Holland codes. Finally, Judging was positively associated with the C Holland code.

The Q factor analysis indicated that the Extraversion on the MBTI was positively associated with Enterprising Holland codes and negatively associated with Investigative and Artistic Holland codes. High MBTI Sensing and Judging scorers were negatively correlated with Artistic Holland code scores. MBTI Extraversion and Feeling dimensions were negatively associated with Investigative Holland codes. High MBTI Intuition scores were positively associated with Investigative and Artistic and lowest on Enterprising and Conventional codes. Perceiving was positively associated with the R and A Holland codes. Finally, Judging was positively associated with the C Holland code.

The Q factor Analysis results supported 8 of the 13 possible Hypotheses concerning the scale dimensions. In no instance did any of the results refute any of the hypotheses.

Discussion

The present study attempted to respond to vocational literature that pointed to a need for more research on the MBTI (Carlson 1989a; 1989b; Healy, 1989a; 1989b). The findings showed that MBTI types are not good predicters of Holland codes and that S-N was clearly the most important variable associated with interests. Additionally, E-I was found to be consistently and significantly associated with vocational interests. Based on statistical significance and consistency across the three mutivariate analyses the findings suggest that (1) one's preferred way of becoming aware (S-N; Myers & McCaulley, 1985) and (2) sociability (E-I, Sipps and DiCaudo, 1988) are probably related to vocational interests in a college sample.

The investigation has shown that there are significant statistical relationships between the two instruments, fulfilling Carlson's hypothesis (1989a) that new statistical approaches may uncover relationships between the two instruments. Holland's theory (1985) postulates that an interest inventory is a personality inventory. Because consistent relationships were found between the MBTI (personality inventory) and SCII (interest inventory), the results also support this tenet of Holland's (1985) theory.

The SCII explained more variance on the MBTI than the MBTI did on the SCII across all three canonical correlation analyses. On the GOT, the SCII explained 23% of the MBTI variance while the MBTI explained 14% of the SCII GOT variance. On the BIS, the SCII explained 35% of the MBTI variance while the MBTI explained 15% of the SCII BIS variance. Finally, the SCII OIS accounted for 65% of the MBTI variance while the MBTI accounted for only 21% of the SCII OIS variance. The fact that the SCII consistently explained more variance on the MBTI than vice-versa also lends support to the notion that an interest inventory (i.e. the SCII) is a personality inventory.

The significant relationships found between the MBTI and SCII generally appeared to be moderate. The strength of the findings are basically consistent with Nelson's (1987) analysis of several studies that examined the relationships between personality variables and vocational interests and inconsistent with her review-of-the-literature finding that the extraversion-introversion dimension showed the strongest and most consistent association with interests. (The construct validity of the extraversion-introversion construct in such studies that she reviewed is open to question.) The results were also consistent with her hypothesized belief that the E-I MBTI scale would be related to vocational interests.

The overall results of this study supported Nelson's (1987) research using multivariate analysis of variance and discriminant function analysis on the MBTI and SCII. Her results and explanation of the results are worth repeating. The reader needs only to bear in mind that in the present study each of the four distinct MBTI dimensions (versus only the S-N and T-F dimension combinations in Nelson's research) were used. The results

> . . . provided weak evidence in support of Myers and Briggs four personality types as they relate to vocational interests. The evidence does not support using MBTI results to predict interests or using SCII results to predict personality type within college populations. (Nelson, 1987, Abstract)

Nelson explained that

> . . . the four Myers' and Briggs' personality types represent broad constructs and that the interests of individuals in any type category may be expected to be varied rather than uniform. Therefore, in applied settings (especially college settings) caution is indicated for counselors tempted to make predictions about vocational interests from personality type or vice versa. (p. 303)

The MBTI may be helpful in a vocational assessment as a useful adjunct to the SCII (see Devito, 1985) by providing the counselor with a psychological perspective for potential career issues. However, it is the investigator's opinion that since only the E-I and J-P scales have been sucessfully interpreted by the factor analytic studies which have pointed to the overall inadequacy of the construct validity of the MBTI, only these two scales

ought to be used by counselors. This opinion represents a compromise position between Carlson (1989 a,b) who stated that the MBTI is ready for routine use and Healy (1989 a,b) who was against the routine use of the MBTI. Half of the MBTI is ready for routine use (i.e., two of its four scales) based on factor analysis/construct validity studies.

Unfortunately, only one (E-I) of the two scales (S-N, E-I) which have been found to be significantly related to Holland codes across all of the multivariate analyses done in this study has been identified by factor analytic investigations. This does not mean, however, that the J-P scale ought to be discarded from being used in career counseling situations due to the fact that this scale was not found to be statistically related to Holland codes across all multivariate analyses done in this study. The fact that the J-P and S-N scale have been found to be correlated to each other could have reduced the magnitude of the relationships in this study between the J-P scale and Holland codes as measured by the SCII. The relationship of the J-P scale to the SCII Holland codes was probably statistically reduced because the S-N scale had the strongest and most consistent relationship to the SCII HOlland codes. The most important reason for using both the J-P and E-I scale, however, is independent of any relationships between interests and careers. It is based on the fact that even in careers where there is a three-point Holland code such as

Psychologist (IAS Holland code) indicating a certain degree of interest specificity, possible job tasks are quite varied.

It is the investigator's opinion that the SCII could be especially useful in orienting an individual toward specific occupations. The MBTI could potentially be very useful later, once a career choice has been made based on both interests (as measured by the SCII) and aptitude. For example, if an individual has an IAS Holland code (and has the requisite aptitude and is motivated to have a career as a Clinical or Counseling Psychologist), there is an optimal match according to Holland's theory and the SCII OIS since the Psychologists have an IAS Holland code. It may be additionally useful for a career counselor to explore the E-I and J-P scales to determine the specific tasks that the person may find most appealing or may wish to specialize in. In the investigator's opinion, an individual who aspires to be a Counseling or Clinical psychologist and is high on Extraversion and Perceiving may be more inclined to do group psychotherapy and administrative tasks based on the social interactions and flexibility it requires. An individual who is high on Introversion and who is not at all impulsive and likes to plan things (i.e., has a low J-P scale score) may find that individual Psychological Evaluations and

individual psychotherapy are comfortable and rewarding to perform. The fact that the MBTI and SCII relationships are moderate at best could very well reflect the fact that even in careers such as Psychologist which have an identified three point Holland code (i.e., IAS), there is a great deal of job task diversity. Perhaps the most useful function of the MBTI, therefore, would be in the latter stages of career counseling.

Implications

The first implication is that the SCII and MBTI could be complementary to one another in career counseling. However, the SCII is clearly the superior instrument to use and should be the choice of a career counselor to use if only one of the instruments were to be given. The SCII appears quite suited to identifying career interests and occupations that match one's interests and the SCII has very good psychmetric qualities. For the individual who has already made a career choice, taking the SCII and finding that one's Holland code matches one's chosen occupation can be inspiring. A mismatch, especially a gross mismatch, could warrant some further examination of the career choice itself. Once the career is chosen, however, the MBTI can be quite useful in helping the individual choose the method of doing the work that is of interest.

The second major implication is the investigator's belief that only the MBTI E-I and J-P scales ought to be

used in career counseling. The MBTI E-I scale can help a person determine if one either wishes to work with others in a more socially-oriented context (E vs. I). The MBTI J-P scale can help an individual determine if one wishes to be planful and potentially more in-depth instead of spontaneous and flexible (J vs. P) in one's actual job tasks in spite of one's interests. Only the E-I and J-P MBTI scale dimensions ought to be presently used since the construct validity/ factor analytic research has only consistently found what these dimensions appear to measure.

Recommendations

It is recommended that future research replicate the present study using other samples and all of the OIS, and investigate the relationship between the MBTI E-I scale and the SCII Introversion-Extraversion scale. The sample compositions would optimally include both sexes, a consistently wider age range, and both college and non-college individuals.

The discriminant function analysis would benefit from pooling the GOT, BIS, and OIS on the SCII and also by assigning one or more Holland codes based on all three indices. More precise Holland codes would be especially useful since the results showed that often, when an inaccurate prediction was made using the discriminant function analysis, the Holland code prediction was one place to the left or right on Holland's Hexagonal Model.

The present research investigation examined the relationship between the MBTI and SCII. Future research investigations also ought to examine the use of Holland codes to predict MBTI dimensions. Use of more precise Holland codes (two or three letter) versus one letter codes could prove to be beneficial in predicting MBTI scores.

The construct validity of the MBTI is suspect. Future research needs to explore further what the MBTI scales measure, especially the S-N and T-F scale. Factor analysis may identify what the scales are measuring.

Finally, future research ought to investigate career counseling efficacy, comparing the use of the SCII alone and the SCII and MBTI in combination. Specifically the research question ought to be "Do the SCII and MBTI in combination lead to a more satisfying career choice and/or a decrease in decision-making time in terms of career specialization than the SCII alone?" Such research would determine the relative efficacy of using the MBTI in career counseling as an adjunct to the SCII. Additionally, taxonimizing tasks in terms of the MBTI dimension of socialability (E-I) and impulsivity (J-P) within all careers could be especially useful for the above outcome study by helping a person match level of sociability and impulsivity to the area of specialization within a career.

REFERENCES

Brooks, L. (1985). Career counseling methods and practice. In Brown, D., & Brooks, L., Career choice and development, (pp. 337-354). San Francisco: Jossey-Bass Publishers.

Brown, D. (1985). Summary, comparison and critique of major theories. In Brown, D., Brooks, L. & Associates (Eds.), Career choice and development, (pp. 311-336). San Francisco: Jossey-Bass Publishers.

Campbell, D. P., & Hansen, J. C. (1981) Manual for the SVIB-SCII Strong-Campbell Interest Inventory (3rd ed.). Stanford, CA: Stanford University Press.

Campbell, D. T. & Stanley, J. C. (1963). Experimental and quasi-experimental designs for research. Boston: Houghton Mifflin Company.

Carlson, J.G. (1985). Recent assessments of the Myers-Briggs Type Indicator. Journal of Personality Assessment, 49(4), 356-365.

Carlson, J. G. (1989a). Affirmative: In support of researching the Myers-Briggs Type Indicator. Journal of Counseling and Development, 67, 484-486.

Carlson, J. G. (1989b). Rebuttal: The MBTI: Not ready for routine use in counseling. A reply. Journal of Counseling and Development, 67, 489.

Carlson, R. (1980). Studies of Jungian typology: 11. Representations of the personal world. Journal of Personality and Social Psychology, 5, 801-810.

Carlson, R. & Levy, N. (1973). Studies of Jungian typology: 1. Memory, social perception, and social action. Journal of Personality, 41(4), 559-576.

Carlyn, M. (1977). An assessment of the Myers-Briggs Type Indicator. Journal of Personality Assessment, 41(5), 461-473.

Carskadon, T. G. (1977). Test - retest reliabilities of continuous scores on the Myers-Briggs Type Indicator. Psychological Reports, 41, 1011-1012.

Carskadon, T. G. & Cook, D. (1982). Validity of MBTI type descriptions as perceived by recipients unfamiliar with type. Research in Psychological Type, 5, 78-79.

Cattell, R.B. (1978). The scientific use of factor analysis in behavioral and life sciences. New York, NY: Plenum Press.

Cattell, R. B. & Kline, P. (1977). The scientific analysis of personality and motivation. New York: Academic Press.

Cohen, D., Cohen, M. & Cross, H. (1981). A construct validity study of the Myers-Briggs Type Indicator. Educational and Psychological Measurement, 41(3), 883-891.

Comrey, A. L. (1983). An evaluation of the Myers-Briggs Type Indicator. Academic Psychology Bulletin, 5, 115-129.

Costa, P. T. Jr., McCrae, R. R., & Holland, J. L. (1984). Personality and vocational interests in an adult sample. Journal of Applied Psychology, 69(3), 390-400.

Devito, A. (1985). Review of Myers-Briggs Type Indicator. In J. Mitchell, Jr. (Ed.), Ninth mental measurements yearbook, (p. 1029). Lincoln, Neb.: Buros Institute of Mental Measurements.

Dillon, M. & Weissman, S. (1987). Relationship between personality types on the SCII and Myers-Briggs Instruments. Measurement and Evaluation In Counseling And Development, 20(2), 68-79.

Dixon, W.J. (1990). BMDP software stat manual [computer program manual]. Berkley, CA: University of California Press.

Eysenck, H. J. & Eysenck, M. W. (1985). Personality and individual differences: A natural science approach. New York: Plenum Press.

Frye, D. (1987). An examination of the Myers-Briggs Type Indicator Scoring System. Master's Thesis, University of Akron.

Gorsuch, R. (1983). Factor analysis. Hillsdale, N. J.: L. Erlbaum Assoc.

Handly, P. (1982). Relationship Between Supervision and Trainees' Cognitive Styles and the Supervision Process. Journal of Counseling Psychology, 29, 508-515.

Hansen, J. C., & Campbell, D. P. (1985). Manual for the SVIB - SCII. Palo Alto, California: Consulting Psychologists Press.

Harris, R. J. (1989). A canonical cautionary. Multivariate Behavioral Research, 24, 17-39.

Healy, C. C. (1989a). Negative: The MBTI: Not ready for routine use in counseling. Journal of Counseling and Development, 67, 487-488.

Healy, C. C. (1989b). Rebuttal: In response to professor Carlson. Journal of Counseling and Development, 67, 490.

Holland, J. L. (1966). The psychology of vocational choice. Waltham, Mass.: Blaisdell.

Holland, J.L. (1973). Making vocational choices: A theory of careers. Englewood Cliffs, NJ: Prentice-Hall.

Holland, J. L. (1985). Making vocational choices: A theory of vocational personalities and work environments. (2nd ed). Englewood Cliffs, NJ: Prentice-Hall, Inc.

Jung, C. J. (1971). Psychological types. (H. G. Baynes, Trans. revised by R. F. C. Hull). Volume 6 of Bollinger Series. Princeton, NJ: Princeton University Press. (Original work published in 1921).

Kachigan, S. K. (1986). Statistical Analysis. New York: Radius Press.

Kauppi, R. J. (1981). Jungian type and field independence--dependence as related to the career orientation of high-achieving college students. (University of Maryland: Unpublished doctoral dissertation).

Kerlinger, F. (1973). Foundations of behavioral research. New York: Holt, Rinehart, & Winston.

Kline, P. (1983). Personality: Measurement and theory. New York: St. Martin's Press.

Layton, W. (1985). Review of Strong-Campbell Interest Inventory. In J. Mitchell, Jr. (Ed.), Ninth mental measurements yearbook, (p. 1479). Lincoln, Neb.: Buros Institute of Mental Measurements.

Loomis, M. (1982). A new perspective for Jung's typology: the Singer - Loomis inventory of personality. Journal of Analytical Psychology, 27(1), 59-69.

Loomis, M. & Singer, J. (1980). Testing the bipolar assumption in Jung's psychology. Journal of Analytical Psychology, 25, 351-356.

Maduro, R. J. & Wheelwright (1983). In Corsini, R. J. & Marsella, A. J. (Eds.), Personality theories, research, & assessment (pp. 125-188). Itasca, Illinois: F. E. Peacock Publishers, Inc.

Marascuilo, L. A. & Levin, J. R. (1983). Multivariate statistics in the social sciences: A researchers guide. Monterey, California: Brooks/Cole Publishing Company.

Martin, D. & Bartol, K. (1986). Holland's Vocational Preference Inventory and the Myers-Briggs Type Indicator as Predictors of Vocational Choice Among Master's of Business Administration Students. Journal of Vocational Behavior, 29(1), 51-65.

Moore, W. S. (1983). The Maryland career course: Type/Learning Style Issues. Brief Report #2. College Park: University of Maryland. (ERIC Document Reproduction No. ED 352 791)

Myers, I. B. & McCaulley, M. H. (1985). Manual: A guide to the development and use of the Myers-Briggs Type Indicator. Palo Alto, CA: Consulting Psychologists Press.

Nelson, T. L. (1987). A multivariate analysis of Myers' and Briggs' personality types in terms of vocational interests (Doctoral dissertation, University of Minnesota, 1986). University microfilms no. 87-06, 648.

Sarle, W.S. (1985). SAS® users guide: Statistics V 5 E. [computer software manual]. Cary, NC: SAS® Institute Inc.

SAS (1988). The SAS System [computer program]. Cary, NC: (ISBN prefixes 0-917382, 1-55544).

Sipps, G. J., & Alexander, R.A. (1987). The multifactorial nature of extraversion-introversion in the Myers-Briggs Type Indicator and Eysenck Personality Inventory. Educational and Psychological Measurement, 47 (3), 543-552.

Sipps, G. J., & DiCaudo, J. (1988). Convergent and discriminant validity of the Myers-Briggs Type Indicator as a measure of sociability and impulsivity. Educational and Psychological Measurement, 48, 445-451.

Sipps, G. J., Alexander, R., & Friedt, L. (1985). Item Analysis of the Myers-Briggs Type Indicator. Educational and Psychological Measurement, 45, 789-796.

Spokane, A. R. (1985). A review of research on person - environment congruence in Holland's theory of careers. Journal of Vocational Behavior, 26, 306-343.

Steiner, R. P. (1989). Using the SAS system to assess multivariate normality. The SAS User's Group International Proceedings of the Fourteenth Annual Conference, 1291-1293.

Stricker, L. J. & Ross, J. A. (1963). Intercorrelations and reliability of the Myers-Briggs Type Indicator scales. Psychological Reports, 12, 287-293.

Tabachnick, B. & Fiddell, L. (1989). Using multivariate statistics. New York: Harper & Row.

Thomas, C. R. (1984). Regression of Myers-Briggs Type Scales. Psychological Reports, 55, 568.

Thompson, B. (1984). Canonical correlation analysis: uses and interpretation. Beverly Hills: Sage.

Thompson, B. & Borrello, G. M. (1986). Construct validity of the Myers-Briggs Type Indicator. Educational and Psychological Measurement, 46, 745-752.

Tzeng. L. C. S., Outcalt, D., Boyer, S. L., Ware, R., Landis, D. (1984). Item validity of the Myers-Briggs Type Indicator. Journal of Personality Assessment, 48, 3.

Van Tubergen, N. (1975). Quanal users guide. University of Alabama: Communications Dept.

Webb, S.C. (1964). An analysis of the scoring system of the Myers-Briggs Type Indicator. Educational and Psychological Measurement, XXIV, (4), 765-781.

Weinrach, S. G. (1985). Determinants of vocational choice: Holland's Theory. In Brown, D., Brooks, L. & Associates (Eds.), Career choice and development (pp. 61-93). San Francisco: Jossey-Bass Publishers.

Westbrook, B. W. (1985). Review of Strong-Campbell Interest Inventory. In J. Mitchell, Jr. (Ed.), Ninth mental measurements yearbook, (p. 1479). Lincoln, Neb.: Buros Institute of Mental Measurements.

Willis, C. G. (1984). The Myers-Briggs Type Indicator. In Keyser, D. J. & Sweetland, R. C. (Eds.) Test critiques, 1, (pp. 482-490). Kansas City: Test Corp. of America.

Zagar, R., Artbit, J., Falconer, J., & Friedland, J. (1983). Vocational interests and personality. Journal of Occupational Psychology, 56(3), 203-214.

APPENDICES

APPENDIX A

JUNG'S TYPOLOGY

Jung (1971)

Extraversion is defined as an outward turning of libido in which there is a positive movement of subject interest toward the object. Extraverts have a positive relation to objects, affirming their importance and continuously valuing it. Extraverts generally act, feel, and think in relation to an object in a direct, observable, object - dependent way, transferring interest to the object. Thinking extraverts think while feeling extraverts feel themselves into objects, respectively.

Jung defined introversion as the inward turning of libido. Introverts are trying to extract

MBTI (Myers & McCaulley, 1985)

In the extraverted attitude attention appears to flow or be drawn to objects and people of the environment. The person wishes to act on, affirm the importance of, and increase the power of the environment. People who are habitually extraverted develop some or all of the following: being action-oriented, perhaps impulsive; communicating easily; sociability; and being aware of and reliant upon the environment for both guidance and stimulation. In the introverted attitude energy is extracted from the environment and the person rearranges it subjectively. Main interests are the inner world of

or pull energy from objects so as not to allow it to gain power over them. The person acts, feels, and thinks in a manner congruent in showing the subject is primary and the object of secondary importance. Intellect, emotion, sensation or intuition may predominate. Introverted types are not at ease around others, but prefer their own inner life. "His best work is done with his own resources, on his own initiative, and in his own way" (p. 551). They tend to detach themselves from the world. However, relationships with other people become warm when safety is assured, and their defensive distrust can be shed. The normal introvert (Maduro and Wheelwright, 1983) forms depth relationships and "tends to limit them in number" (p. 158) in contrast to the breadth relationships of the extravert. both concepts and ideas. People who are habitually introverted develop some or all of the following: a thoughtful contemplative detachment; enjoying solitude and privacy; an interest in the clarity of concepts and ideas; and relying on enduring concepts rather than transitory external events.

A function is defined as ". . . a particular form of psychic activity that remains the same in principle under varying conditions" (Jung, 1971, p. 436). Jung also wrote:

> But the numinal accent does not decide only between subject and object; it also selects the conscious function of which the individual makes the principal use. I distinguish four functions: thinking, feeling, sensation, and intuition. The essential function of sensation is to establish that something exists, thinking tells us what it means, feeling what its value is, and intuition surmises whence it comes and whither it goes. (p. 553)

Thinking and feeling are used to assess things and are considered to be rational functions. Thinking brings the contents of ideation into conceptual connection with one another. Feeling imparts a value in the sense of acceptance or

Thinking and feeling are two ways of coming to conclusions and seeking rational order. The thinking function links ideas together by making logical connections, relies on cause and effect principles and tends to be impersonal. People mainly

rejection. You like or dislike something.

Sensation and intuition are two ways in which people take in information. Because they are outside the realm of

oriented toward thinking may develop the following: analytical ability, criticalness, objectivity, concern with both fairness and justice, and orienting to time in a manner that focuses on connections from the past to the present and toward the future. The feeling function comes to decisions by subjectively weighing relative values and merits, relying on both personal and group values. People oriented toward feeling make decisions by considering what matters to others and are concerned with others, have a need for affiliation, desire harmony, can be warm, and have a time orientation that preserves values of the past.

Sensing and intuition are ways of becoming aware of things, people, events, or ideas, being attuned to the flow of events.

reason (not contrary to reason) they are termed irrational functions as they focus on things that are accidental and not willful. Jung defined sensation as being identical with perception of both external and internal stimuli. It is conscious perception mediated by bodily organs. Jung defined intuition as a basic function which mediates perceptions in an unconscious way. Contents are given, whole and complete, without one being able to explain how it came into existence.

Sensing is perception by the senses and establishes what exists. The focus is on what is presently happening and what is real. Persons who are oriented toward sensing often enjoy the present, are realistic, observe well with a good memory for details, and are practical. Intuition enables perception of possibilities, meanings, and relationships through insight. Intuitive perceptions can be hunches, creative discoveries, and seeing patterns among events, originating in the unconscious. Persons oriented toward intuition may neglect present reality, be imaginative, theoretical, abstract, future oriented, or creative.

Judgement and Perception determine one's orientation to the outerworld. Jung wrote about this implicitly. Isabel Myers and Katherine Briggs explicated these constructs when developing the MBTI. In the judging attitude a person attends to making decisions, closure, planning, or organizing. The person halts perception when they have enough information to make a decision. A deficit of judgement leads to procrastination. In the perceptive attitude a person is focused on incoming information. The person is open, curious, interested, adaptable, and aware. A deficit of

perception is characterized by prejudice.

The Judging-Perceiving (J-P) Scale of the MBTI also determines whether a rational function (Thinking or Feeling) or an irrational function (Sensing or Intuition) predominates in both one's inner and outer world. If extraverted, judgement (J) signifies that a rational function predominates in the outer world and perception (P) signifies that an irrational function predominates in the outer world. If introverted, perception (P) signifies that a rational function predominates in the outer world and judgement (J) signifies that an irrational function

predominates in the outer world.

APPENDIX B

SELECTED CONSTRUCT VALIDITY/FACTOR ANALYSES OF THE MYERS-BRIGGS TYPE INDICATOR

The Myers-Briggs Type Indicator (MBTI) is a rationally derived, forced choice, ipsatively scored, self-report paper and pencil inventory developed to measure Jung's personality typology. Early studies have generally focused on establishing the validity of the instrument at the scale level while more recent studies have sought to establish what the MBTI is actually measuring via factor analyses. Additionally, the traditional scoring of the instrument has been examined with increased frequency in recent years. The research leads the author to conclude that the validity of the MBTI as an instrument that measures Jungian Typology today remains suspect.

Carskadon (1977) investigated continuous score test-retest reliabilities on the four scales of the MBTI Form F over an eight week test-retest interval separately for 70 females and 64 males, all introductory psychology students at Mississippi State University. Pearson r formula coefficients all were significant at the $p < .001$ level; were higher for females on T-F ($p < .10$) and J-P ($p < .10$) using Fisher's Z; and yielded reliabilities that were deemed

generally satisfactory (rs = .73-.87) except for males on the T-F scale (r = .56). Relative instability of T-F scale, especially on males, corroborated Stricker and Ross's (1963) findings. Carskadon concluded that if future research further corroborated the relative instability of the T-F scale, a T-F scale revision or scoring change may prove helpful.

Carlyn (1977) reviewed MBTI intercorrelation studies, reliability studies, and validity studies. She concluded that the MBTI is

> . . . an adequately reliable self-report inventory. The Extraversion-Introversion, Sensation-Intuition, and Thinking-Feeling scales appear to be relatively independent of each other, measuring dimensions of personality which seem to be quite similar to those postulated by Carl Jung. (p. 461)

She noted that Perceptive types score high on impulsiveness and research supported that they are spontaneous, flexible, and open-minded in contrast to Judging types who have a high capacity for endurance and remaining on a job instead of changing jobs. She concluded: "The Indicator appears to be a reasonably valid instrument which is potentially useful for a variety of purposes" (p. 471). However, she pointed out that few studies have specified hypotheses beforehand.

Cohen, Cohen, and Cross (1981) examined the construct validity of the MBTI. Forty-eight subjects and forty-five raters including thirty-one married couples participated. One member of each couple was an undergraduate student volunteering for extra credit in an

introductory psychology course. Experimenters hypothesized that if typologies are construct valid on the MBTI, individuals themselves as well as close friends and relatives should be able to discern them. The Behavioral Styles Inventory (BSI) was given to subjects and spouses, consisting of Form S (self perception); Form I (ideal self); and Form M (rating by spouse); of which 45 subjects were rated on. Subjects then took the MBTI, scores were converted to type categories, and compared by using Kappa coefficients. Form S and I of the BSI showed no agreement with the MBTI. However, Form M on E-I ($p < .001$), S-N ($p < .01$), and T-F ($p < .001$) dimensions all were significantly positive. The results indicated that while subjects could not assess their own typology, spouses could, except on the J-P scale. Divergent validity was shown by the absence of a relationship between subjects' ratings of ideal selves and MBTI preferences. The construct validity on the EI, TF, and SN scales was thus supported because it corresponded to how people are viewed by someone who knows them well.

Comrey (1983) gave the MBTI, Form F and Comrey Personality Scales (CPS) to 102 male and 139 female volunteers recruited from students, faculty, and staff from the University of California, Los Angeles who in turn recruited additional, non-University subjects. Mean age for males was 33.7 (SD = 14.7) and females was 31.9 (SD = 14.1). The CPS is a factor analytically derived personality scale

comprised of eight dimensions: Trust vs. Defensiveness (T), Orderliness vs. Lack of Compulsion (O), Social Conformity vs. Rebelliousness (C), Activity vs. Lack of Energy (A), Emotional Stability vs. Neuroticism (S), Extraversion vs. Introversion (E), Masculinity vs. Femininity (M), and Empathy vs. Egocentricism (P). The 95 scored MBTI items were factor analyzed on interitem correlations; continuous bipolar MBTI scores were correlated with each other and the CPS and computations were done separately for males and females; mean scores for males and females were compared; and MBTI scores were computed differently via equal weighting and only adding scores.

Results of factor analysis varimax rotations yielded five major MBTI factors, identified as IE, NS, TF, FT, and PJ. Correlations among male and female MBTI continuous scores and CPS continuous scores yielded correlations that were significant between IE and E ($p < .01$), for males and females (the extraversion-introversion constructs on both instruments converged); PJ and O ($p < .01$), for males and females; NS and C and NS and O ($p < .01$), for males and females; FT and P ($p < .01$), for males and females; and F-T and M, ($p < .01$) for females and ($p < .05$) for males. Other significant findings included sex differences on MBTI continuous scores with males lower on introversion ($p < .05$) and higher on feeling ($p < .01$); and the regular scoring method correlated with the alternate

method .97 for all four scales for 102 males and the IE, NS, FT, and PJ correlations were .93, .95, .97, and .94, respectively, for 139 females.

Comrey's conclusions included that the unscored items wasted time; many items function poorly, possibly because of the forced choice format; sex differences support that different norms and interpretations are needed; complex scoring could be probably changed without losing predictive power; and MBTI scales, while potentially useful, are rather narrow and do not reflect Jungian typology complexity.

Tzeng, Outcalt, Boyer, Ware, and Landis (1984) examined MBTI items via correlational analyses (interitem, interpole, and interscale) and factor analysis, administering Form G to 444 college students and clerical employees. Results supported the item validity. The authors concluded that four, distinct, psychometric dimensions emerged. Interscale correlations reportedly showed that the four MBTI scales were unidimensional. While no information was given regarding the type of factor analytic procedure used (e.g. orthogonal or oblique angle rotations), the authors did write:

> Factor analysis on intercorrelations among all 95 items yielded clear simple structures with the resultant empirical factors being matched almost perfectly with the theoretical scales of the MBTI. (p. 255)

Reliability was also supported through moderately high alpha coefficients (.74 ~.85).

Thomas (1984) administered Form G of the MBTI to 188 mechanical engineering technology students and made use of continuous scores. He found via both correlations and two regression analyses that the MBTI J-P dimension was related to both the T-F and S-N functions.

Thomas wrote:

> Clearly comparison of multiple Rs shows that the interaction of the sensing-intuition and the thinking-feeling scales predicts scores on the judgement-perception scale almost as well as these same two scales predict collectively. (p. 568)

Willis (1984), in critiquing the MBTI concluded: "The MBTI is a good instrument based on its substantial theoretical and empirical bases" (p. 489). Pertinent concerns include the mood or test taking attitude of the examinee which could lead to increased error; and the need for users to be familiar with the theory, application, and interpretation of the MBTI.

Devito (1985) recommended using the Strong-Campbell Interest Inventory versus the MBTI for making a career choice, but believed that the ". . . MBTI could be a useful adjunct" (p. 1031). Additionally, he stated that the MBTI merits more serious consideration by Psychologists and encouraged its use with normal populations in counseling and within organizations. He also recommended using continuous scores for research purposes. Devito pointed out that the MBTI interpretation by Myers of the dominant and auxiliary function is the most controversial aspect of Myers

interpretation of Jung. He also wrote that he is aware of no research which has adequately tested this aspect.

Carlson's (1985) review of the MBTI focused on selected published studies on Forms F and G between 1975-83 that examined its reliability and validity in clinical, counseling, and research environments. Both internal and test-retest reliabilities reportedly have been satisfactory, possibly excepting the T-F scale, with individual scale r values often greater than .80. Problem areas include a need for longer test-retest time intervals (2 months was the longest example explicated in the article), more assessments, and a wider variety of conditions and subjects as most have been tested in University settings with college students. Validity studies have focused mostly on the E-I scale. Construct validity studies have supported the instrument from correlations of personality inventories with the MBTI to predicting behaviors in both relationship problems and conformity studies. Suggestions for future research included more systematic research, greater attention to all four scales, conducting research outside of University populations, and a greater variety of research done by investigators not connected so intimately to the MBTI. (Included in Carlson's review was the Cohen, et al. study [1981].)

Sipps, Alexander, and Friedt (1985), examined the item structure of the MBTI on a sample on 1291 subjects at

The University of Akron of which 466 were male and 825 were female. The age range was 17 - 65, with a mean and standard deviation of 24.3 years and 10.9 years, respectively.

Analyses included both oblique and orthogonal rotations to find the best fit. The number of factors as well as the extent to which scale items loaded on only one common factor was examined. Six orthogonal (due to low interfactor correlations, r = -.11 - .19) factors were retained after applying Cattell's scree test, four of which were similar to the four scales of the MBTI. Additional analyses included both Kuder-Richardson 20 coefficients and Pearson rs on factors and scales. "All analyses yielded only limited support for the item validity of the MBTI" (p. 789). Issues raised included whether the S-N scale was factorially pure; the inconsistency between empirical factor structure results obtained and the purported MBTI structure; lack of differences within T-F scale factor structure between male scored items and female scored items in spite different T-F scales for the sexes; that double-weighted items are not more discriminating as shown in the factor matrix; and why 71 unscored items are retained.

Thompson and Borrello (1986) examined the factor structure and scoring of the MBTI, Form F. Participants were 359 urban university students in the southern United

States of which 103 students were non-white and 65 students were men. All of the students were enrolled in a health course, Personal and Community Health.

The results supported the construct validity of the MBTI. Cattell's scree test was used and four factors were found which corresponded to the four expected MBTI scales. Results were reportedly ". . . robust over both first-order and second-order factor analytic methods" (p. 75). Factor adequacy coefficients showed that the calculated factors measured the constructs that were expected and factor invariance coefficients suggested that the results were generalizable ("not sample specific" [p. 751]). Additionally, the results supported the appropriateness of how the MBTI items are weighted in scoring.

Frye (1987) examined the MBTI scale item content, scale item definition, and scoring standards using archival data from one thousand and seventy undergraduate University of Akron students (343 males and 727 females) who had completed the MBTI. Subsamples who took the MBTI also completed one or more of the following tests: Extended Personal Attributes Questionnaire (EPAQ), Bem Sex Role Inventory (BSRI), Eysenck Personality Inventory (EPI), the Barratt Impulsivity Scale - 5 (BIS-5), and the Emotionality Activity Sociability Impulsivity III Scale (EASI-III). The MBTI was scored using the standard scoring approach (i.e. 2,

1, 0) as well as an alternative method, using only unit weights and zeros.

The following results confirmed hypotheses made on the MBTI: agreement of type classification between the two scoring systems for all four subscales was 100%; the reliability of the alternate scoring system was equal to or greater than that of the standard scoring system; and there is no need for separate scoring systems for males and females on the TF scale, agreeing with both Webb (1964) and Sipps, et al. (1985).

Factor analysis was performed on MBTI item responses for males, females, and both sexes combined. "Principal components extraction with a varimax rotation was used when performing the three factor analyses" (p. 45). Five factors were extracted in each of the three analyses, four of which corresponded to the MBTI subscales. "The factor loadings on all three appear to be somewhat similar, all three analyses extracted JP, SN, TF, and EI factors" (p. 45). However, the SN (both sexes, males); TF (both sexes, males, females); and JP (females) factors were not pure (internally reliable) measures of the respective MBTI subscales. Replication and cross validation of the study with different populations as well as examining items that did not load significantly on intended subscales all were suggested for future research.

Sipps and Alexander (1987) examined the validity of the construct extraversion-introversion and explored the

MBTI structure. Eight hundred and forty participants, of which 286 were male, participated. The subjects were student volunteers at a state university in psychology courses. They were given both the MBTI and Eysenck Personality Inventory (EPI). (The EPI is probably the most widely used instrument to measure introversion-extraversion and its psychometric properties have been examined extensively, according to the authors.) All 840 subjects' responses to both the EPI and MBTI were factor analyzed. Orthogonality was established by the varimax rotation and Cattell's scree test yielded seven factors.

The factor analysis results supported the view that extraversion-introversion is multidimensional. Three measures of extraversion were obtained: (1) sociability; (2) impulsivity/ nonplanning; and (3) liveliness, risk-taking, jocularity. The MBTI E-I scale was found to measure both sociability and impulsivity/nonplanning. This finding was said to be an aspect of extraversion-introversion as defined by Jung, but not identical to it. Additionally, the J-P scale of the MBTI was surprisingly found to be a measure of impulsivity/nonplanning. The authors also pointed out that the EI and JP scales seem to be pure, internally consistent measures, which was also found by both Sipps, et al. (1985) and Tzeng, et al. (1984).

Sipps and DiCaudo (1988) investigated the MBTI E-I and J-P scales at the scale level administering the MBTI

Form F, Barratt Impulsiveness Scale (BIS-5), and the EASI-III to 120 women and 65 men subject volunteers on a class research day in an introductory psychology class. Mean age was 19.3 years, with a standard deviation of 2.96. A principal components factor analysis was done on subscale scores. An orthogonal rotation was done due to low interfactor correlations (median = .066). Cattell's scree test yielded five factors. Results supported the convergent and discriminant validity of the MBTI E-I, T-F, and J-P scales. The S-N scale, however, loaded with the J-P scale. The J-P scale appeared to measure impulsivity and the E-I scale, sociability; as the authors specified these constructs differ from the 1962 MBTI manual citations.

The research reviewed here has generally supported the MBTI at the scale level (see also studies by Carlson and Levy [1973] and Carlson [1980], which were theoretically guided experiments employing sound research designs with clear predictive hypotheses that supported the construct validity to the MBTI scales). However, questions remain regarding (1) the number of scale dimensions, (2) whether the functions exist as independent scale dimensions, (3) whether the scale dimensions are factorially pure, (4) the construct validity of the dimensions, (5) the weighted scoring of the MBTI, (6) if unscored items should be included, (7) whether different T-F scales are needed for the sexes, (8) if the scales are rather narrow and do not

adequately reflect Jungian typology complexity and (9) whether measuring attitudes separate from the functions in a forced-choice (i.e., bipolar) format is correct both empirically and theoretically (see Loomis, 1982 and Loomis & Singer, 1980). Future research can hopefully clarify and offer solutions to these extant problems.

APPENDIX C

STANDARDIZED CANONICAL CORRELATION COEFFICIENTS, STRUCTURAL COEFFICIENTS, CROSS-STRUCTURE CORRELATIONS, PERCENTS OF VARIANCE, AND REDUNDANCIES BETWEEN MYERS-BRIGGS TYPE INDICATOR AND COMBINED STRONG-CAMPBELL INTEREST INVENTORY GENERAL OCCUPATIONAL THEMES, BASIC INTEREST SCALES, AND OCCUPATIONAL INTEREST SCALES VARIABLES AND THEIR CORRESPONDING CANONICAL VARIATES: TABLE AND SUMMARY

The fourth and final canonical correlation analysis looked at the relationship between the 4 MBTI predictor variables and the 103 combined criterion variables of the SCII GOT, BIS, and OIS (see Table A). According to Wilks' lambda criterion, (F [412,318.722] = 2.35, p < .0001), there is an overall significant relationship between the four MBTI and 103 SCII variables. The first canonical correlation was .90 (81% of variance); the second canonical correlation was .88 (77% of variance); the third canonical correlation was .86 (74% of variance); and the fourth canonical correlation was .81 (65% of variance). With the first canonical correlation removed, F (306,240.916) = 2.11, p < .0001; with the first and second canonical correlation removed, F (202,162) = 1.89; and with the first, second, and

Table A.

Standardized Canonical Correlation Coefficients, Structural Coefficients, Cross-Structure Correlations, Percents of Variance, And Redundancies Between Myers-Briggs Type Indicator (MBTI) and Combined Strong Campbell Interest Inventory General Occupational Themes (SCII GOT), Basic Interest Scales (SCII BIS), and Occupational Interest Scales (SCII OIS) Variables And Their Corresponding Canonical Variates.

MBTI Set	First Canonical Variate			Second Canonical Variate			Third Canonical Variate			Fourth Canonical Variate		
	Coeff	Struct	Cross Struct	Coeff	Struct	Cross Struct	Coeff	Struct	Cross Struct	Coeff	Struct	Cross Struct
E-I	.4968	.4844	.4361	-.7302	-.8196	-.7211	.3646	.2266	.1954	.3804	.2058	.1664
S-N	.8568	.7235	.6513	.4581	.6277	.5522	.2962	.2870	.2476	-.5177	-.0151	-.0122
T-F	-.4114	-.3518	-.3167	.0506	.2867	.2522	.9337	.8744	.7541	.1417	.1719	.1390
J-P	-.0230	.2184	.1967	.1834	.5423	.4771	-.2855	-.0559	-.0482	1.0991	.8093	.6546
% of Var.	.2324			.3605			.2253			.1818	Total = 1.000	
Redundancy	.1884			.2790			.1676			.1189	Total = .7539	

(table continues)

SCII GOT	First Canonical Variate			Second Canonical Variate			Third Canonical Variate			Fourth Canonical Variate		
Set			Cross			Cross			Cross			Cross
	Coeff	Struct	Struct	Coeff	Struct	Struct	Coeff	Struct	Struct	Coeff	Struct	Struct
R	.1364	.2222	.2000	-.9671	.0741	.0652	.3795	-.1346	-.1161	-.2543	.2084	.1686
I	.4896	.3745	.3372	-.5104	.0770	.0678	-.3201	-.0649	-.0559	-.0207	-.0702	-.0568
A	-.2925	.3123	.2812	1.1181	.2917	.2566	.6702	.3584	.3092	.1206	-.0460	-.0372
S	.1285	-.1238	-.1114	-.1951	.3058	.2690	-.1087	.1003	.0865	.8194	-.1817	-.1470
E	-.0556	-.2063	-.1857	-.3713	.3514	.3092	-.1711	-.3084	-.2660	.4409	-.0629	-.0509
C	.2618	-.1450	-.1306	.1205	-.1121	-.0986	.2129	-.2591	-.2235	.7249	-.1699	-.1374
SCII BIS												
Set												
Agr.	-.2173	.0819	.0737	.2588	.1059	.0932	-.2757	.0119	.0102	-.1552	.2593	.2097
Nature	-.2456	.2141	.1928	.2761	.1263	.1111	.0616	.2964	.2556	.4552	.0565	.0457
Adventure	.1319	.2161	.1945	-.0962	.2953	.2598	-.0353	-.3039	-.2621	.3042	.3605	.2916

(table continues)

SCII BIS	First Canonical Variate			Second Canonical Variate			Third Canonical Variate			Fourth Canonical Variate		
Set			Cross			Cross			Cross			Cross
	Coeff	Struct	Struct	Coeff	Struct	Struct	Coeff	Struct	Struct	Coeff	Struct	Struct
Mil. Act.	.0050	.0184	.0166	-.3195	-.0376	-.0331	.4648	-.1319	-.1137	-.3553	.0493	.0399
Mech. Act.	.6956	.2670	.2404	.9994	.0844	.0742	-.6115	-.1791	-.1545	.0827	.1870	.1512
Science	.0067	.3649	.3285	.8583	-.0684	-.0602	.2364	-.0598	-.0516	-1.2023	-.0865	-.0700
Math.	.0801	.1518	.1367	-.1747	-.1084	-.0954	-.0715	-.2814	-.2427	-.0379	-.0668	-.0540
Med. Sci.	-.2466	.1930	.1738	.1869	.0041	.0036	-.4844	-.0194	-.0167	-.2827	-.0336	-.0272
Med. Serv.	.1963	-.0246	-.0222	-.3271	.0134	.0118	.0982	.0390	.0337	.1489	.0004	.0003
Mus./Dram.	.0124	.2444	.2201	-.4652	.2869	.2524	.0122	.3789	.3268	-.0398	-.0526	-.0426
Art	-.2454	.2447	.2203	-.1869	.2515	.2212	-.8336	.4172	.3598	-.4879	-.0908	-.0734
Writing	-.4776	.2675	.2408	-.3020	.2209	.1944	-.2460	.2132	.1839	-.1399	-.1304	-.1055
Teaching	.0762	-.0140	-.0126	.2683	.1800	.1583	.1023	.1744	.1504	.3937	-.1052	-.0851
Soc. Serv	-.2892	-.1811	-.1630	-.0330	.3617	.3182	-.3584	.2247	.1938	-.0367	-.1747	-.1413
Athletics	.2080	-.0047	-.0042	-.4149	.1507	.1326	-.3607	-.3658	-.3155	-.2236	.2973	.2405

(table continues)

SCII BIS	First Canonical Variate			Second Canonical Variate			Third Canonical Variate			Fourth Canonical Variate		
Set			Cross			Cross			Cross			Cross
	Coeff	Struct	Struct	Coeff	Struct	Struct	Coeff	Struct	Struct	Coeff	Struct	Struct
Dom. Arts	.1147	-.1167	-.1050	.2251	.1698	.1494	.1176	.3267	.2818	.3868	-.1161	-.0939
Rel. Act.	-.0799	-.1184	-.1066	.2012	.0202	.0177	.5550	.2298	.1982	-.0608	-.2796	-.2261
Pub. Sp.	-.4087	-.0323	-.0291	-.0445	.4161	.3660	.4083	-.2321	-.2002	.2964	-.1662	-.1344
Law/Pol.	.1281	.0379	.0341	-.5339	.2163	.1903	.4340	-.3505	-.3023	-.3537	-.1228	-.0994
Merch.	.2333	-.1826	-.1644	.2229	.3408	.2999	.2008	-.1181	-.1019	.2284	-.1081	-.0875
Sales	-.2090	-.2132	-.1919	-.3144	.2785	.2450	.3887	-.3216	-.2774	.1354	-.0976	-.0790
Bus. Mgmt.	-.2398	-.2339	-.2106	-.2439	.3125	.2749	-.2074	-.2715	-.2342	-.6571	-.1851	-.1497
Office Pr.	.1570	-.2495	-.2246	-.0520	-.1962	-.1726	-.2382	-.0036	-.0031	-.6038	-.1461	-.1182
SCII OIS												
Set												
A.F. o., F	.1021	.1048	.0943	-.3752	-.1147	-.1009	-1.0846	-.3616	-.3119	-.2226	.2004	.1621

(table continues)

SCII OIS	First Canonical Variate			Second Canonical Variate			Third Canonical Variate			Fourth Canonical Variate		
Set			Cross			Cross			Cross			Cross
	Coeff	Struct	Struct	Coeff	Struct	Struct	Coeff	Struct	Struct	Coeff	Struct	Struct
A.F. o., M	-.3422	.0396	.0356	.1707	-.0497	-.0437	.2460	-.4440	-.3829	-1.0510	.1913	.1547
Pol. o., F	-.0914	-.0189	-.0171	.2360	.1566	.1377	1.4398	-.3433	-.2961	-.5373	.2777	.2246
Pol. o., M	.2177	-.0715	-.0644	.4715	.0826	.0727	-1.2379	-.3942	-.3399	.8803	.3699	.2992
Bus Dr., F	-.8864	-.1719	-.1548	.1076	-.1504	-.1324	.2542	-.1663	-.1434	-.5623	.4043	.3271
Bus Dr., M	-.1749	-.2203	-.1983	-.1757	-.1090	-.0959	-.6008	-.2465	-.2126	-.6266	.3284	.2656
Hor. w., F	.2266	.1591	.1433	-.0599	-.2386	-.2100	1.2715	.2450	.2113	.3936	.2213	.1790
Hor. w., M	-.4250	.1609	.1448	-.0677	-.1476	-.1298	.1794	.2572	.2218	-.4385	.1680	.1359
Math., F	-1.1402	.3620	.3260	.9373	-.3810	-.3352	.3759	-.0986	-.0850	.6952	.0837	.0677
Math., M	-.0124	.3180	.2863	-.0901	-.4925	-.4333	.7331	.2113	.1822	1.2704	.0867	.0701
Col. P., F	-.3758	.3840	.3457	.2264	-.3768	-.3315	-1.0741	.1486	.1282	-.0568	-.0027	-.0022
Col. P., M	.3851	.4610	.4150	.1290	-.1720	-.1514	-.1613	.2323	.2003	-.3293	-.1397	-.1130

(table continues)

SCII OIS	First Canonical Variate			Second Canonical Variate			Third Canonical Variate			Fourth Canonical Variate		
Set			Cross			Cross			Cross			Cross
	Coeff	Struct	Struct	Coeff	Struct	Struct	Coeff	Struct	Struct	Coeff	Struct	Struct
Art te., F	-.6061	.2598	.2339	.1850	.2585	.2274	-.0227	.4001	.3451	.1415	-.0254	-.0206
Art te., M	-.3212	.1822	.1640	1.0798	.2415	.2125	.4781	.5827	.5026	1.5196	-.0706	-.0571
Art. f., F	-.4284	.3924	.3533	.3111	-.0313	-.0275	.8813	.2376	.2050	-.1617	.1305	.1055
Art. f., M	.1528	.3082	.2775	-.9628	-.0663	-.0583	.8012	.4227	.3645	-.8957	.0329	.0266
Art. c., F	-.5591	.4338	.3905	.5330	.1931	.1699	-.5928	.3424	.2953	-1.0961	.0800	.0647
Art. c., M	.6510	.3251	.2927	.1294	.1015	.0893	.5702	.4244	.3661	.2041	.0306	.0248
Phot., F	.6115	.5288	.4761	-.6426	.2069	.1821	-.3081	.3000	.2587	.2131	.0553	.0447
Phot., M	.0738	.4672	.4207	.3512	.3050	.2684	.0687	.2331	.2010	.7122	.0828	.0670
Mus., F	1.2086	.3870	.3485	-.2654	-.0765	-.0673	-.3724	.5200	.4484	-1.2239	.0236	.0191
Mus., M	-.2208	.3584	.3226	.0864	.0590	.0519	.4758	.5032	.4340	.4215	.0562	.0454
Ad. Ex., F	.2547	.1096	.0987	.4116	.3823	.3364	.2292	.1507	.1299	.4303	-.0430	-.0348
Ad. Ex., M	.5125	.2468	.2222	-.3082	.3160	.2780	-.5913	.3447	.2973	.4079	-.0838	-.0678

(table continues)

SCII OIS	First Canonical Variate			Second Canonical Variate			Third Canonical Variate			Fourth Canonical Variate		
Set			Cross			Cross			Cross			Cross
	Coeff	Struct	Struct	Coeff	Struct	Struct	Coeff	Struct	Struct	Coeff	Struct	Struct
Brcstr., F	.1987	-.0003	-.0003	.9130	.4993	.4393	.3040	.0445	.0384	-.9990	-.1337	-.1081
Brcstr., M	-.1223	.0647	.0582	-1.1430	.2508	.2206	-.8661	.2140	.1846	.0414	-.0862	- .0697
P.r.di., F	.4263	.1208	.1088	-.5107	.3955	.3480	-.4542	-.0387	-.0334	.2211	-.2220	-.1796
P.r.di., M	-.5263	.0076	.0068	.3424	.3427	.3015	-.1563	.0874	.0754	.0504	-.2325	-.1881
Lawyer, F	.2850	.3554	.3200	.5827	.1787	.1572	.3516	-.3107	-.2679	1.3736	-.0015	-.0012
Lawyer, M	-.1485	.2564	.2309	.0470	.3578	.3148	.0550	-.1020	-.0880	-.1624	-.0898	-.0727
Rpter., F	.3788	.3747	.3373	.1920	.2978	.2620	.0362	.1539	.1327	.4054	-.1047	-.0847
Rpter., M	-.5710	.2822	.2541	-.1577	-.0069	-.0061	.2980	.3709	.3199	-.4249	-.0689	-.0557
Librn., F	.7352	.4182	.3765	-.2682	-.1128	-.0993	.2490	.3349	.2889	.4025	-.2272	-.1837
Librn., M	.1010	.2290	.2062	-.0715	-.0175	-.0154	.8955	.4838	.4173	-1.5396	-.2533	-.2049
G.Coun., F	.2747	-.2034	-.1831	.7445	.3890	.3422	.4111	.1454	.1254	-.0945	-.3615	-.2924
G.Coun., M	-.0641	-.1444	-.1300	-.4676	.3075	.2705	-.7945	.2440	.2104	-.6108	-.3215	-.2601

(table continues)

SCII OIS	First Canonical Variate			Second Canonical Variate			Third Canonical Variate			Fourth Canonical Variate		
Set			Cross			Cross			Cross			Cross
	Coeff	Struct	Struct	Coeff	Struct	Struct	Coeff	Struct	Struct	Coeff	Struct	Struct
S.Sc.t., F	-.2899	-.0440	-.0396	-1.5712	.2222	.1955	-.7204	-.0573	-.0494	-.2490	-.3284	-.2656
S.Sc.t., M	-.2432	-.1496	-.1347	.2993	.3053	.2686	-.2318	.0934	.0806	-.6043	-.1931	-.1562
Elem.t., F	-.3031	-.3609	-.3249	-.4824	-.2129	-.1873	.1307	.4429	.3820	1.1224	-.0551	.0446
Elem.t., M	.0875	-.0136	-.0122	-.1534	-.0852	-.0750	.3498	.3824	.3298	-.6847	.0187	.0151
S.ed.t., F	.2868	-.2113	-.1902	.2782	.1235	.1086	-.3257	.3145	.2713	-.9302	-.2009	-.1625
S.ed.t., M	.4847	-.0343	-.0309	.5058	.2689	.2366	1.0911	.2776	.2394	.7966	-.1162	-.0940
Realtor, F	.1877	-.2859	-.2574	-.6710	.3992	.3512	-1.6063	-.3664	-.3160	-.4575	-.2052	-.1660
Realtor, M	.1632	-.1695	-.1526	.5535	.4547	.4000	.4394	-.4327	-.3732	-.0672	-.0768	-.0621
Florist, F	.4830	-.2936	-.2643	-.6804	-.0128	-.0112	.7675	.1979	.1707	.2523	.1025	.0829
Florist, M	.4725	-.2720	-.2449	.3113	.1176	.1035	-1.0996	.0318	.0274	-.1590	-.0157	-.0127
Acctnt., F	-.1784	-.1525	-.1373	-.3983	-.3436	-.3023	.3818	-.4598	-.3965	-.0860	.0921	.0745
Acctnt., M	-.1052	-.1209	-.1088	.2426	-.0991	-.0872	-.3018	-.6291	-.5425	-.1249	.0671	.0542

(table continues)

SCII OIS	First Canonical Variate			Second Canonical Variate			Third Canonical Variate			Fourth Canonical Variate		
Set	Coeff	Struct	Cross Struct	Coeff	Struct	Cross Struct	Coeff	Struct	Cross Struct	Coeff	Struct	Cross Struct
Banker, F	.4666	-.4801	-.4323	-.4981	-.1864	-.1640	.4908	-.2838	-.2448	-.6563	-.0302	-.0244
Banker, M	-.3765	-.1979	-.1781	-.1502	.2014	.1772	-.2999	-.4821	-.4158	.3710	-.1084	-.0877
AF e.p., M	-.0711	-.1000	-.0901	-.3588	-.2263	-.1991	.3744	-.2537	-.2188	.5586	.4047	.3273
Farmer, M	1.2037	-.1406	-.1266	.5432	-.3309	-.2912	-.2495	-.3204	-.2763	.3970	.2267	.1833
V/A. t., F	.1126	-.1009	-.0908	-.1854	-.1316	-.1158	.0886	.0295	.0255	-.2019	.1385	.1120
Frster., M	.5097	.2020	.1819	-.0570	-.3637	-.3200	-.5101	.0280	.0242	-.4478	.2097	.1696
Em.m.t., M	-.2054	-.1005	-.0905	-.2491	-.1948	-.1714	.0237	-.3037	-.2619	-.1207	.2743	.2218
Crpntr., M	.3191	.1753	.1578	-.4070	-.0944	-.0831	.3602	-.0812	-.0700	.6657	.4268	.3452
Electr., M	.0389	.0640	.0576	-.3191	-.2438	-.2145	-.5486	-.2252	-.1943	.1026	.4078	.3298
Chiro., M	-.3253	.3193	.2874	.2981	.1442	.1269	-.1930	.0646	.0557	-.3739	.0237	.0192
Physic. F	.9937	.4407	.3968	-.8789	-.2681	-.2359	.6264	.0639	.0551	.6879	.0556	.0450
Biol., M	-.7039	.3553	.3198	-.2450	-.3413	-.3003	-2.0264	.2690	.2320	.5113	.0275	.0222

(table continues)

SCII OIS	First Canonical Variate			Second Canonical Variate			Third Canonical Variate			Fourth Canonical Variate		
Set			Cross			Cross			Cross			Cross
	Coeff	Struct	Struct	Coeff	Struct	Struct	Coeff	Struct	Struct	Coeff	Struct	Struct
Geog.,M	-.0275	.4574	.4118	.1456	-.2811	-.2473	.1972	.1754	.1513	-.0886	-.0440	-.0356
In.dec., M	-.5715	-.0907	-.0817	-.2845	.2080	.1830	.0091	.3964	.3419	-.5887	-.1555	-.1258
Fl.att., M	.0015	.0188	.0170	-.1993	.5234	.4605	.2904	.2055	.1772	1.1491	-.0332	-.0268
Pub.Ad., F	-.0309	.2061	.1856	.2787	.1589	.1398	.3502	-.3182	-.2744	-.1650	-.1625	-.1315
Pers.d., F	.0101	-.2226	-.2004	.1756	.4284	.3769	.9040	-.3172	-.2736	.6989	-.2212	.1789
El.p.o., M	.2463	-.0262	-.0235	-.1746	.4097	.3605	.3488	-.2326	-.2006	.2928	-.1983	-.1604
C.C.ex., M	-.2693	-.1882	-.1694	.3386	.4633	.4076	.2771	-.3452	-.2977	-.7985	-.2311	-.1869
R. man., M	.3450	-.3493	-.3145	.3255	.2805	.2468	-.2740	-.3380	-.2915	-.1276	.1002	.0811
Trvl.a., M	.1616	-.3972	-.3576	.0585	.1916	.1685	.4708	-.0359	-.0310	.5937	-.1135	-.0918
Fu.dir., M	-.3775	-.4922	-.4432	.1651	.0062	.0055	1.2481	-.3740	-.3226	.5530	.0770	.0622
Btcian., F	-.5234	-.3544	-.3191	-.1575	-.1968	-.1732	-.6957	.1172	.1011	-.2319	.1937	.1567
Buyer, M	-.2761	-.3500	-.3151	.2521	.2803	.2466	-.7186	-.2285	-.1971	-.5330	-.0763	-.0617

(table continues)

SCII OIS	First Canonical Variate			Second Canonical Variate			Third Canonical Variate			Fourth Canonical Variate		
Set	Coeff	Struct	Cross Struct	Coeff	Struct	Cross Struct	Coeff	Struct	Cross Struct	Coeff	Struct	Cross Struct
Secy., F	-.5251	-.5745	-.5173	1.0553	-.1210	-.1065	.0663	-.0480	-.0414	.6781	-.0325	-.0263
AF e.p., M	.1572	-.3410	-.3070	.4999	-.2739	-.2410	.2419	-.1045	-.0901	.5412	.2251	.1821
% of Var.	.0682			.0642			.0819			.0318	Total = .2460	
Redundancy	.0553			.0497			.0609			.0208	Total = .1867	
Can. Corr.	.900324			.879791			.862468			.808840		

Note. Coeff = Standardized Canonical Correlation Coefficient; Struct = Structural Coefficient; Cross Struct = Cross-Structure Correlation; E-I = Extraversion-Introversion; S-N = Sensing-Intuition; T-F = Thinking-Feeling; J-P = Judging-Perceiving; R = Realistic; I = Investigative; A = Artistic; S = Social; E = Enterprising; C = Conventional; Can. Corr. = Canonical Correlation; % of Var. = Percent of Variance; Agr. = Agriculture; Mil. Act. = Military Activities; Mech. Act. = Mechanical Activities; Math. = Mathematics; Med. Sci. = Medical Science;

(table continues)

Med. Serv. = Medical Service; Mus./Dram. = Musical Dramatics; Soc. Serv. = Social Service; Dom. Arts = Domestic Arts; Rel. Act. = Religious Activities; Pub. Sp. = Public Speaking; Law/Pol. = Law/Politics; Merch. = Merchandising; Bus. Mgmt. = Business Management; Office Prac. = Office Practices; F = female; M = male; A.F. o. = Air Force officer; Pol. o. = Police officer; Bus Dr. = Bus Driver; Hor. w. = Horticultural worker; Math. = Mathematician; Col. P. = College Professor; Art te. = Art teacher; Art. f. = Artist, fine; Art. c. = Artist, commercial; Phot. = Photographer; Mus. = Musician; Ad. Ex. = Advertising Executive; Brcstr. = Broadcaster; P.r.di. = Public relations director; Rpter. = Reporter; Librn. = Librarian; G. Coun. = Guidance counselor; S.Sc.t. = Social Science teacher; Elem. te. = Elementary teacher; S.ed.t. = Special education teacher; Acctn. = Accountant; AF e.p. = Air Force enlisted personnel; V/A. t. = Vocational/Agricultural teacher; Frster. = Forester; Em.m.t. = Emergency medical technician; Crpntr. = Carpenter; Electr. = Electrician; Chiro. = Chiropractor; Physic. = Physician; Biol. = Biologist; Geog. = Geographer; In. dec. = Interior decorator; Fl.att. = Flight attendant; Pub.Ad. = Public Administrator; Pers.d. = Personnel director; El.p.o. = Elected public official; R.man. = Restaurant manager; Trvl.a. = Travel agent; Fu.dir. = Funeral director; Btcian. = Beautician; Secy. = Secretary.

third canonical correlation removed, F (100,82) = 1.55, p < .0202. All four pairs of canonical variates thus accounted for statistically significant relationships between the two sets of variables.

The first cross-structure canonical variate on the MBTI variable set was high on Intuition (r = .6513), Introversion (r = .4361), and Thinking (r = -.3167) with the SCII canonical variables. For the SCII set, examples of high positive correlations were on the GOT Investigative (I; r = .3372); BIS Science (I; r = .3285); Photographer, Female (A; r = .4761), Interior Decorator, Male, (A; r = .4118), OIS College Professor, Male (r = .4150), and OIS Mathematician, Female (I; r = .3260) with the MBTI canonical variables. Examples of high significant negative correlations include Secretary, Female (C; r = -.5173), Beautician, Female (E; r = -.4432) and Buyer, Male (r = -.3191). The predictor variable appears to be a measure of Introverted, Intuitive thinking. The criterion variable appears to be a measure of Investigative and Artistic interests.

The second cross-structure variate on the MBTI variables was high on Extraversion (r = -.7211), Intuition (r = .5522), and Perceiving (r = .4771). For the SCII set, examples of high positive correlations were on the GOT Enterprising (E; r = -.3092), BIS Social Service (S; r = .3182); BIS Public Speaking (r = .3660), OIS Advertising

Executive, Female (A; r = .3364); OIS Broadcaster, Male (A; r = .4393), Public Relations Director, Female (A; r = .3480), Chamber of Commerce Executive, Male (E; r = .4076) and Flight Attendant, Male (A; r = .4605). High negative correlation examples include OIS of Mathematician, Male (I; r = -.4333), Mathematician, Female (I; r = -.3352), College Professor, Male (I; r = -.3315), and Forester, Male (R; r = -.3200). The predictor variable appears to be a measure of Extraversion, Intuition, and Impulsivity. The criterion variable seems to be a measure of Social, Enterprising, and Artistic interests.

The third cross-structure canonical variate on the MBTI variable set was high on Feeling (r = .7541). The high positive correlations on the SCII set included the GOT Artistic (A; r = .3092); BIS Art (A; r = .3598), and Writing (A; r = .3268); and OIS Art Teacher, Male (A; r = .5026), Musician, Female (A; r = .4484) and Musician, Male (A; r = -.4340). Examples of high negative correlations include BIS Athletics (r = -.3155), Law/Politics (r = -.3023); OIS of Accountant, Male (r = -.5425), Accountant, Female (r = -.3965), Air Force Officer, Male (R; r = .3829), Air Force Officer, Female (R; r = .3119) and Police Officer, Male (R; r = -.3399). The predictor variable appears to be a measure of subjective preference. The criterion variable seems to be measuring Artistic interests.

The fourth cross-structure variate was on the MBTI variable set was high on Perceiving (r = .6546). High positive correlations included OIS of Bus Driver, Female (R; r = .3271); Police Officer, Male (R; r = .2992), Carpenter, Male (R; r = .3452), and Electrician, Male (r = .3298). There were no negative correlations at the cutoff of .3 . The predictor variable appears to be measuring impulsivity. The criterion variable seems to be a measure of Realistic interests.

The first pair of canonical structure coefficients consisted of S-N, E-I and T-F variables. All Holland codes were represented in the MBTI set. The first pair of canonical variates show that high Intuition (r = .8568), Introversion (r = .4968), and Thinking (r = -.4114) MBTI scores are positively associated with, for example, GOT Investigative (I; r = .3745), GOT Artistic (A; r = .3123), BIS Science (I; r = .3649), OIS Mathematician, Female (I; r = .3620), College Professor, Male (S; r = .4160), Photographer, Female (A; r = .5288), and Librarian, Female (A; r = .4182). High negative correlation examples include Secretary, Female (C; r = -.545), OIS Banker, Female (C; r = -.4801), Special Education Teacher, Female (S; r = -.3609), Funeral Director, Male (E; r = -.4922) and Travel Agent, Male (E; r = -.3972).

The second pair of canonical structure coefficient consisted of E-I, S-N, and J-P variables in the MBTI set.

The SCII set consisted of all Holland codes. The second pair of canonical variates indicate that high Extraversion (r = -.8196), Intuition (r = .6277), and Perceiving (r = .5423) MBTI scores are positively associated with, for example, SCII GOT Enterprising (E; r = .3514), GOT Social (S; r = .3058), BIS Social Service (r = .3617), BIS Public Speaking (E; r = .4161), OIS Broadcaster, Female (r = .4993), Flight Attendant, Male (r = .4605), and Chamber of Commerce Executive, Male (E; r = .4076). Examples of high negative correlations include OSI College Professor, Female (I; r = .3768), Mathematician, Male (I; r = .4925), and Accountant, Female (C; r = -.3436).

The third pair of canonical structure coefficients was comprised of the T-F variable in the MBTI set. The SCII set was made up of all Holland codes. The third pair of canonical variates show that high Feeling (r = .8744) is positively associated with, for example, SCII GOT Artistic (A; r = .3584), OIS Librarian, Male (A; r = .4838), and OIS Special Education Teacher, Female (S; r = .4429), OIS Art Teacher, Male (A; r = .5827), and OIS Musician, Female (A; r = .5200). Examples of negative correlations include Emergency Medical Technician, Male (R; r = .4821), Vocational Agriculture teacher, Female (R; r = -.6291), and Funeral Director, Male (E; r = -.3740).

The fourth pair of canonical structure coefficients was comprised of the J-P variable in the MBTI set. In the SCII set, Realistic Holland codes are represented.

The fourth pair of canonical variates show that high scores on Perceiving (r = .6546) is associated with high SCII BIS Adventure (r = .3605), high SCII OIS Bus Driver, Female (R; r = .3699), SCII OIS Bus Driver, Male (R; r = .4043), SCII OIS Horticultural worker, Female (R; r = .3284), OIS Carpenter, Male (R; r = .4268), OIS Electrician, Male (E; r = .4078), and Air Force enlisted personnel, Male (R; r = .4047). High negative associations include OIS Guidance Counselor, Female (S; r = -.3615), OIS Guidance Counselor, Male (S; r = -.3215), and Social science teacher, Male (S; r = -.3284).

The redundancy coefficient on the first variate showed that about 19% of the MBTI variance was explained by the SCII variables and 5.5% of the SCII variance was accounted for by the MBTI variables. For the second variate, about 28% of the MBTI variance was explained by the SCII variables and about 5% of the SCII variance was accounted for by the MBTI variables. For the third variate, almost 17% of the MBTI variance was accounted for by the SCII variables and 6% of the SCII variance was explained by MBTI variables. And for the fourth variate, almost 12% of the MBTI variance was explained by the SCII variables while

about 2% of the SCII variance was accounted for by MBTI variables. Overall, the SCII variables accounted for more MBTI variance (75%) than the MBTI explained for the SCII (19%).

The percent of variance statistic for the first canonical variate variables accounted for 23% of the total MBTI variance; the second 36%; the third 22.5% and the fourth accounted for about 18% of the total MBTI variance. THe variables of the first canonical variate explained about 7% of the total SCII variance; the second, about 6%; the third 8%; and the fourth accounted for about 3% of the total SCII variance.

In summary, the relationships between the 4 MBTI predictor variables and the 103 combined criterion variables of the SCII GOT, BIS, and OIS. All four pairs of canonical variates accounted for significant relationships between the two sets of variables. Cross-structure canonical variates and canonical structure coefficients were interpreted. Finally, redundancy coefficients and percent of variance statistics were reported.

APPENDIX D

UNIVERSITY OF AKRON INSTITUTIONAL REVIEW BOARD LETTER

INTEROFFICE CORRESPONDENCE

The University of Akron

DATE: March 29, 1989

TO: Mr. Louis A. DeCola, Jr.

FROM: J. Mulhauser, Chair

SUBJECT: INSTITUTIONAL REVIEW BOARD

Since the University of Maryland has domain over the material to be used, the University of Akron respect whatever the University of Maryland may determine regarding access to retrospective data related to this research.

APPENDIX E

EXEMPTION LETTER FROM UNIVERSITY OF MARYLAND INSTITUTIONAL REVIEW BOARD

UNIVERSITY OF MARYLAND
College Park, MD 20742

INSTITUTIONAL REVIEW BOARD

PRINCIPAL INVESTIGATOR:
(or Faculty Advisor) Dr. J. Zarski

STUDENT INVESTIGATOR: Louis DeCola

PROJECT TITLE: A Factor-Analytic Study of the Strong-Campbell Interest Inventory and Myers-Briggs Type Indicator

The Chairman of the University IRB reviewed the above-mentioned project on 5-15-89 in accordance with Public Health Service grant policy as defined in "The Institutional Guide to DHHS Policy on Protection of Human Subjects," 12-2-71, and in Title 45, Code of Federal Regulations, Part 46, and found this project to be exempt.

Exemption No. 5

Willard V. Ladin
Chairman of Institutional Review Board

The Principal Investigator and Student Investigator, in signing this report, agree to notify the Office of the Dean for Graduate Studies and Research of any addition to or changes in procedure subsequent to this review.

John J. Zarski, PH.D.
~~Principal Investigator~~
(or Faculty Advisor)

Louis A. DeCola Jr.
Student Investigator

PLEASE RETURN ONE SIGNED COPY TO THE GRADUATE SCHOOL, RM 2133, SOUTH ADMINISTRATION BUILDING

4/88
IRB-4

APPENDIX F

UNIVERSITY OF AKRON INSTITUTIONAL REVIEW BOARD "FINAL APPROVAL"

FINAL APPROVAL

The University of Akron

Office of the Associate Vice President for Research and Graduate Studies
Akron, OH 44325-2102
(216) 375-7666 Fax: (216) 375-4990

10/2/91
(date)

Mr. Louis A. DeCola, Jr.

751 Garrison Rd.

Ashtabula, Ohio 44004

Dear Mr. DeCola:

You requested review by The University of Akron's Institutional Review Board for Protection of Human Subjects (IRB) of your research project entitled "The Relationship between the Myers-Briggs Type Indicator and Strong-Campbell Interest Inventory."

The IRB Chairperson conducted the research review and made the following determinations:

XX project was found exempt of need for further review under 46.101(b)_____ (see attached sheet)

_____ project required expedited review _____ (approval date)

_____ project required convened meeting held on _____

IRB review concluded that your research was:

1. _____ approved--no human subjects under definition of federal regulations are involved.

2. XX approved without qualifications

3. _____ approved with contingencies. You need further IRB approval of the following before the project is begun:
   a. _____ survey/testing instrument after it is developed
   b. _____ documented consent of cooperating institution
   c. _____ an adequate letter of informed consent
   d. _____ a verbal script to be read to subject
   e. _____ a cover letter explaining project to respondent
   f. _____ other_____

4. _____ disapproved

If this recommendation was made from a convened meeting, then a copy of the minutes is attached. If your research fell under expedited or exempt review, then no minutes are attached. If your project was disapproved, then attached are reasons included in the minutes, and you are invited to respond in person or in writing. Thank you for your cooperation in this matter.

Sincerely,

Gerald M. Parker

Chairperson/Vice Chairperson IRB

cc/Faculty advisor (if student) Dr. J. Zarski
Department Head (if faculty)

Form 3/89 This is to confirm University of Maryland's review. This project is exempt.