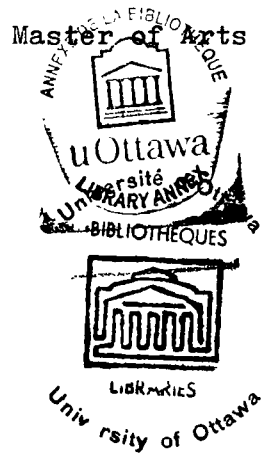


DIFFERENTIATION OF UNIVERSITY FRESHMEN IN ARTS
AND SCIENCE ON THE BASIS OF THEIR SCORES ON THE
SIX 'GENERAL OCCUPATIONAL THEMES' OF THE STRONG-
CAMPBELL INTEREST INVENTORY, 1974

by Peter E. Meuser

Thesis presented to the School of
Graduate Studies of the University
of Ottawa as partial fulfillment of
the requirements for the degree of



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CURRICULUM STUDIORUM

Peter E. Meuser was born in Wuppertal, West Germany, on January 25, 1951. He received the Bachelor of Arts degree in Psychology from the University of British Columbia in 1973. The title of his thesis was Visual Cues and Word Association Effects on Learning.

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INTRODUCTION

Determining characteristic personality patterns of various groups is certainly not a new idea. A large volume of research data supports the development of "keys" or "profiles" that best represent given populations and subsequently employing them in a predictive sense to classify individuals in terms of similarity or dissimilarity to those populations. A tongue-in-cheek reference, for example, is often made to the "salesman" or "dominant mother" profiles formed by certain configurations on the Minnesota Multiphasic Personality Inventory, (MMPI). Similarly, Drake and Oetting, 1972, list at least 1,200 different configurations of the MMPI scales, giving hypotheses for each one concerning the emotional and attitudinal states of the counselees.

Although personality "keys" or "profiles" have been available for many years, their applications have traditionally remained in the realm of therapy and pathologies. Little use has been made of these data in educational counseling, vocational planning, occupational training, and job selection.

This research is an attempt to provide groundwork upon which such data may be applied to educational

counseling, and is based largely upon recent research developments emphasizing the importance of personality in educational and vocational choices. This research trend has culminated in the work of John L. Holland, Making Vocational Choices: A Theory of Careers (1973), in which he characterizes all people and environments by their resemblance to each of six personality and environmental types, namely, "realistic", "investigative", "artistic", "social", "enterprising", and "conventional". This typology has provided the framework for the General Occupational Themes of the Strong-Campbell Interest Inventory, (SCII, 1974; revision of the Strong Vocational Interest Blank, SVIB, 1966).

The present study seeks to investigate the use of the General Occupational Themes of the SCII in differentiating between freshmen enrolled in the two curricula of Arts and Science at the University of Ottawa. Specifically, this study investigates differences between the groups by attempting to delineate personality patterns within the groups according to their scores on the General Occupational Themes. It further investigates the validity of the differentiation in this data by employing the results to classify individuals into group membership. These tasks, here briefly stated, constitute the core of this dissertation.

The literature relevant to the study is presented in the first chapter. The first chapter also discusses the problems investigated in greater depth, and presents this study's hypotheses. The second chapter presents the experimental design and specifically describes the experimental tools, the subject population, and the methods of data analysis. The results of the study are presented and discussed in the third chapter, along with suggestions for further research.

CHAPTER I

REVIEW OF THE LITERATURE

Literature relevant to this study is presented in this chapter. It begins in section one by summarizing a number of studies addressing themselves to the relationship between personality and choice of college major. In section two, Holland's (1973) theory of personality and vocational choice is presented in some depth, including major assumptions of the theory, background concepts, and a number of key studies indicating support for certain portions of the theory. This section will also summarize the integration of Holland's theory into the new form of the SVIB (1966), the SCII (1974). Section three concludes the chapter with a brief list of operational definitions, the specific problems investigated by this study, and a statement of the experimental hypotheses.

For the purposes of this dissertation, all tests referred to in the text will be listed once in full, followed wherever possible by the correct abbreviation and date, and thereafter referred to only by abbreviation.

1. Personality and Choice of Major:

Personality, as defined by Allport (1937) is "the dynamic organization within the individual of those psychophysical systems that determine his unique adjustments to his environment" (p. 48). As such, personality plays a predispositional role in our development as individuals and subsequently in making educational choices.

A number of noteworthy cross-departmental studies of the relationship between type of major of college students and personality have been carried out. In a study bearing directly upon the present investigation in that it attempts to elucidate personality features associated with two types of educational interests, Tyler (1964) assessed the interests, special abilities, and personal characteristics of boys and girls over a period of twelve years. Boys, divided into scientist versus non-scientist groups, and girls, separated into career versus non-career groups, were compared on the SVIB and the California Personality Inventory (CPI), among other tests.

The principal difference between the two groups of boys was that the scientist group gave substantially more masculine responses as early as fourth grade. On the CPI, the scientist group scored higher on the "psychological-

mindedness" scale than the non-scientist group, but lower on the "dominance" scale. The career girls, meanwhile, scored higher on the "responsibility", "self-control", "tolerance", "good-impression", and "psychological-mindedness" scales than their non-career counterparts, while scoring lower on the "communality" scale.

Likewise, a relationship seems to exist between the way parents deal with children's curiosity and the latter's vocational and educational choice. Galinsky (1962) contrasted students in Physics and Psychology in terms of their childhood experiences (i.e., the reactions of their parents to expressions of curiosity), and found that in the case of Psychology students, interpersonal relationships tended to have been nurtured and protected. The Physics students, on the other hand, had had proportionately more frustrations in their interpersonal relationships, but greater intellectual stimulation.

Thus, it does seem conceivable that early developmental factors play a leading role in influencing later educational and vocational choices.

Not all investigations have concerned themselves with correlating specific developmental factors and educational curricula. In a campus study, Sternberg (1955) attempted

to identify interest, value, and personality factors characteristic of students enrolled in various college academic curricula. It was found that each subgroup of majors differed significantly from all others on at least one factor, and that broader differences existed between areas of study such as Social Science and Natural Science than between individual fields of study such as Psychology and Chemistry.

Darley (1941) and Darley and Hagenah (1955), with data from over 1,000 college students, reported that business contact and social service fields tended to have students who are better adjusted socially than the literary and technical fields. Tyler (1945) reported similar results in that scientific interests are related to poor social adjustment, while business contact is related to better social adjustment.

Sarbin and Berdie (1940) obtained both SVIB and Allport-Vernon Study of Values scores from 52 college students, finding positive relationships between enrollment in scientific courses and theoretical values. Duffy and Crissy (1940) reported similar results with 108 college women, as did Burgemeister (1940).

Some correlational studies have reported findings that make one feel like keeping some group memberships a closely guarded secret. Teevan (1954) administered the Blacky Test

(Blum, 1950) to a group of male students who were classified into three groups of majors and scored according to the three main categories of the test (oral eroticism, oral sadism, and guilt feelings). Those students in the Humanities (i.e., music, art, English, etc.) were described as disturbed in oral eroticism, those in the Social Sciences (government, economics, history) as having difficulties in all three categories, and those in the Natural Sciences (i.e., chemistry, geology, biology, etc.) as being least disturbed in all categories rated.

Small, Sweat, and Von Arnold (1955) studied the personality characteristics of four groups of students in different fields at a two-year institute. They found Art students to be emotionally flat, narcissistic, withdrawn, bizarre, and possessing a marked element of anality. Retailing students demonstrated more anxiety and greater emphasis on money, status, and power than the other groups. Dental Hygiene students had strong needs to sympathize, help, and protect others, to establish close personal relations with others, and to restrain impulses. Finally, they reported Mechanical Technology students as having strong needs for achievement, restraint, recognition, affiliation, and for taking care of and saving things.

In many practical settings where tests are used, inferences are often made about client characteristics which may well be tangential to the designed purpose of the test or tests. The SVIB in particular has attracted much attention in this respect. Strong (1936) for example, employed his Blank to measure masculinity and femininity, as well as interest maturity (1930, 1933). Investigating scholastic success, Young and Estabrooks (1937) found the SVIB most predictive among several tests. Tussing (1942) used the SVIB to predict traits such as self-confidence and sociability, and types such as theoretical and economic.

Berdie (1955) reported follow-up data on Darley's (1941) investigation. A group of 554 men and 547 women freshmen in the Arts College at the University of Minnesota were tested in 1939 and 1949 with the SVIB. The evidence indicated that the SVIB scores of college freshmen were significantly related to the curriculum they had entered, and that interest tests were far superior in differentiating these groups than achievement, aptitude, and personality tests.

The relationship of personality to curriculum has been suggested in a roundabout or possibly even unintentional fashion by Bordin and Wilson (1953). On a sample

of 256 freshmen at Washington State College it was noted that, in a test-retest situation employing the Kuder Preference Record (KPR), students either shifted their curriculum to fit their interests, or shifted their interests to fit their curriculum. The authors concluded that some predictable relationship exists "between stability or instability of the test-retest results" (p. 305).

The Bordin and Wilson (1953) study above has rather interesting possibilities if seen in the light of certain assumptions. The first assumption being that interests are merely another expression of one's personality (Bordin, 1943; Darley and Hagenah, 1955; Super, 1972; Holland, 1973). The second being that conformity to the characteristics, standards, goals, etc. of a group is a function of membership within that group over time (Sims and Patrick, 1947; Newcomb, 1957; Siegel and Siegel, 1957; Converse and Campbell, 1968). Viewed in this perspective, those that shifted curriculum had strong personality patterns that were not compatible with the environment provided by their former curriculum, and those that shifted interests may have had less well-established personality patterns (including interests) allowing them to gradually identify more and more with their present curriculum. It will become clear to

the reader that these hypotheses concerning personality, interests, and curricula touch upon the very essence of the present investigation in that more information about the relationships between personality and curricula may bring about fewer of the "shifts" in Bordin and Wilson's study.

The final work reported in the present review is highly relevant due to a number of important similarities to the goals and procedures of this dissertation. In a complex study involving five personality tests¹ to forecast college majors along the two continua of Science and Humanities, Goldschmid (1965) obtained data involving 1,817 students of three large universities. The different predictions based upon scores on the five tests were in substantial agreement in identifying similar personality characteristics as being correlated with each of the two continua. The personality traits which best identified each group of students seemed to fall into five broad categories: (1) orientation to life; (2) modes of adjustment and psychological functioning; (3) interest patterns;

¹ Note that one of the tests, the SVIB, is considered a personality test in Goldschmid's study.

(4) behavior in social contexts; and (5) modes of cognitive functioning.

In Category 1, for example, Science students were characterized as prudent, conventional, energetic, and preferring overt action, whereas Humanities students were participant, ambitious, independent, and self-centered, emphasizing success and personal gain. In Category 2, Science students were listed as relatively free from self-doubt, as having a sense of well-being, and tending toward strict control of impulses and denial of emotionality. The Humanities students were reported to be impatient, demanding, difficult, expressive, anxiety-prone, and tended to complain about physical and psychological status. Category 3 of Goldschmid's study found Science students as having a restricted range of interests, an interest in science and scientific activities, and being unlikely to venture into new and different pursuits, while Humanities students were interested in a wide range of subjects including literature, philosophy, art, religion, etc., and were responsive to and involved in current social and political affairs. Category 4 classified Science students as not assertive or dominant, reserved, socially introverted, and not spontaneous, whereas Humanities students were

characterized as ascendant, persuasive, clever, and imaginative in social situations, as well as outspoken, gregarious, and seeking social contact. Finally, in Category 5, Science students were found to have a preference for logical, precise analyses, taking a problem solving approach, be impersonal and critical, and value form, while Humanities students had preferences for imaginative, even autistic thinking, took the intuitive approach, and were personal and subjective in evaluating ideas. The interested reader may refer to Appendix 1 for a more complete presentation of Goldschmid's findings.

The personality characteristics associated with educational choice in Goldschmid's (1965) study become extremely meaningful to the present investigation when viewed in the light of Holland's (1973) typological descriptions presented at length in Appendix 8, upon which the SCII General Occupational Scales and this study rely for their theoretical underpinnings.

In the relationship of personality and choice of curriculum, then, it appears that differences in terms of social adjustment and behavior, values, eroticism, guilt, emotionality, impulsiveness, needs, anxieties, sex, interests, childhood home environments, orientation to life,

and psychological and cognitive functioning effect in some way enrollment into the broad curricula of Arts or Science. Furthermore, it appears that some of these differences are already present during early childhood.

This section of chapter I has dealt with the relationship of personality and choice of major as measured by a wide variety of tests. The astute reader may have noticed that discussion has tended to center around studies dating only to 1965, the reason being that later works have gravitated towards empirical testing of Holland's vocational theory which appeared in the literature in 1959 and thereafter. These studies will be discussed following the in-depth presentation of Holland's theory in the next section.

2. Holland's Typology and the New SCII (1974):

This section of chapter I is concerned chiefly with Holland's (1973) theory of personality types and how it has been integrated into the existing structure of interest measurement.

Holland's (1973) classification system is an extremely sophisticated and all-encompassing extension of the so-called "trait and factor" theory that dominated occupational research

from the 1920's to the 1950's - at its worst, seeing to it that square pegs eventually found their way into square holes. Holland's theory, which is fully and skilfully presented in his book Making Vocational Choices: A Theory of Careers, (1973), is essentially based upon four main assumptions that indicate the nature of the personality types and environmental models, how the types and models are determined, and how they interact to create the phenomena (vocational, educational, and social) that the theory is designed to explain. They are as follows.

(1). In our culture, most persons can be categorized in terms of six types: Realistic, Investigative, Artistic, Social, Enterprising, or Conventional. Each type is the product of a characteristic interaction between a variety of cultural and personal forces (i.e., parents, peers, social class, culture, physical environment). Out of this scattered experience a person learns first to prefer some activities to others, while later these preferences may become strong interests and lead to a special group of competencies. Finally, a person's set of interests and competencies create a particular personal disposition that leads him/her to think, perceive, and act in special ways.

By comparing a person's characteristics with those of

Each model type, one can determine which type he resembles most. That model, then, becomes his personality type. One may also determine what other types he resembles, in descending order, forming a total resemblance to each of the six types in a pattern of similarity and dissimilarity. This pattern becomes his personality pattern. With this system, inherent problems of a single classification are avoided, while allowing for the complexity of personality by providing the possibility of 720 different personality patterns. (See Appendix 8 for descriptions of each type).

(2). There are six kinds of occupational environments: Realistic, Investigative, Artistic, Social, Enterprising, and Conventional. Each environment is dominated by a given type of personality, thereby contributing as much as job requirements to establishing the working environment of a given occupation.

Because different types have different interests, competencies, and dispositions, they tend to surround themselves with special people and materials to seek out the problems that are congruent with their interests, competencies, and outlook on the world. Thus, where people congregate, they create an environment that reflects the types they are, making it possible to assess the

environment in the same terms as we assess individuals.

(3). People search for environments that will allow them to exercise their special skills and abilities, express their attitudes and values, take on problems and roles that they find satisfying and stimulating, and avoid chores or responsibilities that they find distasteful or formidable.

(4). The fourth assumption upon which Holland's theory rests, is that a person's behavior is determined by an interaction between his personality and the characteristics of his environment. Factors such as job performance, satisfaction, and stability are especially influenced by this interaction.

Holland deals with other concerns as well, especially regarding developmental issues. For example, he notes that Investigative, Artistic, Social, and Conventional types usually do well in school because their attitudes and values are compatible with those of their teachers, while Realistic and Enterprising types lack such a match with educators.

Within the context of the theory, Holland also deals with a number of measurement problems that create difficulties for researching the relationships between a person's measured interests and eventual behavior. He defines three concepts, for example, and shows how these characteristics can be measured and used to clarify the individual's vocational behavior.

Consistency is determined by the nature of the high or low scores on the profile such that if the high scores are on the scales of related themes (i.e., Investigative, Artistic), the pattern is consistent and will be more predictive than a pattern with equally high scores on less related themes (i.e., Investigative, Enterprising). Differentiation refers to the sharpness of profile scores. A well-differentiated profile has definite highs and lows, making it more predictive than a flat or undifferentiated profile. Finally, Holland defines congruence in terms of consistency between environments and types within that environment. For instance, Realistic types flourish in Realistic environments because such an environment provides the opportunities and rewards a Realistic type needs. Incongruence occurs when a type lives and/or works in an environment that provides opportunities and rewards foreign to the person's preferences and abilities (i.e., Realistic type in a Social environment).

Because of the nature of Holland's theory, a number of principles, both empirical and implied, are crucial to its theoretical base.

First, the choice of a vocation is an expression of personality. Findings indicate that vocational preferences are moderately correlated with personality and originality

scales (Holland, 1963), self-ratings of ability, personality traits, and life goals (Baird, 1970), self-confidence and sociability (Tussing, 1942), maturity (Dunkleberger and Tyler, 1961), and many other psychological and sociological variables. Hence, if vocational interests are assumed to be extensions of personality, then they represent its expression in work, hobbies, school subjects, recreational activities, and preferences.

Second, interest inventories are personality inventories. This follows from the first principle, and seems to have been the impetus for Forer's (1948) pioneering attempts to assess personality from interests and activities. More recently, Holland's Vocational Preference Inventory (VPI, Holland, 1958, 1965), and Jackson's Personality Research Form (PRF, Jackson, 1967) have employed this principle. Research has tended to indicate that interpretation of vocational interest inventories in terms of personality variables seems useful, and provides reliabilities and validities approximating those obtained for other methods of assessing personality (Holland, 1973).

Third, vocational stereotypes have reliable and important psychological and sociological meanings. Just as we judge people by their friends, dress, and actions, so we

judge them by their vocations. Thus, we believe that plumbers are handy, lawyers aggressive, actors self-centered, salesmen persuasive, accountants precise, and scientists unsociable. Studies have demonstrated that occupations are perceived accurately and consistently by all types of people at many levels of experience (O'Dowd and Beardslee, 1960, 1967; Marks and Webb, 1969). Plainly, if perceptions of occupations were to have no validity, interest inventories would likewise have no validity, as they rely upon perceptions remaining stable across large numbers of people.

Fourth, the members of a vocation have similar personalities and similar histories of personal development. If a person enters a given occupation because of his particular personality and history, it appears logical to assume that each vocation attracts and retains people with similar personalities. Laurent (1951), for example, documented similarities in life histories of engineers, physicians, and lawyers. Others have supported these findings (Roe, 1956; Kulberg and Owens, 1960; Nachmann, 1960; Chaney and Owens, 1964).

Fifth, because people in a vocational group have similar personalities, they will respond to many situations

and problems in similar ways, and they will create characteristic interpersonal environments. Although difficult to test directly, this principle is supported by Astin and Holland (1961) who found that the percentage of students in a particular curricular group at a given college becomes the predominant profile of that college. Recent large-scale surveys of educational environments have documented similar findings (Astin, 1968; Richards, Seligman, and Jones, 1970).

Sixth and last, vocational satisfaction, stability, and achievement depend on the congruence between one's personality and the environment in which one works. Just as we are more comfortable among friends whose tastes, talents, and values resemble our own, so we are more likely to perform well at a vocation in which we "fit psychologically", so to speak. The SVIB and other generally accepted vocational inventories are partially based upon this phenomena (Holland, 1973).

At this point in the discussion, the reader may well be wondering how such an all-encompassing theory could possibly muster cohesive support. Since 1959, there have been well over one hundred studies carried out to test the various aspects of the theory, and to even briefly summarize would go beyond the scope of this review. Let it suffice to

direct the interested reader to Holland (1973, chapter 5) for further detail.

There have, however, been a number of studies that relate to this dissertation in dealing with the relationship of Holland's personality types to educational choices and curricular groups, essentially covering the period from 1965 to the present.

In a study of 332 boys and 181 girls, Holland and Nichols (1964) concluded that remaining in a given major field appears to be related to having personal attributes commonly associated with those of the typical student, and that leaving a field is related to dissimilarity between the student's attributes and those of the typical student. For example, they found that boys who left realistic fields (largely Engineering in this sample) appeared to be irresponsible, original, tolerant of ambiguity, and complex in outlook when contrasted with those remaining.

A study implying a clear distinction in types between Arts and Science was carried out by Holland (1963-64) with 638 students. He found that students classified as different types according to their VPI scores described themselves in expected ways. Boys with high scores on the Realistic scale of the VPI said that they "most enjoy working with their

hands, tools, or instruments"; that they would find it most frustrating to "take patients in mental hospitals on recreational trips"; that they believe their greatest "ability lies in the area of mechanics"; and that they are "most incompetent in the area of human relations" (Holland, 1973, p. 47).

Abe and Holland (1965b) assessed 12,432 college freshmen by classifying them by choice of major and comparing them on 117 variables. In general, many comparisons resulted in large mean differences that were consistent with the formulations of the personality types.

In a comprehensive study of 1,576 men and 1,571 women freshmen from 28 colleges, Holland (1968b) categorized students in terms of types and subtypes according to their VPI profiles and then compared them on 22 dependent variables, including competencies, life-goals, self-ratings, and personality and attitudes. Analysis of variance indicated substantial differences across types (i.e., Realistic), significant comparisons across subtypes (i.e., Realistic-investigative), and some differences across related subtypes (i.e., Realistic-Investigative-Social). Mean scores for types and subtypes for men went as follows: 76 per cent of the predictions were correct for comparisons

across types, 75 per cent correct across two-letter subtypes, and 64.1 per cent correct across three-letter subtypes. For women the percentages were 84, 75.4, and 72.7, respectively. These results strongly suggest that people with similar codes have similar characteristics, and that a comparison of subtypes reveals an increasing similarity of personality.

Williams (1972), in a study of male graduate students from eighteen departments found that a student's field of study and his VPI, Allport-Vernon-Lindzey Study of Values (AVL), Miller Occupational Values Indicator, and 16 PF scores are usually consistent with the characteristics attributed to the types. Using discriminant analysis for classification of students, it was found that the VPI was correct 64.14 per cent of the time, the AVL 46.21 per cent, and the 16 PF 57.24 per cent. The latter finding is especially important because it is strong evidence that field of study is partially dependent upon personality. These findings tend to be supported by earlier ones as well (Kelso, 1969; Bohn, 1966).

In summing Holland's theory, it appears that people grow up, perceive occupations, search for occupations, move among occupations, and behave in ways that can be predicted

and classified. The environmental models appear useful to characterize educational and occupational environments, and, based upon a census of types within environments, can incorporate many physical and non-psychological aspects of the environment. Furthermore, types influence environments, environments influence types, personality incorporates interests, and interest tests as such are merely personality tests in disguise.

This rather complex system has been integrated into the existing structure of interest measurement by its inclusion in the SCII, the test with which this study is concerned. The SCII is the most recent revision and extension of the widely used SVIB, and differs from it in three main aspects: (1) the addition of the General Occupational Themes according to Holland's theory; (2) the structuring of the profile in relation to the six Themes; and (3) the merging of men's and women's forms into a single instrument.

To facilitate inclusion of Holland's personality types, Campbell and Holland (1972) and Hansen and Johansson (1972) developed scales to measure the types and applied them to Strong's (SVIB) data. The result was a meaningful structure for presentation of profile scores of both the Basic Interest Scales and the Occupational Scales of the SCII. With the

changes, the SCII has three main categories besides the usual Administrative Indexes and Special Scales. They are (1) the General Occupational Themes, which are a direct translation of Holland's personality types; (2) the Basic Interest Scales, which present homogeneous clusters of interest areas within the framework of each of the General Occupational Themes; and (3) the Occupational Scales, which list dozens of possible occupations categorized under the Basic Interest areas and the General Occupational Themes.

The three types of scores may be better understood as an analogy to descriptions of physical build (SCII Manual, Campbell, 1974):

The General Occupational Themes are concerned with global categories, and are similar to such overall descriptions as 'She is tall and slender' or 'He is small and wiry.' The Basic Interest Scales are concerned with specific attributes and are similar to statements such as 'She weighs 118 pounds' or 'He has a reach of 38 inches.' The Occupational Scales are concerned with how the person resembles other types of people, and are analogous to statements such as 'She has the build of a swimmer' or 'He looks like a jockey.' Thus, although the three types of scales report three types of scores, a general thread of consistency runs through all of them (p. 19).

This second section of chapter I has covered Holland's

theory of personality types in considerable depth, and has outlined how this new approach has been incorporated into the SCII.

3. Definitions, Problems Investigated, and Hypotheses:

This final section of chapter I will include a number of definitions deemed important within the context of this dissertation, the problems investigated herein, and this study's experimental hypotheses.

Definitions:

(a) Curricula. Referring to the two main arteries of undergraduate study, namely Arts and Science, often referred to as Humanities and Sciences.

(b) Arts. The branches of learning regarded as having primarily a cultural character, and which are concerned, among other things, with the nature of knowledge and experience, and with the aims and purposes of Man's being (Goldschmid, 1965). For the purposes of this study, the subjects were attending a compulsory Arts course (English).

(c) Science. A branch of study that is concerned with the observation and classification of facts and especially with the establishment and/or quantitative induction of general laws verifiable by hypotheses and experimentation (Goldschmid, 1965). For the purposes of this study, the subjects were attending a compulsory Science course (Math).

(d) Personality. Personality is the dynamic organization within the individual of those psychophysical systems that determine his unique adjustments to his environment (Allport, G.W., 1937, p. 48).

(e) Personality Types. One of the six personality types described by Holland as they appear in the General Occupational Themes of the SCII (Realistic, Investigative, Artistic, Social, Enterprising, Conventional).

(f) Personality Patterns. Refers to two-code (i.e., Realistic-Investigative) or three-code (i.e., Realistic-Investigative-Artistic) combinations of the six basic types into meaningful and observable patterns.

The present study seeks to employ the General Occupational Themes of the SCII to add to the body of knowledge about the relationship between personality and educational choice. Specifically, the investigation will attempt to (1) discriminate between the two continua of Arts and Science on the basis of their scores on the six personality types; (2) determine whether there are Male-Female differences within these groups on the six variables; (3) delineate which variables or pattern of variables best differentiate the groups; and (4) employ a classification system using differences found to classify individuals into the various groups. The purpose of the latter step of course being to determine the usefulness and accuracy of the data for prediction in counseling.

Thus, the problems posed are now put in the null form as experimental hypotheses:

1.1 There are no significant differences at $p < .01$ in scores or patterns of scores on the six General

Occupational Themes of the SCII between students in Arts and students in Science.

1.2 There are no significant differences at $p < .01$ in scores or patterns of scores on the six General Occupational Themes of the SCII between Male students and Female students.

1.3 There are no significant differences at $p < .01$ in scores or patterns of scores on the six General Occupational Themes of the SCII between Males in Arts and Females in Arts.

1.4 There are no significant differences at $p < .01$ in scores or patterns of scores on the six General Occupational Themes of the SCII between Males in Science and Females in Science.

1.5 There are no significant differences at $p < .01$ in scores or patterns of scores on the six General Occupational Themes of the SCII between Males in Arts and Males in Science.

1.6 There are no significant differences at $p < .01$ in scores or patterns of scores on the six General Occupational Themes of the SCII between Females in Arts and Females in Science.

2.1 There are no significant differences at $p < .01$ in scores or patterns of scores on the six General Occupational Themes of the SCII among four mutually exclusive groups of subjects, one being Male Arts, another being Male Science, a third being Female Arts, and the fourth being Female Science.

Other interests to be examined will be the possibility of employing findings in a classification system to predict group membership from scores obtained on the six scales of the General Occupational Themes. Also of interest will be the nature of determined relationships in terms of similarities and differences among groups.

The next chapter presents the experimental design for the testing of these hypotheses.

CHAPTER II

EXPERIMENTAL DESIGN*

The design of this study is presented in this chapter in four main sections. The tools used are described in the first section, with a discussion of the rationale for their use. The second section deals with the subjects who participated in the study. In the third section, the experimental procedures are discussed. Section four concludes the chapter with a discussion of the statistical procedures used in the analysis of the data.

1. The Tools:

In this study, the Strong-Campbell Interest Inventory (SCII, Campbell, 1974) was the only measuring instrument used. Merged Form T325, is presented in Appendix 2.

The basic purpose of the SCII is to assist people in delineating their interests, both relatively and in comparison to a norm-group, as well as aid in the determination of primary interest areas. As has been previously mentioned, the test is designed to measure interests in essentially three different ways, namely, the General

* The author is ~~aware~~ aware that some readers may not consider this dissertation to employ a true "experimental" design.

Occupational Themes, the Basic Interest Scales, and the Occupational Scales. As this dissertation is chiefly concerned with the first method, some additional information about norming, intercorrelations, validity, etc., is warranted at this time.

The six General Occupational Themes are based upon the work of Holland (1973) and have as their core his six idealized occupational-interest personality types. The scores provide a global view of the respondent's occupational orientation. High scores suggest the general kind of activities the person may enjoy, the type of occupational environment the person may find most comfortable, the kinds of problems he or she may be most willing to deal with, and the kinds of people who may be found most appealing as co-workers by that person. (See Appendix 8).

Item selection consisted of choosing 20 SVIB items to represent each inventoried personality type of the SCII, where items are all "reasonable" in the sense of corresponding either obviously or intuitively to the descriptions of the six personality types.

A distribution of 600 people, half males, half females, was employed in the norming of the General Occupational Themes. Their raw-score mean and standard deviation are

used in the usual conversion formula to transform scores into standardized form, with a combined sample mean of 50 and standard deviation of 10. As men and women have different distributions on these scales, two scores are printed for each scale, a printed standard score based upon the combined male-female sample, and a printed interpretive comment based on the distribution of scores for the respondent's sex.

General Theme intercorrelations are presented in a rather informative hexagonal model in the SCII Manual, in which the strongest correlations occur between adjacent scales and the weakest between scales directly opposite each other. Scales are related to each other in the same manner in which they have been presented in this dissertation's first chapter, namely, Realistic, Investigative, Artistic, Social, Enterprising, and Conventional. In this pattern, for example, Realistic and Investigative are considered as adjacent scales, whereas Realistic and Social are considered directly opposite each other.

Reliability data is understandably limited due to the recent addition of these themes and publication of the SCII. However, thirty-day test-retest statistics were calculated on a sample of 102 individuals (Campbell, 1974). The means

of this sample were roughly 50, indicating similarity to the General Reference sample (600 people). The median test-retest correlation was .86, indicating substantial short-term stability. Another study by Whitton (quoted in Campbell, 1974, p. 34), included 180 people in a mean 14 day test-retest situation. The median correlation was .91, again indicating high short-term stability.

In sum, basic information has been provided concerning the fundamental necessities of a reliable and valid test. Further information is available in the Handbook for the Strong Vocational Interest Blank (Campbell, 1971), and the Manual for the Strong-Campbell Interest Inventory, T325, Merged Form (Campbell, 1974).

The rationale for using the SCII can be summed up in one sentence. It is currently the most up-to-date interest measuring device available to psychologists, it has incorporated both personality and interest information into a single test, it is supported by nearly 50 years of research and thousands of studies, and finally, it contains a wealth of data that is collected in a relatively short time (average test-taking time is 30-45 minutes).

2. The Subjects:

In all, 371 subjects participated in this study. After eliminating all answer sheets that were incomplete, completed in ink, or otherwise inappropriate, there remained 360 subjects, 202 Males and 158 Females. The breakdown by curricula was Arts, 154 total (53 Males and 101 Females), and Science, 206 total (149 Males and 57 Females).

There was no control for language, other than that subjects had to be able to read English well enough to complete the test.

The subjects ranged in age from 16 to 25 years with a mean age of 19.0 and a standard deviation of 1.6 years. They were all freshmen students, that is, they were enrolled in their first year of university at the University of Ottawa. Subjects were chosen by entire classrooms, Science subjects from compulsory courses in Science, and Arts subjects from compulsory Arts courses. These courses were, for Arts, English Literature 1111-1112 (involving seven entire classrooms), and for Science, Mathematics 1400 A and B (involving two large classes).

No monetary incentive was offered. Instead, each

participant received a copy of their interest profile as it was received from the computer-scoring agency, along with a 3,500-word interpretive statement of how to best make use of the results. (See Appendix 3)

3. The Procedure:

Permission was obtained from the professor responsible for each of the nine classes within the Faculties of Arts and Science at the University of Ottawa before testing was begun. The rationale for having chosen entire classrooms from compulsory courses is that such courses are usually assumed to be relatively heterogeneous and randomized samples of freshmen students enrolled in either Arts or Science. Furthermore, student overlap was expected to be nil, as no student would be enrolled in more than one section of a compulsory course.

Two experimenters, one Male, one Female, both aged 24 administered the tests to each class. Both testers were present during the entire class testing to distribute and collect materials as well as answer questions. Subjects were presented with a five-minute introduction to the experiment, informed that participation was voluntary,

how long the test would take and that it was not timed, how they would personally benefit by participation in the study, and given instructions for completion of the test. Particular attention was drawn to the technical aspects of computer-scored answer sheets and to the necessary data needed for the study (name, age, sex, faculty, major).

Of the roughly 400 students approached, about 25 were asked not to participate because they were either not freshmen students, or were enrolled in a faculty other than Arts or Science. Several students did not wish to participate for unknown reasons.

Questions were answered during testing, usually concerning the meaning of a certain term, and the average testing time was about 45 minutes. To accumulate the 360 correctly scored answer sheets took two weeks, from January 13, 1975 to January 27, 1975.

4. The Analysis of the Data:

The 360 correctly scored answer sheets were sent to National Computer Systems in Minneapolis for computer scoring and profiling. Results returned with two profiles

for each subject (one for the subject, one for the study) and raw scores for each of the 109 scorable items that comprise the test. The raw scores were received in the form of regular computer-punched cards, with nine cards per subject for a total of 3,240 cards. These raw score cards were deemed necessary as the profiles offer standardized scores only. An example of a typical profile is presented in Appendix 3.

For the purposes of this dissertation, only the six General Occupational Themes of the SCII profile were considered. As the Theme scores happen to be the first six scores presented on the profile and the cards, each subject's scores on these variables is represented by the first six scores on the first card of every series of nine cards. In other words, 360 cards were considered, and the first six scores on each of these were used. The raw data of this study may be seen as the first six scores for each subject on the computer printout in Appendix 4.

The principle techniques of analysis were a series of six two-group discriminant analyses and a stepwise four-group multiple-discriminant analysis, both employing the IBM computer at the Computing Centre at the University of Ottawa. A user's program of discriminant analysis was

chosen from Statistical Package for the Social Sciences, Second Edition (SPSS, Nie et al., 1975). Multiple-discriminant analysis was chosen as the test statistic because it most completely answers the questions, "Is it possible to discriminate among the different groups on the basis of their scores on the six personality variables, and if so, which variable or combination of variables best accomplishes this?"

The two-group comparisons were between the following groups:

- (a) Males vs. Females (M - F);
- (b) Arts vs. Science (A - S);
- (c) Arts Males vs. Science Males (Am - Sm);
- (d) Arts Females vs. Science Females (Af - Sf);
- (e) Arts Males vs. Arts Females (Am - Af);
- (f) Science Males vs. Science Females (Sm - Sf).

The four-group multiple-discriminant analysis included the groups Am, Sm, Sf, and Af. Throughout the analyses, the six personality types were considered in relation to groups divided by curricular membership and sex.

For each of the two types of analyses, the means and standard deviations for the various groups on the six personality scales were computed. The differences among the groups on each scale were tested for significance by an F-ratio. A discriminant-function analysis was then

conducted in a step-wise fashion on all groups using the personality scales to eliminate the less useful ones before performing the actual analysis. Rao's "V" (Rao, 1952, ch. 8) was used as the stepwise criterion for inclusion into the analysis. Wilks' lambda (Cooley and Lohnes, 1962) was computed and tested for significance by a chi-square approximation in order to determine whether the vectors of means for the personality scales across the various groups were significantly different from each other. Each discriminant function was tested for significance by a chi-square test (Bartlett, 1947). The centroids and dispersions of each group on each discriminant function were then computed. When the overall chi-square test indicated significance (in all cases), an attempt was made to predict these same students' curricula and sex from their discriminant-function scores. That is, each person, treated as a point in the discriminant-function space, was predicted to be a member of that group of which their point fell closest to the centroid. Probabilities of prior group membership based upon the uneven numbers of subjects in the groups was taken into consideration in making the predictions.

To cross-check the findings and reduce the chance of programming and computational errors, another discriminant

analysis program named SOUPAC was employed to carry out all of the aforementioned analyses. Allowing for rounding of decimals, findings were identical, although the SPSS program gave far more data in the printouts.

For statistical significance, it was decided to accept the .01 level of probability in all cases where significance was tested. The results of these analyses are presented and discussed in the next chapter.

CHAPTER III

PRESENTATION AND DISCUSSION OF RESULTS

The first section of this chapter deals with presentation of the results of the analyses performed on the experimental data. The findings of these analyses are discussed in the second section. The third section presents suggestions for further research, and the chapter ends in section four with a summary of the study and conclusions.

1. Presentation of the Results of the Analyses:

The hypotheses regarding differences in scores or patterns of scores on the six General Occupational Themes of the SCII with respect to Sex and Curricula were tested by discriminant and multiple-discriminant analyses.

The results are presented in a similar manner for each of the experimental hypotheses in order to facilitate comparison of the findings for the seven discriminations. The order of presentation is as follows:

- (1) Group means and standard deviations,

- (2) Univariate F-ratios and corresponding significance,
- (3) Discriminant function summary data,
- (4) Standardized discriminant function coefficients,
- (5) Group centroids,
- (6) Prediction results,
- (7) In the case of the four-group analysis, centroids of the groups in the discriminant function space.

Additional information for interest, replication, or further research is provided in the form of raw scores used for this study (Appendix 4), within-groups correlation matrix for each analysis (Appendix 5), classification function coefficients for each analysis (Appendix 6), and unstandardized discriminant function coefficients for each analysis (Appendix 7).

In order to test hypothesis 1.1, regarding differences in General Occupational Theme scores between Arts and Science freshmen, a discriminant analysis including all of the 360 subjects was employed. The results of the analysis are presented in Tables 1 through 6.

Table 1 indicates that the Arts group had high means on the Artistic and Social scales, while the Science group had high means on the Realistic and Investigative scales. This pattern is reflected as well in Table 2, where, out of the

six General Occupational Theme scales of the SCII, Realistic, Investigative, Artistic, and Social scales resulted in F-ratios significant at less than the .001 level, Enterprising was not significant, and Conventional was found significant at the .01 level. These data indicate that significant differences exist between the two groups on at least four of the six scales.

The discriminant analysis was performed in a stepwise manner, that is, the most discriminating variable is first considered alone, then the variables which account for most of the remaining unexplained variance are added one at a time and in order of their importance. The criterion used in this study was the overall multivariate F-ratio for the test of differences among the group centroids. In this case, the variable which maximizes the F-ratio also minimizes Wilks' lambda, a measure of group discrimination. Table 3 indicates the discriminating power of the discriminant analysis with a chi-square approximation of 200.012, which is significant at less than the .01 level with 4 degrees of freedom. Since there were only two groups in this analysis, only one discriminating function is possible, accounting for 100 per cent of the variation between Arts and Science groups. These data suggest that the chance of producing group

differences this large or larger by drawing two random samples from a four-dimensional multivariate swarm is less than one in one hundred. These results indicate that discrimination between Arts and Science freshmen students is possible on the basis of the predictor variables used (i.e., the six General Occupational Scales).

Thus, hypothesis 1.1, which in the null form held that the two groups had similar scores or patterns of scores on the six scales, can now be regarded as not tenable. Group differences obtained may now be examined in Tables 4 and 5.

Table 4 shows the standardized discriminant function coefficients for a number of the different analyses, including the Arts-Science discrimination. These scaled weights indicate the relative contribution of each General Occupational Theme in determining the discriminant score for placement of individuals along the discriminant function axis. The sign merely indicates whether the variable is making a positive or negative contribution. Hence, in the case of the Arts-Science discrimination, Table 4 indicates that Investigative (0.516) and Artistic (-0.419) constitute the largest contribution in opposite directions on the function, while Realistic (0.222) and Social (-0.296) are of lesser

importance but still meaningful in separating the groups along the function. As in factor analysis, these contributing coefficients can be used to "name" the functions by identifying the dominant characteristic or characteristics they measure (Nie et al., 1975). Function 1, therefore, in the case of the Arts-Science discrimination could be labelled as essentially an Investigative-Artistic continuum, with each at opposite poles.

Table 5 represents the group centroids for all seven of the analyses. The placement of the Arts and Science groups along the function or continuum mentioned above may be readily determined by inspecting their respective group centroids listed in Table 5. In this way, the data may be employed to classify individuals in terms of their location along the function axis. Thus, an individual with a discriminant function score nearing that of the Arts centroid (-0.615) would be classified into the Arts group, while a student with a score closer to the Science centroid (0.460) would fall into the Science group. The relative closeness to a centroid would dictate the degree of accuracy or probability of correct classification. This point will be further discussed later in this chapter.

Success or lack thereof in a discriminant analysis can be measured by employing the discriminating variables and their respective unstandardized weights (Appendices 6 and 7) to classify individuals into the prescribed groups on the basis of their discriminant function score(s) alone, regardless of their actual group membership. This information for the Arts-Science discrimination is presented in the form of a classification matrix in Table 6. This matrix indicates the number of cases who were correctly and incorrectly predicted to be members of the respective groups. It can then be seen, for example, that of the 154 Arts students in the analysis, 112 were correctly classified as Arts students on the basis of their discriminant function scores, while 42 were incorrectly classified. These figures represent 72.7 per cent and 27.3 per cent, respectively. Similarly, of the 206 Science students, 178 or 86.4 per cent were correctly classified as Science students, leaving an error of 28 cases, or 13.6 per cent.

Prior probability of group membership is also important in this matrix. As can be readily determined, a subgroup of 206 Science students in a pool of 360 students is more likely to have one of its members chosen in a random pick as they represent more than half of the population. Thus, prior

Table 1

General Occupational Themes: Group Means and Standard Deviations for the Arts-Science Discrimination

Personality Scale	Arts N=154	Science N=206	Total Sample N=360
Group Means			
Realistic	-5.201	0.903	-1.708
Investigative	2.026	8.743	5.869
Artistic	6.805	-0.510	2.619
Social	3.617	-0.918	1.022
Enterprising	-6.682	-7.233	-6.997
Conventional	-5.740	-3.961	-4.722
Standard Deviations			
Realistic	7.740	8.029	8.455
Investigative	8.187	6.233	7.863
Artistic	8.759	9.958	10.122
Social	7.313	7.636	7.819
Enterprising	7.118	7.047	7.073
Conventional	6.494	6.333	6.454

Note: Calculations based upon both + and - raw scores.

Table 2
General Occupational Themes: Univariate F-Tests for the
Arts-Science Discrimination

Personality Scale	Wilks' Lambda	F-ratio	p
Realistic	0.872	52.523	.001
Investigative	0.821	78.119	.001
Artistic	0.872	52.640	.001
Social	0.917	32.216	.001
Enterprising	0.999	0.535	n.s.
Conventional	0.981	6.805	.01

ndf = 1;358

Table 3

General Occupational Themes: Discriminant Function Summary
Data for the Seven Discriminant Analyses

Comparison	Function	Relative %	Wilks' Lambda	Chi-Square	ndf	p
M-F	1	100.0	0.673	140.558	6	.01
A-S	1	100.0	0.570	200.012	4	.01
Am-Sm	1	100.0	0.696	71.985	3	.001
Af-Sf	1	100.0	0.598	79.323	4	.001
Am-Af	1	100.0	0.688	55.950	5	.001
Sm-Sf	1	100.0	0.823	39.292	4	.001
Am-Sm-Sf-Af	1	87.59	0.438	292.403	15	.01
	2	11.65	0.875	47.205	8	.001
	3	0.76	0.991	3.056	3	n.s.

Table 4

General Occupational Themes: Standardized Discriminant
Function Coefficients for the Male-Female, Arts-
Science, and Male Arts-Male Science
Discriminations

Personality Scale	Comparison		
	M-F	A-S	Am-Sm
Realistic	-0.328	0.222	-
Investigative	-0.139	0.516	0.589
Artistic	0.327	-0.419	-0.462
Social	0.265	-0.296	-0.279
Enterprising	-0.371	-	-
Conventional	0.099	-	-

Note: Missing scales were not significant enough for inclusion in the stepwise discriminant analysis.

Table 5

General Occupational Themes: Group Centroids in Reduced
Space for the Seven Discriminant Analyses

Analyses	Function 1	Function 2
Analysis 1:		
Males	-0.330	-
Females	0.422	-
Analysis 2:		
Arts	-0.615	-
Science	0.460	-
Analysis 3:		
Male Arts	-0.671	-
Male Science	0.239	-
Analysis 4:		
Female Arts	-0.357	-
Female Science	0.633	-
Analysis 5:		
Male Arts	-0.445	-
Female Arts	0.234	-
Analysis 6:		
Male Science	0.178	-
Female Science	-0.466	-
Analysis 7:		
Male Arts	-0.211	-0.405
Male Science	0.563	-0.028
Female Science	0.095	0.357
Female Arts	-0.774	0.053

Note: Only Analysis 7 involved more than two groups, hence it was the only one to have more than one Function.

Table 6

General Occupational Themes: Prediction Results for the
Arts-Science Discrimination

Actual Group	N	Prior Probability	Predicted Gr. Membership			
			Arts	N	Science	N
Arts	154	42.8%	72.7%	112	27.3%	42
Science	206	57.2%	13.6%	28	86.4%	178

Correctly classified cases: 80.6%

Note: Prior probabilities are based upon relative group size.

probabilities of group membership have been based upon relative group size, and may be used as a base against which to compare the predicted group membership figures.

In order to test hypothesis 1.2, regarding differences in General Occupational Theme scores between Male and Female freshmen, a second discriminant analysis including the 360 subjects was employed, switching the comparison from Curricula to Sex. The results of the analysis are presented in Tables 3 through 5, and 7 through 9.

Table 7 shows that the Males had their highest mean score on the Investigative scale, while Females scored highest as a group on the Artistic scale. It also indicated that there seemed to be fairly large differences between mean scores on all of the scales. Again, this is reflected in Table 8, where all six of the variables provided F-ratios significant at less than the .001 level. This suggests that significant differences between the sexes exist on each of the personality scales.

This analysis, as all of the others, was carried out in a stepwise fashion, culminating in a discriminant function that was significant beyond the .01 level with 6 degrees of freedom. The data indicates that producing these dif-

ferences by chance is unlikely, and that discrimination between Males and Females is possible on the basis of their scores on the General Occupational Themes of the SCII. (See Table 3).

Therefore, hypothesis 1.2, which in the null form held that Males and Females had similar scores or patterns of scores on the six scales, must be rejected.

The standardized discriminant function coefficients in Table 4 show that in the Male-Female discrimination, Enterprising (-0.371) and Realistic (-0.328) were the largest contributors in separating Males from Females along the function, while Artistic (0.327) and Social (0.265) offset the Females from the Males. In other words, the function along which Males and Females can be differentiated could be visualized with Enterprising and Realistic clustered at the Male end, and Artistic and Social at the Female end. This may be readily seen in Table 5 in which the centroids for the Male-Female discrimination are -0.330 and 0.422, respectively.

The classification matrix is shown in Table 9, in which Males were correctly classified 79.2 per cent of the cases, while Females were correctly identified 75.3 per cent of the time.

Table 7

General Occupational Themes: Group Means and Standard
Deviations for the Male-Female Discrimination

Personality Scale	Males N=202	Females N=158	Total Sample N=360
Group Means			
Realistic	1.208	-5.437	-1.708
Investigative	7.272	4.076	5.869
Artistic	0.074	5.873	2.619
Social	-0.312	2.728	1.022
Enterprising	-5.446	-8.981	-6.997
Conventional	-3.639	-6.101	-4.722
Standard Deviations			
Realistic	7.746	7.857	8.455
Investigative	7.566	7.894	7.863
Artistic	10.080	9.231	10.122
Social	7.591	7.797	7.819
Enterprising	7.516	5.917	7.073
Conventional	6.340	6.350	6.454

Note: Calculations based upon both + and - raw scores.

Table 8

General Occupational Themes: Univariate F-Tests for the
Male-Female Discrimination

Personality Scale	Wilks' Lambda	F-ratio	p
Realistic	0.848	64.427	.001
Investigative	0.959	15.231	.001
Artistic	0.919	31.578	.001
Social	0.963	13.881	.001
Enterprising	0.938	23.543	.001
Conventional	0.964	13.425	.001

ndf = 1;358

Table 9

General Occupational Themes: Prediction Results for the
Male-Female Discrimination

Actual Group	N	Prior Probability	Predicted Gr. Membership			
			Male	N	Female	N
Male	202	56.1%	79.2%	160	20.8%	42
Female	158	43.9%	24.7%	39	75.3%	119

Correctly classified cases: 77.5%

Note: Prior probabilities are based upon relative group size.

Hypothesis 1.3, regarding differences in scores between Male Arts and Female Arts freshmen, was tested with a third discriminant analysis involving the 154 Arts subjects. The results of this analysis are presented in Tables 3 and 5, and 10 through 13.

The means for these two groups, presented in Table 10, indicate that Male Arts students scored highest on the Artistic and Investigative scales, while Female Arts students scored higher on Artistic and Social. It seems more noteworthy, however, to point out that their scores appear to differ most on the Realistic and Enterprising scales. These differences are reflected in Table 11, which shows that of the six variables, only the Realistic and Enterprising scales hold significant differences between the two groups at the .001 level, while other scales were found to have insignificant differences in means. These findings indicate that differences do exist between Male and Female Arts students in terms of two of the General Occupational Theme scales.

Following the stepwise analysis, the resulting discriminant function was tested for significance by a chi-square approximation. The chi-square was 55.950, which,

with 5 degrees of freedom, was significant well beyond the .001 level. This suggests that discrimination between Male and Female Arts freshmen is possible on the basis of their scores on the two of the six General Occupational Themes (Table 3).

The null form of hypothesis 1.3, which held that Male and Female Arts students would have similar scores or patterns of scores on the six scales, must be rejected.

Table 12 contains the standardized discriminant function coefficients for the Male Arts-Female Arts discrimination. It shows that Realistic and Enterprising were the two largest contributors to separation of Male and Female Arts students along the discriminant function. A glance at Table 5 will show that the group centroids for Male and Female Arts freshmen along the function were -0.445 and 0.234, respectively. As both the Realistic and Enterprising standardized coefficients for this discrimination were negative, it could be said that they contributed most to separating the Males from the Females.

Table 13 presents the prediction or classification results, and indicates that Male Arts were correctly classified only 60.4 per cent of the time, while Female Arts were correctly identified in 92.1 per cent of the cases.

Table 10

General Occupational Themes: Group Means and Standard
Deviations for the Male Arts-Female Arts
Discrimination

Personality Scale	Male Arts N=53	Female Arts N=101	Total Sample N=154
Group Means			
Realistic	-0.868	-7.475	-5.201
Investigative	3.358	1.327	2.026
Artistic	5.359	7.564	6.805
Social	3.076	3.901	3.617
Enterprising	-3.208	-8.505	-6.682
Conventional	-4.113	-6.594	-5.740
Standard Deviations			
Realistic	7.437	6.889	7.740
Investigative	8.979	7.694	8.187
Artistic	8.420	8.879	8.759
Social	7.356	7.311	7.313
Enterprising	7.811	6.003	7.118
Conventional	6.600	6.303	6.494

Note: Calculations based upon both + and - raw scores.

Table 11

General Occupational Themes: Univariate F-Tests for the
Male Arts-Female Arts Discrimination

Personality Scale	Wilks' Lambda	F-ratio	p
Realistic	0.835	30.154	.001
Investigative	0.986	2.157	n.s.
Artistic	0.986	2.222	n.s.
Social	0.997	0.441	n.s.
Enterprising	0.874	21.881	.001
Conventional	0.967	5.213	n.s.

ndf = 1;152

Table 12

General Occupational Themes: Standardized Discriminant
Function Coefficients for the Female Arts-Female
Science, Male Arts-Female Arts, and Male Science-
Female Science Discriminations

Personality Scale	Af-Sf	Comparison Am-Af	Sm-Sf
Realistic	0.258	-0.455	0.306
Investigative	0.523	-	-
Artistic	-0.362	0.252	-0.353
Social	-0.280	0.236	-0.324
Enterprising	-	-0.317	0.477
Conventional	-	0.093	-

Note: Missing scales were not significant enough for
inclusion in the stepwise discriminant analysis.

Table 13

General Occupational Themes: Prediction Results for the
Male Arts-Female Arts Discrimination

Actual Group	N	Prior Probability	Predicted Gr. Membership			
			Am	N	Af	N
Male Arts	53	34.4%	60.4%	32	39.6%	21
Female Arts	101	65.6%	7.9%	8	92.1%	93

Correctly classified cases: 81.2%

Note: Prior probabilities are based upon relative group size.

In order to test hypothesis 1.4, regarding differences in scores between Male and Female Science freshmen, a fourth analysis was carried out employing the 206 Science students in the sample. The results of the analysis are presented in Tables 3, 5, 12, and 14 through 16.

Table 14 shows Male Science students to have their highest mean scores on the Investigative and Realistic scales, while Female Science students scored higher on Investigative and Artistic than their Male counterparts. Furthermore, the largest differences in means appeared to exist between the two groups on the Enterprising, Realistic, and Artistic scales. This can be readily seen in Table 15, which presents the univariate F-ratios of the six variables for this discrimination. Enterprising is significant at the .001 level, while Realistic and Artistic indicate differences between Male and Female Science students significant at less than the .005 level. The remaining scales were found to have non-significant F-ratios. It can be said from this that differences between Male and Female Science students do exist on three of the scales, and that these differences are significant.

Table 3 presents the significance of the resulting

discriminant function, which, in this case, was less than .001 with 4 degrees of freedom. This suggests that it is unlikely that these differences between groups is due to chance, and that discrimination between Male and Female Science freshmen is possible on the basis of their scores on three of the six scales.

On the strength of these findings, hypothesis 1.4, which in the null form held that Males and Females in Science had similar scores or patterns of scores on the six scales, must be rejected.

The standardized discriminant function coefficients presented in Table 12 and the group centroids in Table 5 indicate that Enterprising (0.477) was the largest contributor to the function and was in the Male Science direction along the continuum, while Artistic (-0.353) was the next largest and in the Female Science direction. The directionality can be seen by the centroids, with Male Science at 0.178 and Female Science at -0.466.

In the classification phase of the analysis, Male Science students were more readily identified with an 88.6 per cent "hit-rate" or accurate classifications. Female Science students were correctly classified 64.9 per cent of the time and incorrectly 35.1 per cent.

Table 14

General Occupational Themes: Group Means and Standard
Deviations for the Male Science-Female Science
Discrimination

Personality Scale	Male Science N=149	Female Science N=57	Total Sample N=206
	Group Means		
Realistic	1.946	-1.825	0.903
Investigative	8.664	8.947	8.743
Artistic	-1.805	2.877	-0.510
Social	-1.517	0.649	-0.918
Enterprising	-6.242	-9.825	-7.233
Conventional	-3.470	-5.246	-3.961
	Standard Deviations		
Realistic	7.731	8.218	8.029
Investigative	6.479	5.585	6.233
Artistic	9.977	9.156	9.958
Social	7.327	8.252	7.636
Enterprising	7.270	5.717	7.047
Conventional	6.260	6.398	6.333

Note: Calculations based upon both + and - raw scores.

Table 15

General Occupational Themes: Univariate F-Tests for the
Male Science-Female Science Discrimination

Personality Scale	Wilks' Lambda	F-ratio	p
Realistic	0.956	9.471	.005
Investigative	0.999	0.085	n.s.
Artistic	0.956	9.493	.005
Social	0.984	3.356	n.s.
Enterprising	0.948	11.187	.001
Conventional	0.984	3.278	n.s.

ndf = 1;204

Table 16

General Occupational Themes: Prediction Results for the
Male Science-Female Science Discrimination

Actual Group	N	Prior Probability	Predicted Gr. Membership			
			Sm	N	Sf	N
Male Science	149	72.3%	88.6%	132	11.4%	17
Female Science	57	27.7%	64.9%	37	35.1%	20

Correctly classified cases: 73.8%

Note: Prior probabilities are based upon relative group size.

The fifth discriminant analysis was carried out to test hypothesis 1.5, regarding differences in scores between Males in Arts and Males in Science. In this case, the 202 Male students of the sample were employed. The results are presented in a fashion similar to the previous hypotheses in Tables 3 through 5, and 17 through 19.

Table 17 shows that Male Arts freshmen scored highest on the Artistic and Investigative scales, while Male Science students scored higher than Male Arts on the Investigative and Realistic scales. The largest significant differences between the two groups can be inspected in Table 18, which indicates that Investigative, Artistic, and Social scales held the most significant differences between Males in Arts and Science Curricula.

Table 3 presents the significance of the discriminant function to be less than .001 with 3 degrees of freedom, implying that it is possible to discriminate between Male Arts and Male Science students on the basis of their scores on three of the six scales.

Hypothesis 1.5, therefore, must be rejected. It held that the null condition exists in scores or patterns of scores of the two groups on the six General Occupational Themes of the SCII.

Table 4 shows that the most contributing standardized discriminant function coefficients were Investigative and Artistic, with Artistic tending towards the Male Arts end of the function and Investigative contributing towards the Male Science end. This can be seen when inspecting the group centroids in Table 5 and respective standardized weightings given in Table 4.

The results of the classification program are listed in Table 19. It can be seen that of the 53 Male Arts students, only 28, or 52.8 per cent, were correctly classified as such. Fully 47.2 per cent were misclassified. For the Male Science students, however, the picture looks entirely different. Only 5 of the 149 were incorrectly classified, while 96.6 per cent were correctly identified as Male Science students, solely on the basis of the weighted discriminant and classification scores derived from the analysis.

Table 17

General Occupational Themes: Group Means and Standard
Deviations for the Male Arts-Male Science
Discrimination

Personality Scale	Male Arts N=53	Male Science N=149	Total Sample N=202
Group Means			
Realistic	-0.868	1.946	1.208
Investigative	3.359	8.664	7.272
Artistic	5.359	-1.805	0.074
Social	3.076	-1.517	-0.312
Enterprising	-3.208	-6.242	-5.446
Conventional	-4.113	-3.470	-3.639
Standard Deviations			
Realistic	7.473	7.731	7.746
Investigative	8.979	6.479	7.566
Artistic	8.420	9.977	10.080
Social	7.356	7.327	7.591
Enterprising	7.811	7.270	7.516
Conventional	6.600	6.260	6.341

Note: Calculations based upon both + and - raw scores.

Table 18

General Occupational Themes: Univariate F-Tests for the
Male Arts-Male Science Discrimination

Personality Scale	Wilks' Lambda	F-ratio	p
Realistic	0.974	5.270	n.s.
Investigative	0.904	21.155	.001
Artistic	0.902	21.787	.001
Social	0.929	15.326	.001
Enterprising	0.968	6.547	n.s.
Conventional	0.998	0.401	n.s.

ndf = 1;200

Table 19

General Occupational Themes: Prediction Results for the
Male Arts-Male Science Discrimination

Actual Group	N	Prior Probability	Predicted Gr. Membership			
			Am	N	Sm	N
Male Arts	53	26.2%	52.8%	28	47.2%	25
Male Science	149	73.8%	3.4%	5	96.6%	144

Correctly classified cases: 85.2%

Note: Prior probabilities are based upon relative group size.

To test hypothesis 1.6 regarding differences in General Occupational Theme scores between Female Arts and Female Science freshmen, a sixth discriminant analysis was carried out, including the 158 Female subjects of the sample. Results of this analysis are presented in Tables 3, 5, 12, and 20 through 22.

Table 20 shows Female Arts students to score higher on the Artistic and Social scales than their Science counterparts, while Science Females scored highest on the Investigative scale. Rather large mean differences between Females in Arts and Science on the Realistic, Investigative, and Artistic scales are supported by Table 21, which indicates that these differences are indeed significant, at the .001, .001, and .005 levels, respectively.

Upon completion of the stepwise analysis, the resulting discriminant function was found to be significant well beyond the .001 level, with a chi-square of 74.323 and 4 degrees of freedom. This information, gleaned from Table 3, indicates that discriminating between Arts and Science Females is possible on the basis of their scores on the six Themes.

Thus, the null condition stated in hypothesis 1.6

must be rejected on the grounds that differences do exist in terms of the six scales for these two groups, and that these differences are quite significant.

Table 12 presents the standardized discriminant function coefficients for the Female Arts-Female Science discrimination. From this table, it can be seen that Investigative and Realistic scales are the largest contributors in the positive direction, and Artistic and Social contribute most to the negative direction. Table 5 indicates that in the case of this analysis, the positively scaled direction will include the Science Female centroid, whereas the negative direction will take in the Female Arts centroid.

The classification results are presented in Table 22, and show that fully 87.1 per cent of the Female Arts cases were correctly classified, while 63.2 Female Science cases were correctly identified. This resulted in a total of 78.48 per cent correct predictions based upon the positioning of individuals' discriminant scores along the discriminant function.

Table 20

General Occupational Themes: Group Means and Standard
Deviations for the Female Arts-Female Science
Discrimination

Personality Scale	Female Arts N=101	Female Science N=57	Total Sample N=158
	Group Means		
Realistic	-7.475	-1.825	-5.437
Investigative	1.327	8.947	4.076
Artistic	7.564	2.877	5.873
Social	3.901	0.649	2.728
Enterprising	-8.505	-9.825	-8.981
Conventional	-6.594	-5.246	-6.108
	Standard Deviations		
Realistic	6.889	8.218	7.857
Investigative	7.694	5.585	7.894
Artistic	8.879	9.156	9.231
Social	7.311	8.252	7.797
Enterprising	6.003	5.717	5.917
Conventional	6.303	6.398	6.350

Note: Calculations based upon both + and - raw scores.

Table 21

General Occupational Themes: Univariate F-Tests for the
Female Arts-Female Science Discrimination

Personality Scale	Wilks' Lambda	F-ratio	p
Realistic	0.880	21.284	.001
Investigative	0.784	43.054	.001
Artistic	0.940	9.929	.005
Social	0.960	6.564	n.s.
Enterprising	0.989	1.822	n.s.
Conventional	0.990	1.650	n.s.

ndf = 1;156

Table 22

General Occupational Themes: Prediction Results for the
Female Arts-Female Science Discrimination

Actual Group	N	Prior Probability	Predicted Gr. Membership			
			Af	N	Sf	N
Female Arts	101	63.9%	87.1%	88	12.9%	13
Female Science	57	36.1%	36.8%	21	63.2%	36

Correctly classified cases: 78.5%

Note: Prior probabilities are based upon relative group size.

The six previous discriminant analyses always involved only two groups in each analysis. In each case the null condition was rejected on the basis of the findings that significant differences did exist in scores on the General Occupational Themes. Consider, however, the following situation. Based upon the findings of this study, a student's scores on the six Themes is to be attached to one of the four possible groups (i.e., Male Arts, Male Science, Female Arts, Female Science). It is quite conceivable that, when considering the Male-Female discrimination, this individual's discriminant score may fall closer to the Male centroid, thereby being classified as such. Considering the Arts-Science analysis, we may well place the individual into the Science group. The difficulty arises when employing the information gleaned from the remaining discriminations on the same individual. For example, on the Male Arts-Female Arts function, we could find this individual being classified into the Female Arts, or, on another analysis into the Male Arts category.

It can be seen now that with the best of intentions, the counselor employing this data has done nothing but confuse the individual by placing him/her into a number of mutually exclusive categories due to the fact that six

two-group comparisons do not take into account the possible relationships with other groups in the same analysis. In other words, by having only two groups per analysis, the number of possible discriminant functions can necessarily only be one.

Briefly, these are the underlying reasons for the seventh discriminant analysis, which employed the four possible mutually exclusive groups in a single analysis.

Thus, in order to test hypothesis 2.1, regarding differences in General Occupational Theme scores between Male Arts, Male Science, Female Science, and Female Arts freshmen, a multiple-discriminant analysis employing the total 360 subjects was carried out. In this case, the variables Curricula and Sex were both considered, and the number of possible discriminant functions was three (the number of groups in the analysis minus one). The results of this analysis are presented in Tables 3, 5, and 23 through 26. Figure 1 graphically summarizes the findings by placing the groups' centroids in the discriminant function space.

Table 23 shows that Male Arts freshmen scored highest on the Artistic and Investigative scales, respectively. Male Science students had their highest mean scores on Investigative and Realistic, while the Female Science as a

group scored highest on Investigative and Artistic. Female Arts students indicated high mean scores on the Artistic and Social scales. These findings are in accord with those of the previous analyses, as they must be, since the same subjects were employed in all of the analyses.

Table 24 provides additional information on these differences by showing that Realistic, Investigative, Artistic, Social, and Enterprising scales had differences among the groups significant at less than the .001 level of probability, while Conventional indicated group differences at the .01 level. These findings suggest that significant differences exist between the four groups on each of the six personality scales.

Again, the analysis was carried out in a stepwise fashion to avoid inclusion of non-contributing or insignificant variables in the discrimination. In this case, as in the previous analyses, the inclusion level was a minimum significance of .001, hence Conventional was not considered discriminating enough for the analysis.

Table 3 provides the information concerning significance of discriminant functions. It can be seen that 3 possible functions were calculated, and that the last

one accounted for only 0.76 per cent of the variation among groups. As a result, only the initial two were considered, as they accounted for 87.59 and 11.65 per cent of the variation, respectively. Thus, function 1 was significant at less than the .01 level, while the second function proved significant at the .001 level. This indicates that discrimination in terms of two separate and distinct functions is possible between the four groups on the basis of their General Occupational Theme scores.

Hypothesis 2.1, therefore, which in the null form held that the Male Arts, Male Science, Female Science, and Female Arts groups would have similar scores or patterns of scores on the six scales, must be rejected.

Table 25 provides the standardized discriminant function coefficients for each of the scales on both function 1 and function 2. It can readily be seen that function 1 has Investigative and Artistic at its extremes, while function 2 has Investigative at one end and Enterprising at the other. This data combined with that provided in Table 5 indicates that the Investigative scale in function 1 is at the Male Science end of the function, while Artistic is at the Female Arts end. For function

2, the Female Science end is represented by the Investigative scale, while the Male Arts end tends towards the Enterprising scale. Essentially then, function 1 has as its largest contributors the Investigative and Artistic scales, and best separates Male Science from Female Arts freshmen. Function 2, with Female Science and Male Arts at opposite poles, best employs the Investigative and Enterprising scales for this separation.

Classification results proved rather interesting. Only 17.0 per cent of the Male Arts students were correctly classified, while fully 85.2 per cent of their Science counterparts were classified into the appropriate category. Female Science freshmen were correctly identified only 17.5 per cent of the time, while Female Arts students were placed into the right category 83.2 per cent of the time. In sum, prediction results indicate that the analysis proved useful in classifying an average of 63.9 per cent of all cases correctly on the basis of their General Occupational Theme scores (see Table 26).

Figure 1 provides graphically what Table 5 presented numerically. That is, group centroids are plotted along the two respective discriminant functions to indicate their relative positions to each other. It can be seen

clearly now that function 1 contributes to most of the separation between Female Arts at its negative extreme and Male Science at its positive extreme. Function 2, on the other hand, does very little to separate Female Arts and Male Science, but greatly discriminates between Female Science and Male Arts students.

This section of chapter III, then, has presented the results of the discriminant and multiple-discriminant analyses. It was found in each of the seven analyses that the null condition had to be rejected on the grounds that differences in terms of scores or patterns of scores on the six General Occupational Themes of the SCII did appear to exist. To recap, Arts students were different than Science students, Males differed from Females, Male Arts scored differently than Female Arts, Male Science as a group was different from Female Science, Males in Arts were not similar to Males in Science, Female Arts freshmen were different than Female Science freshmen, and, in the four-group analysis, all of the mutually exclusive possible combinations (i.e., Am, Sm, Af, Sf) differed significantly from each other on at least three of the scales.

The following section will discuss the results presented in light of their implications.

Table 23

General Occupational Themes: Group Means and Standard
Deviations for the Male Arts-Male Science-Female
Science-Female Arts Discrimination

Personality Scale	Am N=53	Sm N=149	Sf N=57	Af N=101	Total Sample N=360
Group Means					
Realistic	-0.868	1.946	-1.825	-7.475	-1.708
Investigative	3.359	8.664	8.947	1.327	5.869
Artistic	5.359	-1.805	2.877	7.564	2.619
Social	3.076	-1.517	0.649	3.901	1.022
Enterprising	-3.208	-6.242	-9.825	-8.505	-6.997
Conventional	-4.113	-3.470	-5.246	-6.594	-4.722
Standard Deviations					
Realistic	7.473	7.731	8.218	6.889	8.455
Investigative	8.979	6.479	5.585	7.694	7.863
Artistic	8.420	9.977	9.156	8.879	10.122
Social	7.356	7.327	8.252	7.311	7.819
Enterprising	7.811	7.270	5.717	6.003	7.073
Conventional	6.600	6.260	6.398	6.303	6.454

Note: Calculations based upon both + and - raw scores.

Table 24

General Occupational Themes: Univariate F-Tests for the
Male Arts-Male Science-Female Science-Female Arts
Discrimination

Personality Scale	Wilks' Lambda	F-ratio	p
Realistic	0.790	31.528	.001
Investigative	0.814	27.068	.001
Artistic	0.843	22.162	.001
Social	0.908	12.089	.001
Enterprising	0.915	11.063	.001
Conventional	0.958	5.158	.01

ndf = 3;356

Table 25

General Occupational Themes: Standardized Discriminant
Function Coefficients for the Male Arts-Male
Science-Female Science-Female Arts
Discrimination

Personality Scale	Am-Sm-Sf-Af	
	Function 1	Function 2
Realistic	0.287	-0.248
Investigative	0.395	0.414
Artistic	-0.407	-0.030
Social	-0.323	0.087
Enterprising	0.152	-0.492
Conventional	-	-

Note: Missing scales were not significant enough for inclusion in the stepwise discriminant analysis.

Table 26

General Occupational Themes: Prediction Results for the
Male Arts-Male Science-Female Science-Female Arts
Discrimination

Actual Group	Prior Probability	Predicted Gr. Membership			
		Am	Sm	Sf	Af
Male Arts	14.7%	17.0%	45.3%	0.0%	37.7%
N	53	9	24	0	20
Male Science	41.4%	2.0%	85.2%	5.4%	7.4%
N	149	3	127	8	11
Female Science	15.8%	5.3%	49.1%	17.5%	28.1%
N	57	3	28	10	16
Female Arts	28.1%	3.0%	6.9%	6.9%	83.2%
N	101	3	7	7	84

Correctly classified cases: 63.9%

Note: Prior probabilities are based upon relative group size.

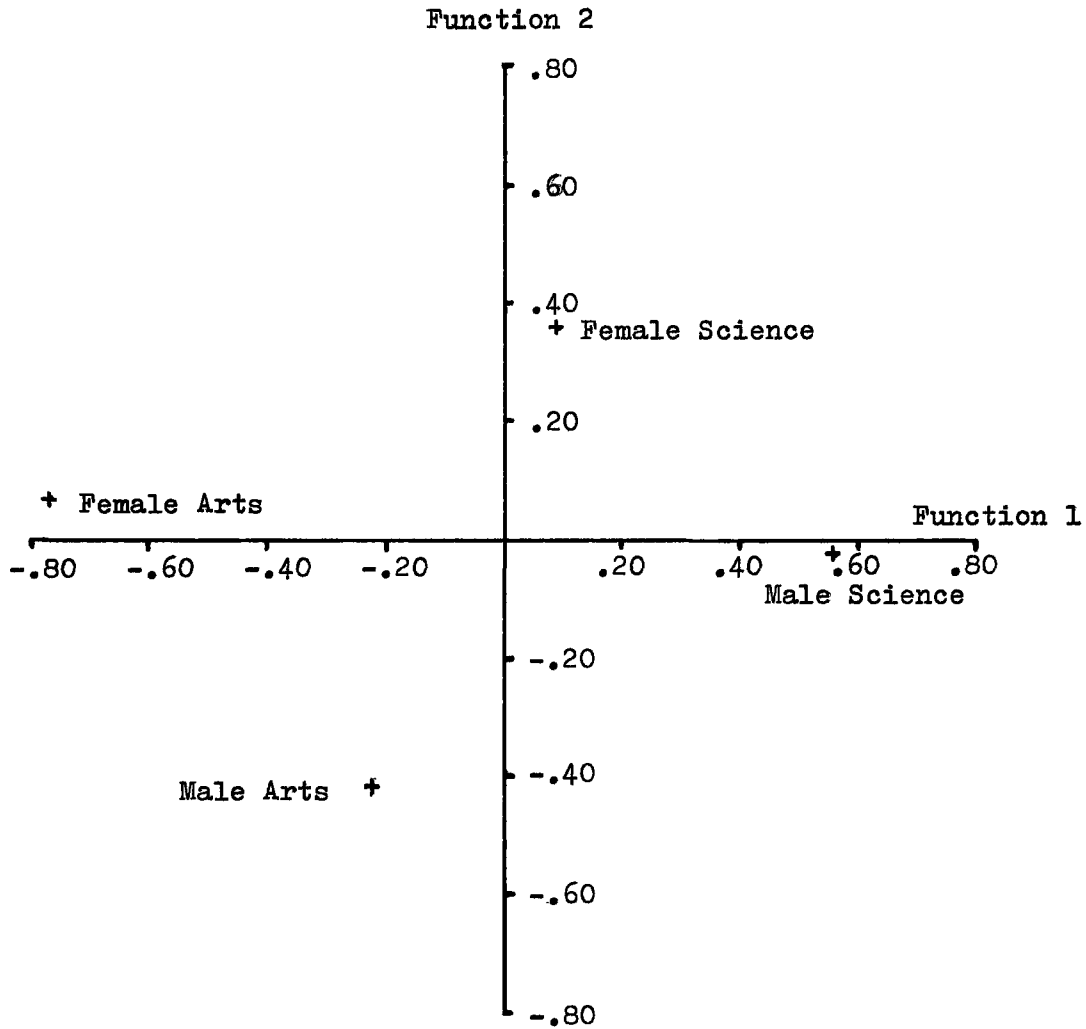


Figure 1. General Occupational Themes: Centroids of the Four Groups in the Discriminant Function Space for the Male Arts-Male Science-Female Science-Female Arts Discrimination.

2. Discussion of Results:

The discussion of results will center primarily upon the multiple-discriminant analysis utilizing the four mutually exclusive groups, Male Arts, Male Science, Female Science, and Female Arts. There are a number of reasons for this. Chiefly, the four-group analysis is essentially more useful and generalizable from a practical standpoint in that no further analyses must be referred to in order to draw meaningful conclusions. Secondly, findings in the first six analyses are more or less replicated in the four-group discrimination. Finally, although the multiple-discriminant analysis provides all of the necessary information for some conclusions, various points can and will be clarified through inspection of the separate two-group analyses, thereby involving them in the discussion in a roundabout manner.

In the multiple-group analysis then, it can be noted in Figure 1 that the Male Science group scored highest on Function 1 while the Female Arts group scored lowest along that Function. On the second Function, Female Science students scored highest whereas the Male Arts freshmen scored lowest. In other words, the first Function

contrasts the Male Science with the Female Arts group, with the Female Science and Male Arts groups lying somewhere in between. The second Function, however, resulted in further separation of the clusters by contrasting the Female Science group with the Male Arts group, this time with the Female Arts and Male Science groups somewhere between the poles.

Possibly the single most important aspect of these two resultant Functions is the finding in Table 3 that Function 1 accounts for approximately 88 per cent of the variation among the four groups, while the second Function accounts for only about 12 per cent. It may be said from this that differences between the Male Science and Female Arts groups, as they have been arranged by the analysis to form Function 1, are both better defined and easier to measure than their counterparts. This hypothesis can be readily supported by inspecting Table 26 and seeing that Male Science and Female Arts freshmen were correctly classified 85.2 and 83.2 per cent of the time, respectively. Contrasting this with the findings for Male Arts and Female Science that indicated a "hit-rate" of only 17.0 and 17.5 per cent, respectively, one wonders about the homogeneity of the latter groups.

At this point, reference to the various two-group analyses involving the Male Science and Female Arts groups indicates that in each of the relevant discriminations these two groups proved most predictable. Table 19, for example, shows that in the Male Science-Male Arts discrimination, Male Science students were accurately classified in about 97 per cent of the cases, while Male Arts were only 53 per cent correctly placed. This striking pattern is repeated for the Male Science-Female Science discrimination shown in Table 16, where the classification figures were 89 and 35 per cent, respectively; in the Female Arts-Female Science analysis in Table 22, with respective hit rates of 87 and 63 per cent; and, in the Female Arts-Male Arts discrimination in Table 13, with correct classifications of 92 and 60 per cent, respectively. These consistent findings indicate that Male Science and Female Arts groups are readily defined and discriminated from others on the basis of their scores on the General Occupational Themes of the SCII.

The technical aspects of these findings may be easily explained by referring to Table 23 and noting that the two groups with the greatest amount of separation (Sm and Af), had their highest mean scores on completely different

scales, while the Male Arts and Female Science groups both had their highest mean scores on the same scales.

To interpret the nature of the differences in terms of the Functions, however, it is necessary to study the characteristics of the variables that define them. From Table 25, for example, it can be noted that the Investigative and Realistic scales have the highest positive scaled weights for determining the discriminant score on Function 1, while the Artistic and Social scales have the highest negative weights. This dimension, then, can be interpreted as representing "scientific" versus "nonscientific" interests or personality tendencies.

This conclusion seems both intuitively reasonable, and when viewed in the light of Holland's (1973) classification system (see Appendix 8), in which he lists Investigative and Realistic types as preferring observational, symbolic, systematic, explicit, ordered, and scientific activities, and characterizes them as analytical, cautious, introverted, precise, asocial, materialistic, and practical, among others. Similarly, he lists nonscientific or Artistic and Social types as preferring ambiguous, free,

unsystematized, training, helping, and enlightening tasks, while characterizing them as complicated, emotional, idealistic, imaginative, nonconforming, helpful, sociable, and understanding, among other traits.

In the case of the first discriminant Function, it would probably not be correct to assume that the continuum represents the Male-Female dimension for the simple reason that a survey of Table 4 will reveal for the Male-Female discrimination, that Males were more aptly described by the Enterprising and Realistic combination of scales and the Females by the Artistic and Social scales. This indicates that something other than scientific versus nonscientific plays a role in the Male-Female discrimination. The same Table, however, shows supportive evidence for labelling the first discriminant Function in the Am-Sm-Sf-Af analysis as scientific versus nonscientific by displaying that the Arts-Science discrimination resulted in the Artistic and Social scales representing Arts students, and the Investigative and Realistic scales representing the Science freshmen.

As previously mentioned, the second discriminant Function is not as well defined in that it accounts for

relatively very little of the variance among the four groups. It does, however, separate Female Science from Male Arts students to some degree by having a high positive weight on the Investigative scale and a high negative weight on the Enterprising scale, as Table 25 will readily indicate. Consequently, this dimension could be interpreted as a "commercial" versus "noncommercial" continuum, with Female Science students at the noncommercial end and Male Arts at the other.

Again, this appears to follow well from Holland's description of Investigative types as preferring observational, systematic, and scientific activities, and Enterprising types as gravitating towards manipulation of others, organizational and economic gains, and away from observational, symbolic, and scientific activities. He further characterizes Enterprising types as acquisitive, ambitious, domineering, self-confident, and energetic. These descriptions tend to befit the superimposition of a commercial versus noncommercial continuum to capture the differences between Female Science and Male Arts students.

To summarize then, Male Science and Female Arts

freshmen are best differentiated along Function 1, which is a continuum representing scientific types at the Male Science end, and nonscientific types at the Female Arts end. Their combined classification hit-rate in the analysis was 84.2 per cent, due largely to the well-defined separation of these two groups along the Function. Male Arts and Female Science students, on the other hand, can be best differentiated on Function 2, which has been delineated as a commercial versus noncommercial dimension. Although separation of these groups along this continuum is relatively poor, with a hit-rate of only 17 per cent for each group, Male Arts can be said to be more at the commercial pole, while Female Science students cluster more towards the noncommercial end.

Classification of each individual was performed by employing the classification function coefficients (see Appendix 6) to determine probable group membership, the unstandardized discriminant function coefficients (see Appendix 7) to calculate the discriminant scores, and the discriminant function space (Figure 1) to determine the actual location of the individual along each Function. As can be noted from the principle diagonal of the classification matrix in Table 26, group membership could be

did Male Science and Female Arts groups have consistently high scores on related themes (i.e., Realistic and Investigative for Sm; Artistic and Social for Af), but also provide a well-differentiated type of profile in having definite high and low mean scores. Male Science students, for example, held their highest average score on the Investigative scale, while scoring definitely low on four of the remaining five scales. Likewise, Female Arts freshmen scored highest on the Artistic scale and definitely low on three of the other five scales.

Contrasting these points with the Male Arts-Female Science discrimination on Function 2, the same Table indicates that Male Arts not only had lower high scores but also less severe lows. Female Science, conversely, appeared to have somewhat better differentiated highs and lows than the Male Arts group, but still less well differentiated than either Male Science or Female Arts along Function 1.

These patterns may be readily supported by inspecting each of the two-group analyses involving one or more of these groups. For instance, in all two-group discriminations having Male Science as one of the groups (Tables 16 and 19), it can be seen that this group was by far more

predictable than its counterpart in the analysis. Similarly, two-group analyses with Female Arts as one of the groups (Tables 13 and 22), invariably predicted membership in this group much more accurately than the other group in the analysis.

Concerning the issue of greater Male Science and Female Arts predictability, it is also noteworthy that finding Male Science members best described in terms of the scientific end of the continuum, and Female Arts in terms of the nonscientific pole, seems hardly profound; it would appear to be in accordance with traditional stereotypic roles attached to these two curricular groups in our society.

The placing of Male Science along Function 1 in contrast with Female Arts, and Female Science onto Function 2 opposite Male Arts, brings to light another interesting point. It suggests that Male and Female Science students can not be spoken of synonymously, by the fact that their personality of General Occupational "types" appear to be dissimilar. Table 12 indicates Female Science students to be distinctly more Artistic and Social than Science Males, while the Male freshmen

exhibit more Enterprising and Realistic characteristics. Neither can Male and Female Arts students be indiscriminantly thrown together, as Females again appear more Artistic and Social when compared to the Males who tend more towards Realistic and Enterprising.

A final point in this discussion concerning greater predictability of Male Science and Female Arts groups is warranted. It concerns the question of how much effect the different group N's had upon increased or decreased predictability of actual group membership. It may be noted, for example, that while Female Arts and Male Science were the two most readily differentiated groups, they also constituted 250 out of a possible 360 subjects. In the breakdown, Female Science and Male Arts groups consisted of 57 and 53 subjects, respectively, while Female Arts constituted 101 of the total and Male Science membership came to 149.

Although this question is basically impossible to answer without further experimentation, it should be noted however, that this particular division of subjects was planned at the onset of the investigation. Based upon statistics presented in the "University of Ottawa Student Statistics" manual (available through the Office of the

Registrar at this university), student enrollment over the years 1971 to 1974 tends to support the 2:1 Female-Male relationship in Arts enrollment, and the 3:1 Male-Female enrollment into the Science Faculty. It must be noted, however, that these figures indicated a trend towards equal enrollment, and that further study must take fresh account of this situation.

The usefulness of the SCII in general, and the General Occupational Themes in particular, is most certainly highlighted by discriminant analysis. If univariate analyses (i.e., univariate F-ratios, Tables 2, 8, 11, 15, 18, 21, and 24) alone had been conducted for each scale, the hypothesis of overall differences among groups could not have been tested. The reason being that scales are intercorrelated (see Appendix 5 for complete correlations for each discrimination), and consequently probability of membership for each scale are not independent of one another. Furthermore, the fact that a number of scales are statistically significant at a given level does not necessarily mean that the overall differences among the groups on all scales are significant or that the differences are practical, in the sense that group prediction

equations can be developed. This line of argument more or less recoups the rationale for conducting and discussing the four-group discriminant analysis and utilizing the two-group analyses for supportive information and hypothesis testing.

Thus, the salient findings of this study stand out as follows:

(a) Significantly different patterns of scores on the General Occupational Themes of the SCII were exhibited by the various groups in the analyses.

(b) Both Sex and Faculty appeared to be significant variables in the analyses, in that scale scores were different, as were prediction results.

(c) Male Science and Female Arts students appeared more clearly defined and easier to classify on the basis of their General Occupational Themes scores, as indicated by an average hit-rate of 84 per cent. Male Arts and Female Science, on the other hand, had poorly defined scale scores, as indicated by an average prediction rate of only 17 per cent.

(d) Male Science and Female Arts groups were best described in terms of a continuum of scientific versus

nonscientific, with Male Science at the Scientific end and Female Arts at the other. This continuum accounted for fully 88 per cent of the variability among the four groups. Male Arts and Female Science groups, when placed along a dimension, were best described in terms of commercial versus noncommercial, with Male Arts being at the more commercial end of the scale. This continuum accounted for roughly 12 per cent of the total variation among the four groups, indicating the reason for the findings in point (c) above.

(e) Males and Females in both curricular groups can not be considered synonymous in terms of their personality types and related interests, as differences in scores on the General Occupational Theme scales indicates.

(f) Implications for counselors would stress the finding that personality differences do exist between the students of either Sex enrolled in either Faculty (as numerous previous studies have indicated), and that these differences can be measured by employing the General Occupational Themes of the SCII. It is possible that possession of certain patterns on the scales may be linked to success or lack thereof in particular curricular environments, although this investigation does not test nor

support this statement.

3. Suggestions for Further Research:

Possibly the best reference point in any suggestions for further research would be the shortcomings characterizing the original investigation. One major problem encountered with the type of classification procedure employed in this study is that generalization from these findings is limited by the absence of cross-validated evidence. As the discussion of results has included, the use of "same-sample" N's in determining validity of prediction equations is somewhat analogous to a self-fulfilling prophecy, in that errors made in the equation phase will be supported by matching errors during the classification stage. This inherent flaw could be readily remedied by a cross-validated study employing an independent sample upon which to make the predictions.

A related problem stems from the very nature of the classification system employed in discriminant analysis. Simply stated, discriminant analysis amounts to comparing an individual (employing any experimental variable) to

a number of groups that have been statistically differentiated upon these variables, and classifying the individual into the group with the pattern most similar to his own. Statistically, this is accomplished through use of classification equations, one for each group, that yield probability of group membership. Naturally, the group with the highest probability score is the one into which the individual will be classified by the program. The rule of highest probability, however, defines a very tight dividing line. Consider, for example, an individual in this study having a .51 probability of being in the Male Arts group and a .49 probability of classification into the Male Science group. Although this subject would be locked into the Male Arts category, the choice is not at all clear, and the individual is really not similar to either group. With this in mind, it may be possible then, to review the probability figures of each case involved in the study, and remove those below a certain cut-off point, say less than 60 or 65 per cent. In this way, the cases that contributed the least to the determination of the prediction equations will be removed, allowing the study to be re-run with subjects that could

now be considered more "typical" of each of the different groups included. Not only would the results of such an investigation by necessity increase the accuracy of predictions, but more importantly would provide clearer dimensions to discriminate the groups. This procedure has been employed in scale development for many years, most notably with the MMPI.

During the discussion of results, the point was raised as to what effect group size had upon discrimination of groups. This point was made chiefly in reference to the Male Arts and Female Science groups, which had respective N's of 53 and 57. Since this question can not be answered by the findings of this study, further investigation might consider the alternate possibilities of having equal N's, say, somewhere around the 150 mark, or, increasing membership in all groups by 100, thereby retaining proportions as they were found to exist in the population at large. My unsupported guess as to results would be that predictability of all groups will increase in such a case, thereby still leaving the finding that Male Science and Female Arts groups are more predictable an open question.

The usefulness of the present study is more or less restricted to determining that personality patterns as measured by the General Occupational Scales of the SCII are different among the groups investigated, and that the patterns are as discussed in the results. If the major thrust of this research is in the direction of providing useful guidelines for counselors in educational settings, as it is, then certain "missing links" of data must still be investigated. For example, does having a "typical" Male Arts pattern go hand-in-hand with what might be called "success" in the Arts curriculum? What happens if this individual were actually in the Science Faculty? Do students with patterns that are atypical of their curriculum meet certain kinds of problems or frustrations? Are they curricula "changers" or "nonchangers", as Dunkleberger and Tyler (1961) would call them? Is any particular subpattern within a group more indicative of either success or failure within a curriculum? These are but a few of the highly interesting and stimulating questions that come to mind, and reminds one that attempting to answer one question usually results in one hundred new ones.

Other areas of related investigation involve extending

the use of the discriminant analysis approach in developing group prediction equations for other types of college majors, community colleges in relation to universities, or even into senior high school groups. Of interest also, may be how well patterns persist throughout the college, university, or other training, and what happens after graduation.

SUMMARY AND CONCLUSIONS

The aim of this investigation was to determine whether curricula and/or sex of subjects resulted in significantly different scores or patterns of scores on the General Occupational Themes of the SCII. The nature and magnitude of determined differences were also important factors.

The Strong-Campbell Interest Inventory (1974) was employed to gather the necessary information, with final attention being paid to the scores on the first section of the SCII which comprises the six General Occupational Themes. The final subject pool was composed of 154 Arts Faculty students (53 Males and 101 Females), and 206 Science Faculty students (149 Males and 57 Females). All were University of Ottawa students in their freshmen year. Questionnaires were administered during class time.

The results generally indicated that differences did indeed exist in terms of scores on the six scales, and that differences were affected by both Faculty and Sex of the subject. Male Science and Female Arts groups were found to constitute a "scientific" versus "nonscientific" continuum, with Male Science at the Science end, and Female

Arts at the other. The scientific pole was characterized by high scores on the Investigative and Realistic scales, while the Female Arts end tended to score higher on the Artistic and Social scales. This continuum accounted for about 88 per cent of the variability in scores among the four groups.

Male Arts and Female Science groups constituted the second, less differentiating continuum, in terms of Male Arts being more Enterprising and hence more "commercial" than their Female Science counterparts, who indicated higher scores on Investigative and definite low scores on Enterprising.

Males and Females in both curricular groups showed different patterns of scores on the Themes, thereby suggesting that considering Males and Females as one homogeneous group in either Faculty during counseling would indeed be an error.

Further research was suggested towards the improvement of the present study through cross-validation, and towards the discovery of other variables affecting students' curricular choices. "Success" or "failure" in a given field might be studied in relation to patterns on the Themes,

in conjunction with the effect of "typical" or "atypical" group patterns upon success within that group. The suggestions centered mainly around establishing "missing-links" of data that are necessary for useful application of these findings to the counseling setting.

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APPENDIX 1

PERSONALITY CHARACTERISTICS ASSOCIATED WITH EDUCATIONAL CHOICE

(GOLDSCHMID, 1965)

Personality Characteristics Associated with Educational Choice

Categories	Characteristics of the student scoring high on the <u>science</u> equation	Characteristics of the student scoring high on the <u>humanities</u> equation
Orientation to Life	Prudent, conventional, energetic. Preference for overt action and a tendency to evaluate ideas on the basis of their practical & immediate application.	Participant, ambitious, wishes to do well & succeed in life. Emphasis on personal gain & pleasure, self-centered. Values personal independence, seeks freedom from rules & constraints.
Modes of Adjustment and Psychological Functioning	Relatively free from self-doubt & dis-illusionment. Has sense of well-being. Tends toward strict control of emotional impulses & emotionality.	Given to complaining about physical & psychological status. Impatient, demanding, difficulty in binding tension. Emotionally expressive, anxiety-prone.
Interest Patterns	Restricted range of interests. Unlikely to venture into new & different pursuits. Interest in science & scientific activities but little in people & social contact.	Wide range of interests, eg., literature, philosophy, art, religion, etc. Responsive to & involved in current social & political affairs.
Behavior in Social Contexts	Not assertive or dominant. Reserved, retiring, socially introverted, not spontaneous.	Ascendant, persuasive, clever, & imaginative in social situations. Outspoken, gregarious. Seeks social contact to satisfy self.
Modes of Cognitive Functioning	Preference for logical, precise analyses. Problem-solving approach. Impersonal & critical habits of thinking. Values form & structure.	Preference for imaginative, even autistic thinking. Intuitive approach. Personal & subjective in evaluating ideas. Cathects innovation & ambiguity.

Source: Goldschmid, M.L. "Prediction of College Major in the Sciences and the Humanities by means of Personality Tests." Unpublished Doctoral Dissertation, University of California, Berkeley, 1965, p. 55.

APPENDIX 2

STRONG-CAMPBELL INTEREST INVENTORY, FORM T325

Strong-Campbell Interest Inventory

Merged Form of the

Strong Vocational Interest Blank

EDWARD K. STRONG, JR. 1884-1963

DAVID P. CAMPBELL

This inventory is used to help you understand your work interests in a general way, and to show you some kinds of work you might be comfortable in. The following pages list many jobs, activities, school subjects, and so forth, and you are asked to show your liking or disliking for each. Your answers will be compared with the answers given by people already working in a wide range of jobs, and your scores will show how similar your interests are to the interests of these people. But this is not a test of your *abilities*; it is an inventory of your *interests*. Your scores will be presented to you later, on a special sheet called a profile, with information on how to understand the scores.

Directions:

1. With this booklet, you should have a **special answer sheet** on which to mark your answers.
2. **Please make no marks on this booklet**; it will be used again by other people.
3. Use any soft, black, lead pencil (such as a No. 2) to make your marks on the answer sheet.
4. Fill in your name and other information on the answer sheet. Follow carefully the instructions for filling in your name.
5. **Instructions for marking your answers** are given on the next page of this booklet and also on the answer sheet.
6. **Make a heavy, dark mark for each answer**—not a cross or a check mark.
7. If you make a mistake or change your mind, **erase carefully and thoroughly**.
8. Your answer sheet will be processed by computer. **Please keep it free from wrinkles or stray marks**, so that it will be scored correctly.
9. Try to answer each question. **Work quickly**; first impressions usually give the best results with this inventory. Turn the page and begin.

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Part I. Occupations

Many occupations are listed below. For each of them, show how you would feel about doing that kind of work.

Mark on the answer sheet in the space labeled “L” if you think you would **like** that kind of work.

Mark in the space labeled “I” if you are **indifferent** (that is, if you think you wouldn’t care one way or another).

Mark in the space labeled “D” if you think you would **dislike** that kind of work.

Don’t worry about whether you would be good at the job or about not being trained for it. Forget about how much money you could make or whether you could get ahead. Think only about whether you would like to do the work done in that job.

Work fast. Answer every one.

- | | | |
|-----------------------------------|---------------------------------|--------------------------------|
| 1 Actor/Actress | 46 Editor | 91 Orchestra conductor |
| 2 Advertising executive | 47 Electrical engineer | 92 Pharmacist |
| 3 Architect | 48 Electronics technician | 93 Photographer |
| 4 Art museum director | 49 Elementary school teacher | 94 Physician |
| 5 Art teacher | 50 Employment manager | 95 Playground director |
| 6 Artist | 51 Factory manager | 96 Poet |
| 7 Artist’s model | 52 Farmer | 97 Police officer |
| 8 Astronomer | 53 Fashion model | 98 Politician |
| 9 Athletic director | 54 Florist | 99 Private secretary |
| 10 Auctioneer | 55 Foreign correspondent | 100 Professional athlete |
| 11 Author of children’s books | 56 Foreign service officer | 101 Professional dancer |
| 12 Author of novels | 57 Free-lance writer | 102 Professional gambler |
| 13 Author of technical books | 58 Governor of a state | 103 Psychologist |
| 14 Auto mechanic | 59 High school teacher | 104 Public relations director |
| 15 Auto racer | 60 Home economics teacher | 105 Rancher |
| 16 Auto sales | 61 Hospital records clerk | 106 Realtor |
| 17 Bank teller | 62 Housekeeper | 107 Receptionist |
| 18 Beauty and haircare consultant | 63 Hotel manager | 108 Retailer |
| 19 Biologist | 64 Illustrator | 109 Sales manager |
| 20 Bookkeeper | 65 Income tax accountant | 110 School principal |
| 21 Building contractor | 66 Interior decorator | 111 Scientific illustrator |
| 22 Business teacher | 67 Inventor | 112 Scientific research worker |
| 23 Buyer of merchandise | 68 Jet pilot | 113 Sculptor |
| 24 Carpenter | 69 Judge | 114 Secret service agent |
| 25 Cartoonist | 70 Labor arbitrator | 115 Social worker |
| 26 Cashier in bank | 71 Laboratory technician | 116 Specialty salesperson |
| 27 Chemist | 72 Landscape gardener | 117 Sports reporter |
| 28 Children’s clothes designer | 73 Librarian | 118 Statistician |
| 29 Church worker | 74 Life insurance agent | 119 Flight attendant |
| 30 City or state employee | 75 Machine shop supervisor | 120 Stockbroker |
| 31 City planner | 76 Machinist | 121 Surgeon |
| 32 Civil engineer | 77 Manager, Chamber of Commerce | 122 Toolmaker |
| 33 College professor | 78 Manager, child care center | 123 Traveling salesperson |
| 34 Computer operator | 79 Manager, women’s style shop | 124 Travel bureau manager |
| 35 Corporation lawyer | 80 Manufacturer | 125 Typist |
| 36 Costume designer | 81 Mechanical engineer | 126 TV announcer |
| 37 Courtroom stenographer | 82 Military officer | 127 Vocational counselor |
| 38 Criminal lawyer | 83 Minister, priest, or rabbi | 128 Waiter/Waitress |
| 39 Dancing teacher | 84 Musician | 129 Wholesaler |
| 40 Dental assistant | 85 Newspaper reporter | 130 X-Ray technician |
| 41 Dentist | 86 Nurse | 131 YMCA/YWCA staff member |
| 42 Designer, electronic equipment | 87 Nurse’s aide/Orderly | |
| 43 Dietitian | 88 Office clerk | |
| 44 Draftsman | 89 Office manager | |
| 45 Dressmaker/Tailor | 90 Opera singer | |

Part II. School Subjects

Show in the same way whether you are interested in these school subjects, even though you may not have studied them.

Mark "L" for Like.

Mark "I" for Indifferent (when you don't care one way or the other).

Mark "D" for Dislike.

132 Agriculture
133 Algebra
134 Arithmetic
135 Ancient languages (Latin, Sanskrit, etc.)
136 Art
137 Bible history
138 Bookkeeping
139 Botany
140 Calculus

141 Chemistry
142 Civics (government)
143 Dramatics
144 Economics
145 English composition
146 Geometry
147 Home economics
148 Industrial arts
149 Journalism
150 Literature

151 Mathematics
152 Mechanical drawing 122
153 Military drill
154 Modern languages (French, German, etc.)
155 Nature study
156 Penmanship
157 Philosophy
158 Physical education
159 Physics
160 Physiology
161 Political science
162 Psychology
163 Public speaking
164 Sociology
165 Statistics
166 Typewriting
167 Zoology

Part III. Activities

Show your interests in the same way as before. Give the first answer that comes to mind.

168 Making a speech
169 Doing research work
170 Repairing a clock
171 Cooking
172 Operating machinery
173 Writing reports
174 Discussing politics
175 Taping a sprained ankle
176 Adjusting a carburetor
177 Going to church
178 Heading a civic improvement program
179 Raising flowers and vegetables
180 Interviewing job applicants

181 Teaching children
182 Teaching adults
183 Meeting and directing people
184 Taking responsibility
185 Sewing
186 Making statistical charts
187 Operating office machines
188 Giving first aid assistance
189 Decorating a room with flowers
190 Interviewing prospects in selling
191 Drilling soldiers
192 Pursuing bandits in a sheriff's posse
193 Watching an open-heart operation
194 Checking typewritten material for errors
195 Repairing electrical wiring
196 Organizing cabinets and closets
197 Adjusting difficulties of others
198 Starting a conversation with a stranger
199 Cabinetmaking
200 Being a forest ranger

201 Bargaining ("swapping")
202 Looking at things in a clothing store
203 Buying merchandise for a store
204 Displaying merchandise in a store
205 Competitive activities
206 Regular hours for work
207 Continually changing activities
208 Interviewing clients
209 Arguments
210 Developing business systems
211 Doing your own laundry work
212 Saving money
213 Contributing to charities
214 Raising money for charity
215 Expressing judgments publicly, regardless of what others say
216 Climbing along the edge of a steep cliff
217 Living in the city
218 Discussing the purpose of life

Part IV. Amusements

Show in the same way how you feel about these ways of having fun. Work rapidly. Do not think over various possibilities. Give the first answer that comes to mind.

219 Golf
220 Fishing
221 Jazz or rock concerts
222 Looking at things in a hardware store
223 Boxing
224 Poker
225 Bridge

226 Solving mechanical puzzles
227 Planning a large party
228 Religious music
229 Drilling in a military company
230 Amusement parks
231 Conventions
232 Formal dress affairs
233 Electioneering for office
234 Art galleries
235 Leading a scout troop
236 Writing a one-act play
237 Symphony concerts
238 Night clubs
239 Church young people's group
240 Sports pages in the newspaper
241 Poetry
242 Skiing
243 Business magazines
244 Popular mechanics magazines

245 Reading the Bible
246 Magazines about art and music
247 Building a radio or stereo set
248 Attending lectures
249 Family pages in newspapers
250 Performing scientific experiments
251 Camping
252 Playing chess
253 Preparing dinner for guests
254 Entertaining others
255 Trying new cooking recipes
256 Being the first to wear the latest fashions
257 Organizing a play

Part V. Types of People

Most of us choose jobs where we can work with people we enjoy. Show in the same way as before how you would feel about having day-to-day contact with the following types of people. Work fast. Don't think of specific examples. Just give the first answer that comes to mind.

- | | |
|----------------------------------|---|
| 258 Highway construction workers | 271 Emotional people |
| 259 High school students | 272 People who have made fortunes in business |
| 260 Military officers | 273 Thrifty people |
| 261 Artistic persons | 274 Musical geniuses |
| 262 Foreigners | 275 Outspoken people with new ideas |
| 263 Ballet dancers | 276 Fashionably dressed people |
| 264 Nonconformists | 277 Prominent business leaders |
| 265 People who assume leadership | 278 Athletic persons |
| 266 Religious people | 279 People who daydream a lot |
| 267 Aggressive people | 280 Outstanding scientists |
| 268 Physically sick people | 281 People who live dangerously |
| 269 Babies | |
| 270 Very old people | |

Part VI. Preference Between Two Activities

Here are several pairs of activities or occupations. Show which one of each pair you like better: if you prefer the one on the **left**, mark in the space labeled "L" on the answer sheet; if you prefer the one on the **right**, mark in the space labeled "R"; if you like **both the same**, or if you **can't decide**, mark in the space labeled "=". Work rapidly. Make one mark for each pair.

- | | |
|--|---|
| Airline pilot | 282 Airline ticket agent |
| Taxicab driver | 283 Police officer |
| Headwaiter/Hostess | 284 Lighthouse keeper |
| Selling things house to house | 285 Gardening |
| Developing plans | 286 Carrying out plans |
| Doing a job yourself | 287 Telling somebody else to do the job |
| Dealing with things | 288 Dealing with people |
| Taking a chance | 289 Playing safe |
| Drawing a definite salary | 290 Receiving a commission on what is done |
| Outside work | 291 Inside work |
| Work for yourself | 292 Carrying out the program of a superior whom you respect |
| Superintendent of a hospital | 293 Warden of a prison |
| Vocational counselor | 294 Public health officer |
| Physical activity | 295 Mental activity |
| Dog trainer | 296 Juvenile parole officer |
| Thrilling, dangerous activities | 297 Quieter, safer activities |
| Physical education director | 298 Free-lance writer |
| Statistician | 299 Social worker |
| Technical responsibility (in charge of 25 people doing scientific work) | 300 Supervisory responsibility (in charge of 300 people doing business-office work) |
| Going to a play | 301 Going to a dance |
| Teacher | 302 Salesperson |
| Experimenting with new grooming preparations | 303 Experimenting with new office equipment |
| Being married to a research scientist | 304 Being married to a sales executive |
| Working in a large corporation with little chance of being president before age 55 | 305 Working for yourself in a small business |
| Working in an import-export business | 306 Working in a research laboratory |
| Music and art events | 307 Athletic events |
| Reading a book | 308 Watching TV or going to a movie |
| Appraising real estate | 309 Repairing and restoring antiques |
| Having a few close friends | 310 Having many acquaintances |
| Work in which you move from place to place | 311 Work where you live in one place |

Part VII. Your Characteristics

Show here what kind of person you are: if the statement describes you, mark in the space labeled "Y" (for "Yes"); if the statement does **not** describe you, mark in the space labeled "N" (for "No"); if you cannot decide, mark in the space labeled "?". (Be frank in pointing out your weak points, because these are as important as your strong points in choosing a career.)

- | | |
|---|---|
| 312 Usually start activities of my group | 319 Can prepare successful advertisements |
| 313 Have more than my share of novel ideas | 320 Stimulate the ambitions of my associates |
| 314 Win friends easily | 321 Can write a concise, well-organized report |
| 315 Make decisions immediately, not after considerable thought | 322 Enjoy tinkering with small hand tools |
| 316 Prefer working alone rather than on committees | 323 Can smooth out tangles and disagreements between people |
| 317 Have mechanical ingenuity (inventiveness) | 324 Put drive into an organization |
| 318 Am concerned about philosophical problems such as religion, meaning of life, etc. | 325 Have patience when teaching others |

APPENDIX 3

ANSWER SHEET AND PROFILE FOR THE SCII

STRONG - CAMPBELL INTEREST INVENTORY

FORM T325

NAME: Print your name in the boxes below, one letter to a box. Print your last name first, skip a box, then print as much of your first name as possible. Put your middle initial in the last box. Fill in the appropriate circle under each box. For spaces, fill in the blank circles. Use a soft (No. 2) lead pencil.

ADDRESS (No. & St.)

FACULTY %

CITY

STATE

ZIP

MAJOR %

IMPORTANT MARK ONE

SEX

 M
MALE

 F
FEMALE

DATE

AGE

Directions: Use a soft (No. 2) lead pencil. The answer spaces below are numbered the same as the items in the booklet. Fill in one space for each item. Erase completely any answer you wish to change.

If you like the item, mark the "L" L D

If you are indifferent, mark the "I" L D

If you dislike the item, mark the "D" L D

127 L I D 147 L I D128 L I D 148 L I D129 L I D 149 L I D

OCCUPATIONS

1 L I D 19 L I D 37 L I D 55 L I D 73 L I D 91 L I D 109 L I D 130 L I D 150 L I D2 L I D 20 L I D 38 L I D 56 L I D 74 L I D 92 L I D 110 L I D 131 L I D 151 L I D3 L I D 21 L I D 39 L I D 57 L I D 75 L I D 93 L I D 111 L I D **SCHOOL SUBJECTS** 152 L I D4 L I D 22 L I D 40 L I D 58 L I D 76 L I D 94 L I D 112 L I D 132 L I D 153 L I D5 L I D 23 L I D 41 L I D 59 L I D 77 L I D 95 L I D 113 L I D 133 L I D 154 L I D6 L I D 24 L I D 42 L I D 60 L I D 78 L I D 96 L I D 114 L I D 134 L I D 155 L I D7 L I D 25 L I D 43 L I D 61 L I D 79 L I D 97 L I D 115 L I D 135 L I D 156 L I D8 L I D 26 L I D 44 L I D 62 L I D 80 L I D 98 L I D 116 L I D 136 L I D 157 L I D9 L I D 27 L I D 45 L I D 63 L I D 81 L I D 99 L I D 117 L I D 137 L I D 158 L I D10 L I D 28 L I D 46 L I D 64 L I D 82 L I D 100 L I D 118 L I D 138 L I D 159 L I D11 L I D 29 L I D 47 L I D 65 L I D 83 L I D 101 L I D 119 L I D 139 L I D 160 L I D12 L I D 30 L I D 48 L I D 66 L I D 84 L I D 102 L I D 120 L I D 140 L I D 161 L I D13 L I D 31 L I D 49 L I D 67 L I D 85 L I D 103 L I D 121 L I D 141 L I D 162 L I D14 L I D 32 L I D 50 L I D 68 L I D 86 L I D 104 L I D 122 L I D 142 L I D 163 L I D15 L I D 33 L I D 51 L I D 69 L I D 87 L I D 105 L I D 123 L I D 143 L I D 164 L I D16 L I D 34 L I D 52 L I D 70 L I D 88 L I D 106 L I D 124 L I D 144 L I D 165 L I D17 L I D 35 L I D 53 L I D 71 L I D 89 L I D 107 L I D 125 L I D 145 L I D 166 L I D18 L I D 36 L I D 54 L I D 72 L I D 90 L I D 108 L I D 126 L I D 146 L I D 167 L I D

124

FOR NCS
USE ONLY

0	0	0	0	0	0
1	1	1	1	1	1
2	2	2	2	2	2
3	3	3	3	3	3
4	4	4	4	4	4
5	5	5	5	5	5
6	6	6	6	6	6
7	7	7	7	7	7
8	8	8	8	8	8
9	9	9	9	9	9

0	0	0	0	0	0	0	0	0	0
1	1	1	1	1	1	1	1	1	1
2	2	2	2	2	2	2	2	2	2
3	3	3	3	3	3	3	3	3	3
4	4	4	4	4	4	4	4	4	4
5	5	5	5	5	5	5	5	5	5
6	6	6	6	6	6	6	6	6	6
7	7	7	7	7	7	7	7	7	7
8	8	8	8	8	8	8	8	8	8
9	9	9	9	9	9	9	9	9	9

ITEMS 282-311

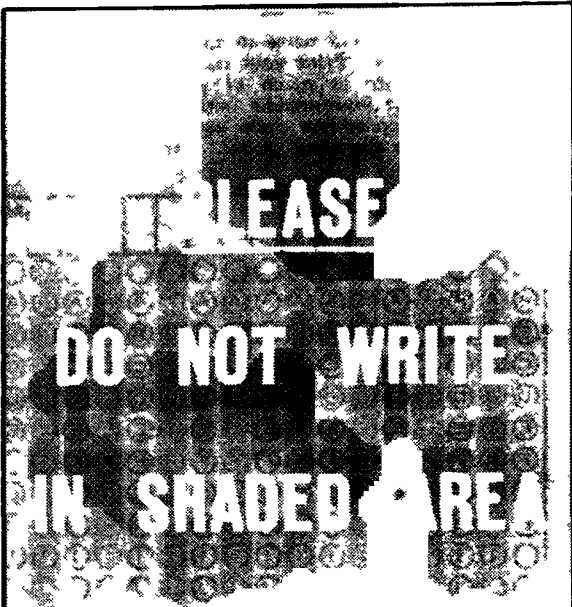
- If you prefer the item on the left, mark the "L"
- If you like both items or can't decide, mark the "="
- If you prefer the item on the right, mark the "R"

ITEMS 312-325

- If the item describes you, mark "Yes (Y)"
- If you are not sure, mark the "?"
- If the item does not describe you, mark "No (N)"

24

ACTIVITIES			AMUSEMENTS			TYPES OF PEOPLE			YOUR CHARACT- TERISTICS									
168	<input type="radio"/> <input type="radio"/> <input type="radio"/>	188	<input type="radio"/> <input type="radio"/> <input type="radio"/>	208	<input type="radio"/> <input type="radio"/> <input type="radio"/>	219	<input type="radio"/> <input type="radio"/> <input type="radio"/>	239	<input type="radio"/> <input type="radio"/> <input type="radio"/>	258	<input type="radio"/> <input type="radio"/> <input type="radio"/>	278	<input type="radio"/> <input type="radio"/> <input type="radio"/>	292	<input type="radio"/> <input type="radio"/> <input type="radio"/>	312	<input type="radio"/> <input type="radio"/> <input type="radio"/>	
169	<input type="radio"/> <input type="radio"/> <input type="radio"/>	189	<input type="radio"/> <input type="radio"/> <input type="radio"/>	209	<input type="radio"/> <input type="radio"/> <input type="radio"/>	220	<input type="radio"/> <input type="radio"/> <input type="radio"/>	240	<input type="radio"/> <input type="radio"/> <input type="radio"/>	259	<input type="radio"/> <input type="radio"/> <input type="radio"/>	279	<input type="radio"/> <input type="radio"/> <input type="radio"/>	293	<input type="radio"/> <input type="radio"/> <input type="radio"/>	313	<input type="radio"/> <input type="radio"/> <input type="radio"/>	
170	<input type="radio"/> <input type="radio"/> <input type="radio"/>	190	<input type="radio"/> <input type="radio"/> <input type="radio"/>	210	<input type="radio"/> <input type="radio"/> <input type="radio"/>	221	<input type="radio"/> <input type="radio"/> <input type="radio"/>	241	<input type="radio"/> <input type="radio"/> <input type="radio"/>	260	<input type="radio"/> <input type="radio"/> <input type="radio"/>	280	<input type="radio"/> <input type="radio"/> <input type="radio"/>	294	<input type="radio"/> <input type="radio"/> <input type="radio"/>	314	<input type="radio"/> <input type="radio"/> <input type="radio"/>	
171	<input type="radio"/> <input type="radio"/> <input type="radio"/>	191	<input type="radio"/> <input type="radio"/> <input type="radio"/>	211	<input type="radio"/> <input type="radio"/> <input type="radio"/>	222	<input type="radio"/> <input type="radio"/> <input type="radio"/>	242	<input type="radio"/> <input type="radio"/> <input type="radio"/>	261	<input type="radio"/> <input type="radio"/> <input type="radio"/>	281	<input type="radio"/> <input type="radio"/> <input type="radio"/>	295	<input type="radio"/> <input type="radio"/> <input type="radio"/>	315	<input type="radio"/> <input type="radio"/> <input type="radio"/>	
172	<input type="radio"/> <input type="radio"/> <input type="radio"/>	192	<input type="radio"/> <input type="radio"/> <input type="radio"/>	212	<input type="radio"/> <input type="radio"/> <input type="radio"/>	223	<input type="radio"/> <input type="radio"/> <input type="radio"/>	243	<input type="radio"/> <input type="radio"/> <input type="radio"/>	262	<input type="radio"/> <input type="radio"/> <input type="radio"/>			296	<input type="radio"/> <input type="radio"/> <input type="radio"/>	316	<input type="radio"/> <input type="radio"/> <input type="radio"/>	
173	<input type="radio"/> <input type="radio"/> <input type="radio"/>	193	<input type="radio"/> <input type="radio"/> <input type="radio"/>	213	<input type="radio"/> <input type="radio"/> <input type="radio"/>	224	<input type="radio"/> <input type="radio"/> <input type="radio"/>	244	<input type="radio"/> <input type="radio"/> <input type="radio"/>	263	<input type="radio"/> <input type="radio"/> <input type="radio"/>			297	<input type="radio"/> <input type="radio"/> <input type="radio"/>	317	<input type="radio"/> <input type="radio"/> <input type="radio"/>	
174	<input type="radio"/> <input type="radio"/> <input type="radio"/>	194	<input type="radio"/> <input type="radio"/> <input type="radio"/>	214	<input type="radio"/> <input type="radio"/> <input type="radio"/>	225	<input type="radio"/> <input type="radio"/> <input type="radio"/>	245	<input type="radio"/> <input type="radio"/> <input type="radio"/>	264	<input type="radio"/> <input type="radio"/> <input type="radio"/>			298	<input type="radio"/> <input type="radio"/> <input type="radio"/>	318	<input type="radio"/> <input type="radio"/> <input type="radio"/>	
175	<input type="radio"/> <input type="radio"/> <input type="radio"/>	195	<input type="radio"/> <input type="radio"/> <input type="radio"/>	215	<input type="radio"/> <input type="radio"/> <input type="radio"/>	226	<input type="radio"/> <input type="radio"/> <input type="radio"/>	246	<input type="radio"/> <input type="radio"/> <input type="radio"/>	265	<input type="radio"/> <input type="radio"/> <input type="radio"/>	PREFER- ENCE BETWEEN TWO ACTIVITIES	299	<input type="radio"/> <input type="radio"/> <input type="radio"/>	319	<input type="radio"/> <input type="radio"/> <input type="radio"/>		
176	<input type="radio"/> <input type="radio"/> <input type="radio"/>	196	<input type="radio"/> <input type="radio"/> <input type="radio"/>	216	<input type="radio"/> <input type="radio"/> <input type="radio"/>	227	<input type="radio"/> <input type="radio"/> <input type="radio"/>	247	<input type="radio"/> <input type="radio"/> <input type="radio"/>	266	<input type="radio"/> <input type="radio"/> <input type="radio"/>		300	<input type="radio"/> <input type="radio"/> <input type="radio"/>	320	<input type="radio"/> <input type="radio"/> <input type="radio"/>		
177	<input type="radio"/> <input type="radio"/> <input type="radio"/>	197	<input type="radio"/> <input type="radio"/> <input type="radio"/>	217	<input type="radio"/> <input type="radio"/> <input type="radio"/>	228	<input type="radio"/> <input type="radio"/> <input type="radio"/>	248	<input type="radio"/> <input type="radio"/> <input type="radio"/>	267	<input type="radio"/> <input type="radio"/> <input type="radio"/>		301	<input type="radio"/> <input type="radio"/> <input type="radio"/>	321	<input type="radio"/> <input type="radio"/> <input type="radio"/>		
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180	<input type="radio"/> <input type="radio"/> <input type="radio"/>	200	<input type="radio"/> <input type="radio"/> <input type="radio"/>			231	<input type="radio"/> <input type="radio"/> <input type="radio"/>	251	<input type="radio"/> <input type="radio"/> <input type="radio"/>	270	<input type="radio"/> <input type="radio"/> <input type="radio"/>		284	<input type="radio"/> <input type="radio"/> <input type="radio"/>	304	<input type="radio"/> <input type="radio"/> <input type="radio"/>	324	<input type="radio"/> <input type="radio"/> <input type="radio"/>
181	<input type="radio"/> <input type="radio"/> <input type="radio"/>	201	<input type="radio"/> <input type="radio"/> <input type="radio"/>			232	<input type="radio"/> <input type="radio"/> <input type="radio"/>	252	<input type="radio"/> <input type="radio"/> <input type="radio"/>	271	<input type="radio"/> <input type="radio"/> <input type="radio"/>		285	<input type="radio"/> <input type="radio"/> <input type="radio"/>	305	<input type="radio"/> <input type="radio"/> <input type="radio"/>	325	<input type="radio"/> <input type="radio"/> <input type="radio"/>
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	<input type="radio"/> <input type="radio"/> <input type="radio"/>	204	<input type="radio"/> <input type="radio"/> <input type="radio"/>			235	<input type="radio"/> <input type="radio"/> <input type="radio"/>	255	<input type="radio"/> <input type="radio"/> <input type="radio"/>	274	<input type="radio"/> <input type="radio"/> <input type="radio"/>		288	<input type="radio"/> <input type="radio"/> <input type="radio"/>	308	<input type="radio"/> <input type="radio"/> <input type="radio"/>		
	<input type="radio"/> <input type="radio"/> <input type="radio"/>	205	<input type="radio"/> <input type="radio"/> <input type="radio"/>			236	<input type="radio"/> <input type="radio"/> <input type="radio"/>	256	<input type="radio"/> <input type="radio"/> <input type="radio"/>	275	<input type="radio"/> <input type="radio"/> <input type="radio"/>	289	<input type="radio"/> <input type="radio"/> <input type="radio"/>	309	<input type="radio"/> <input type="radio"/> <input type="radio"/>			
	<input type="radio"/> <input type="radio"/> <input type="radio"/>	206	<input type="radio"/> <input type="radio"/> <input type="radio"/>			237	<input type="radio"/> <input type="radio"/> <input type="radio"/>	257	<input type="radio"/> <input type="radio"/> <input type="radio"/>	276	<input type="radio"/> <input type="radio"/> <input type="radio"/>	290	<input type="radio"/> <input type="radio"/> <input type="radio"/>	310	<input type="radio"/> <input type="radio"/> <input type="radio"/>			
	<input type="radio"/> <input type="radio"/> <input type="radio"/>	207	<input type="radio"/> <input type="radio"/> <input type="radio"/>			238	<input type="radio"/> <input type="radio"/> <input type="radio"/>			277	<input type="radio"/> <input type="radio"/> <input type="radio"/>	291	<input type="radio"/> <input type="radio"/> <input type="radio"/>	311	<input type="radio"/> <input type="radio"/> <input type="radio"/>			



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Comments for the Counselor on Interpreting the SVIB-SCII

The Strong-Campbell Interest Inventory is a revision and extension of the widely used Strong Vocational Interest Blank, and differs from the earlier SVIB chiefly in two ways: in the addition of the General Occupational Themes and in the merging of men's and women's forms into a single instrument.

The SCII can be used with anyone who understands the vocabulary of the test items, that is, most people over 16. The inventory has been used for special projects as early as the eighth grade (age 14), but although profiles for students of 14 or 15 do reflect their current interests, they may not accurately predict future interests or careers. At this age, the inventory should be used mainly as a vehicle for discussion of the world of work. By age 17, definite patterns emerge that remain fairly stable, and by age 25, most people's interests are well established.

The profile reflects the patterns of answers made to the inventory, patterns that can be related statistically to the interests of men and women in particular occupations, but the results should be seen only as general predictions of where the individual can find occupational satisfaction. The best help a counselor can give is to help students realize the importance of the overall patterns in their scores. Most students tend to overemphasize the importance of one or two high (or low) scores that may, for various reasons, be misleading. The emphasis should be on long-term development rather than on making immediate decisions. Students often need help in finding more information about the areas where they scored high, and they usually need to be reminded that this is a test of interests, not aptitudes.

Earlier editions of the inventory were used mainly with college students, but one purpose of the revisions leading to the current edition was to make the inventory more broadly useful. Toward this end, the item coverage was expanded, the reading level of the booklet was lowered, more noncollege occupations were added to the profile, and a few unpopular occupations were dropped.

Men and women, even those in the same occupation, give somewhat different responses to the inventory. As the norms for the Basic Interest Scales demonstrate, these differences are most prominent in the artistic and domestic areas, which tend to be favored by women, and in the mechanical area, favored by men. To have ignored the various sex-linked differences in the norming of the Occupational Scales would have introduced significant error. Until men's interests no longer differ notably from women's, separate scales will provide more meaningful results. And because some occupations continue to be dominated by one sex—"farmer," for example, or "secretary"—Occupational Scales have not yet been developed for both sexes in all cases. Research is under way toward reconciling these disparities of the real world with the purposes of interest inventories.

On the reverse side of the student's copy of the profile is a basic explanation of the three principal classes of scales, with the help of these comments, most students can understand their own scores. The counselor can help, first, by explaining the finer technical details, second, by explaining any apparent inconsistencies between scores of different types, and third, by helping students integrate this information with such data as are available on their aptitudes and experiences.

The General Occupational Themes

These six themes, described briefly on the student's copy of the profile, are based on J. L. Holland's work, *Making Vocational Choices: A Theory of Careers* (Prentice-Hall, 1973). His book is an excellent source for further information about these themes and the world of work.

Holland's chief premise is that each of us can be described in terms of relative similarity to one or more of six idealized occupational-interest personality types, and that each type seeks out a different kind of occupational environment. Thus, personality types do as much as job requirements to establish the working tenor of a given occupation. Although this formulation is oversimplified, it offers a useful structure—one that conforms to empirical research results—for analyzing the differences between people and the occupations they choose. Most important, Holland's theory offers an organizing structure for the extensive network of empirical studies carried out over the years with the Strong inventories.

The six themes or scales each contain 20 items, scored positively for "Like" responses and negatively for "Dislike" responses. Norms have been established by scoring a general sample of 600 people (300 men and 300 women), then assigning this sample a mean of 50 and a standard deviation of 10, as a basis for converting future raw scores to standard scores. The numerical score, printed out under "Std Score," is based on this combined norm sample. Because

males and females score somewhat differently on these scales, printed interpretive comments—This is a HIGH score" and so forth—are also supplied, these comments are based on comparisons with people of the same sex as the person being tested (and for some cases, therefore, men and women with the same numerical score will be furnished different printed comments. Within each sex, the interpretive comments correspond to the following percentile ranges:

Very high	94th and above	Moderately low	16th—30th
High	85th—93rd	Low	7th—15th
Moderately high	70th—84th	Very low	6th and below
Average	31st—69th		

The six themes can be arranged in the form of a hexagon, as shown on the student's copy of the profile, in such a way that themes falling next to each other (that is, on adjacent corners) are the most similar to each other, and those directly across the hexagon from each other are the most dissimilar. These similarities and differences among extreme types are useful in interpreting the student's scores. In particular, two aspects of the General Theme scores should be used to advantage: if the two or three highest scores are on the scales of related themes, such as INVESTIGATIVE and ARTISTIC, the pattern is consistent and will be more predictive than a pattern of equally high scores on less related themes, such as INVESTIGATIVE and ENTERPRISING, and a pattern of clearly differentiated highs and lows among the six theme scores is more predictive than a flat or undifferentiated pattern of scores.

The General Themes should be used to help the student identify a general section of the occupational world for more intensive study. The two or three themes where the student has scored highest should be noted, and then (in conjunction with results on the Basic Interest Scales) compared with the occupations listed in the Occupational Scales section that relate strongly to the same themes. Conjunctions of high scores on particular Occupational Scales and on their related General Theme and Basic Interest Scales are particularly worth noting.

The descriptions of the extreme types for the six themes, given on the student's copy of the profile, have been carefully worded to avoid unfavorable connotations or the appearance of valuations. Still, people might occasionally resent these characterizations, particularly in a nonpsychiatric instrument. But what seems to happen is that a person scoring high on a particular theme feels gratified by being thus described and tends to look coolly upon the other, dissimilar types, whereas someone scoring moderately on all six themes reads nothing particularly into any of the descriptions.

The Basic Interest Scales

The Basic Interest Scales are homogeneous scales, they were constructed by clustering together items with high intercorrelations. Because the item content is closely focused on only the single topic indicated by the scale name, the scales are relatively easy to understand. "Like" responses to these items are scored positively, "Dislike" responses negatively, thus the level of scores is somewhat related to the percentage of "Like" and "Dislike" responses given. People who give many "Like" responses, say 50 percent or more, will have many more high scores here than those who give only a few, say 15 percent or fewer. For this reason, the LP and DP indexes, described below under "Administrative Indexes," will be useful in interpreting these scales. (These comments apply also to the General Occupational Themes.)

The Basic Interest Scales have been normed on a general sample of 600 men and women, the combined sample has been assigned a standard-score mean of 50 and standard deviation of 10 on each scale. Norms for the two sexes are indicated by the bars printed on the scales, the shaded bar gives the norm for men, the open bar the norm for women. The thick portion of the bar defines the middle half of the sample, from the 25th to the 75th percentile, the thin, extending lines run from the 10th to the 90th percentile, and the vertical line indicates the mean.

The Basic Interest Scales have been arranged in clusters corresponding to their relationships to the General Occupational Themes. Usually there is a marked consistency in the patterns of scores on the two scale types. For example, a person who scores high on the REALISTIC theme will have at least some high scores in the corresponding cluster of Basic Interest Scales.

Workers in occupations directly related to a given scale score 8—10 points higher on that scale than the general sample does, that is, salesmen average about 60 on the SALES scale, scientists about 60 on the SCIENCE scale, artists about 60 on the ART scale, and so forth. Thus, scores over 60 should be considered high, on those

scales showing substantial sex differences, scores 10 points above the relevant sex mean are high

Scores on the Basic Interest Scales do not change much with age, though there is a tendency for scores to creep upward slightly, perhaps 3 or 4 points on the average between the teenage years and adulthood. One major exception to this pattern of stability is the ADVENTURE scale, on which teenage boys score about 8–10 points higher than adults. Scores on ATHLETICS and MILITARY ACTIVITIES tend to decrease slightly with age.

The Occupational Scales

Each Occupational Scale was developed by testing 200–300 happily employed men or women (depending on the scale) in that occupation, then isolating the items that they answered differently from the general sample, these items then became the scale for that sex working in that occupation. The scales have been normed by setting the mean of the occupational sample equal to 50, the standard deviation to 10. Thus, a student scoring 50 on a given scale has responded to these characteristic items in the same way the average member of that occupation does. A student scoring in the "average" range—between 26 and 44—has responded to these items the way people in general do. Since scores in this range are of little value in profiling the student's interests, they are not discriminated in the profile plotting (the screened area accommodates two asterisk positions—one for scores from 26 to 35, the other for scores from 36 to 44).

Each of the occupations has been given a code type corresponding to its high General Theme scores, the code types are indicated on the profile and have been used to order the scales. Students should be encouraged to note that the code types of the Occupational Scales where they have high scores usually correspond to their high scores on the General Themes.

The Occupational Scales are more complex than either of the other two types of scales they include more items, they include items with a wider variety of content, and they score some "Dislike" responses positively (for example, if the members of an occupation dislike an activity substantially more than the general population does, the "Dislike" response to that activity will be weighted positively). Thus, a person can score high on an Occupational Scale by sharing patterns of aversions with the members of that occupation, as well as by sharing their "Likes."

The Occupational Scales should not be seen as precise predictors of occupations where the student will be happy, but only as suggestions. High scores should also be used as leads to related occupations that are not on the profile. And the student should be especially cautioned to infer not that "I scored high on the Farmer scale, therefore I'd be a good farmer," but rather that "I have answered the inventory in much the way farmers do."

Following each Occupational Scale is an "f" or "m" indicating the sex of the sample used to establish the scale. Although same-sex scales are more valid for the individual than other-sex scales, everyone is scored on all scales, to ensure that maximum information is made available to everyone. But only the scores for the same-sex scales, which merit more attention, are plotted visually.

The Administrative Indexes

These indexes are checks to make certain that the answer sheet was completed and processed correctly. The first one, TOTAL RESPONSES, shows how many answer marks the computer has read from the answer sheet, since there are 325 items, the score on this index should be 325 or close to it. Up to 20 items can be omitted without significantly affecting the results.

The second index, INFREQUENT RESPONSES, shows the number of rare responses given. It is weighted so that almost everyone scores zero or higher here, if the score is below zero, the person has marked an uncommonly high number of rare responses (this weighting technique may seem puzzling at first, but it permits the counselor simply to ignore this index, unless it is negative). Usually a negative score indicates some confusion, such as skipping a number on the answer sheet, or random marking.

The remaining indexes show the percentage of "Like" (LP), "Indifferent" (IP), and "Dislike" (DP) responses made to the various sections of the inventory. These percentages can be quite useful in detecting problems—for example, if a section was left blank on the answer sheet the percentages for it will be 0-0-0. The percentages can also be useful in identifying unusual response patterns. Because the General Themes and Basic Interest Scales are scored positively for "Like" responses and negatively for "Dislike" responses, when the percentage of "Like" or "Dislike" responses varies greatly from the usual split of roughly 33-33-33, say to 90-8-2, the level of scores on these scales will be affected. But although these percentages are useful in understanding the student's response style, they should not be interpreted, some people produce extreme percentages, yet

still have a "normal" pattern on the profile. The tolerance of the scoring system for extreme test-taking strategies is considerable. The distributions of these percentages for a general sample of men and women are given in the *Manual*.

The Special Scales

The AOR (ACADEMIC ORIENTATION) scale contains items that discriminate between students who do well in academic settings and those who do not, and as such can be considered an "Occupational Scale" for "college student." Students graduating with a B A from a liberal arts college average about 50, M A s about 55, Ph. D s about 60. Most students gain about 10 points on this scale over their 4 years of college, thus, the scores of freshmen should be judged with that in mind. The item content is heavily oriented toward science and the arts (weighted positively) and business and blue-collar activities (weighted negatively).

On the IE (INTROVERSION-EXTROVERSION) scale, high scores (60 and above) indicate introversion and low scores (40 and below), extroversion. The item content is concerned almost entirely with working with people in social service, educational, entertainment, or business settings.

Scores for males are distributed about the same as scores for females, on both of these scales.

Inconsistencies Between Scales

There are three main types of scores on the profile, and one of the tasks of the counselor will be to straighten out misunderstandings about their differences.

The three types of scores can be better understood by using an analogy to descriptions of physical build. The General Occupational Themes are concerned with global categories, and are similar to such overall descriptions as "She is tall and slender" or "He is small and wiry." The Basic Interest Scales are concerned with specific attributes and are similar to statements such as "She weighs 118 pounds" or "He has a reach of 38 inches." The Occupational Scales are concerned with how the person resembles other types of people, and are analogous to statements such as "She has the build of a swimmer" or "He looks like a jockey." Thus, although the three types of scales report three types of scores, a general thread of consistency runs through all of them.

One kind of confusion arises when the score on a specific Basic Interest Scale—such as ART or AGRICULTURE—is high and the score on the related Occupational Scale—ARTIST or FARMER—is low. This happens because the Occupational Scales are more complex in content than the Basic Interest Scales, they contain *all* of the substantial differences between the people in those occupations and people in general. The FARMER scale, for example, contains items involving mechanical activities as well as agriculture, and also items involving rejection of social service, artistic, and leadership pursuits. To score high, one must resemble farmers in many of these areas, and not simply share their agricultural interests.

Inconsistencies like this can be useful in counseling. A student who questions an apparent inconsistency between a high score on the AGRICULTURE Basic Scale and a low score on the FARMER scale is usually receptive to a discussion of the "environment" of an occupation, that is, that to be satisfied with farming as a career involves more than simply liking agriculture. Farming involves a way of life, working with machines and animals and not so much with people, it is physically demanding, and for many "intellectual types" it has little appeal. Other inconsistencies—between, say, ART and ARTIST, MATHEMATICS and MATHEMATICIAN, or MILITARY ACTIVITIES and ARMY OFFICER—can lead to equally fruitful discussions.

Further Information

The SVIB-SCII *Manual* contains more detailed information on this inventory and its background, and should be studied before the inventory is administered. Considerably more background information on the history and technical issues of interest measurement is reported in the *Handbook for the SVIB* (D P Campbell, Stanford University Press, 1971). Although the earlier Strong Vocational Interest Blank and its *Manual* (Stanford, 1966, *Supplement*, 1969) are still available from the publisher for special purposes (and although some scoring agencies will continue to score the SVIB), for the purpose of the SCII the SVIB *Manual* is completely superseded.

Strong-Campbell Interest Inventory of the Strong Vocational Interest Blank, Form T325 Copyright © 1933 (renewed 1961), 1938 (renewed 1965), 1945 (renewed 1973), 1946 (renewed 1974), 1959, 1964, 1965, 1966, 1968, 1969, 1972, 1974, 1974* by The Board of Trustees of The Leland Stanford Junior University. All rights reserved. Printed under license from Stanford University Press, Stanford, California 94305.

fairly well predicted on the basis of scores on the six General Occupational Theme scales of the SCII. In all, there were 230 correct classifications out of a possible 360.

At this point in the discussion, it should be noted that the classification matrices presented for the various analyses, including the four-group discrimination, are based upon predicting group membership for the same sample on which the discriminant equations were derived. Consequently, there has undoubtedly been some capitalization on error and the frequencies in the diagonal cells are higher than would normally be obtained if predictions were made for an independent sample.

Possibly the most potentially stimulating prospect for discussion would be the question of why Female Arts and Male Science groups were so well defined and easily discriminated on the basis of the six scales, while Female Science and Male Arts students were not. The findings seem to suggest that Holland's concepts of "consistency" and "differentiation", mentioned in chapter 1, may well contribute to these differences between group predictability. A survey of Table 23 will reveal that not only

APPENDIX 4

RAW SCORES ON SIX PERSONALITY VARIABLES
USED IN DISCRIMINANT ANALYSES

- N. B. (a) Raw data consists of subjects' number (i.e., F208), sex and faculty (i.e., Male Arts are 1-1; Female Arts are 2-1; Male Science are 1-2; Female Science are 2-2, and General Occupational Themes.
- (b) The General Occupational Themes scores are the first six starting to the right of the sex and faculty identification on the printout. They represent Realistic, Investigative, Artistic, Social, Enterprising, and Conventional, respectively.

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SUBJECT SRX FACULTY R I A S E C

0208SC21	M208	1	1	-5	11	-15	-10	-14	-9	-1	-1	-4	-5	1	13	4	7	4	-12	-11	-11	-5	-5
0310SC21	M310	1	1	-3	-10	-3	5	17	3	-2	-4	1	0	-7	-12	-8	-6	-5	-3	-5	-1	-1	5
0311SC21	M311	1	1	1	5	14	8	3	-9	4	6	7	-1	-10	-6	-2	0	-6	5	7	11	6	6
0312SC21	M312	1	1	-5	-9	-7	-12	-6	-11	1	2	3	-1	-16	-11	-9	-7	-9	-4	-8	-4	-6	-3
0313SC21	M313	1	1	9	9	14	-2	2	-7	3	6	9	-3	1	8	3	2	-1	9	8	7	1	-1
0314SC21	M314	1	1	-11	-9	4	7	-10	-8	1	3	-4	-5	-19	-14	-8	-5	-3	2	-7	9	5	2
0315SC21	M315	1	1	-3	17	17	-3	-6	-7	3	6	5	-5	-4	7	2	4	-3	8	9	8	-1	1
0316SC21	M316	1	1	13	17	1	13	1	9	2	9	-2	5	18	11	6	8	2	-2	-1	4	7	8
0317SC21	M317	1	1	5	19	10	3	1	-2	4	10	4	1	5	12	5	8	-3	3	-1	6	0	3
0318SC21	M318	1	1	4	11	3	2	-5	0	4	10	-1	0	0	10	4	5	5	1	2	-10	4	1
0319SC21	M319	1	1	-10	-9	-2	2	-9	-8	1	-4	1	-3	-13	-7	-2	-1	-5	-6	-11	3	-1	-6
0320SC21	M320	1	1	11	6	-2	16	13	3	3	2	6	3	12	2	-1	4	3	-4	1	-1	7	11
0321SC21	M321	1	1	9	14	12	6	-4	1	2	3	9	-2	7	10	6	-1	0	7	1	3	3	4
0322SC21	M322	1	1	7	14	4	-1	-11	-7	3	5	3	-1	14	15	0	7	6	-4	7	0	1	-3
0323SC21	M323	1	1	-7	-2	9	13	6	-7	-6	-6	3	-3	-4	-5	-2	-3	-8	10	2	11	5	8
0324SC21	M324	1	1	-13	-9	5	-6	-9	-7	-2	-1	-6	-1	-7	-4	-7	-4	-7	7	1	-1	-7	-2
0325SC21	M325	1	1	-8	-3	-5	2	-13	-13	-1	1	0	-1	-12	-3	-4	5	-3	-5	-7	0	4	-1
0326SC21	M326	1	1	-7	11	13	-1	-4	-3	1	8	4	-1	-12	6	2	5	-3	8	11	6	-1	-1
0327SC21	M327	1	1	12	3	17	15	7	3	4	4	6	4	8	-3	-6	4	5	8	9	12	2	8
0328SC21	M328	1	1	6	12	6	12	-5	4	0	1	-1	-1	16	14	5	0	0	4	-4	10	5	4
0329SC21	M329	1	1	2	-5	-1	-1	4	5	2	2	6	1	-8	-5	-5	-4	-7	0	-3	1	-7	4
0330SC21	M330	1	1	0	-4	15	-6	-11	-10	1	3	7	-4	-2	-4	-2	-4	-5	5	8	7	5	-5
0331SC21	M331	1	1	4	3	1	7	11	-4	4	3	9	0	-1	-4	-4	4	-1	2	-1	-3	1	5
0332SC21	M332	1	1	8	4	3	10	13	6	5	2	10	-3	-5	-1	7	0	0	-3	-2	4	0	8
0333SC21	M333	1	1	-8	6	-11	5	-11	-11	2	1	6	-1	-15	5	-6	5	-2	-5	-14	-5	4	-4
0334SC21	M334	1	1	-7	-4	9	-9	-10	0	-3	-3	-9	-4	-1	-6	4	-7	-4	2	7	2	-5	-5
0335SC21	M335	1	1	-5	8	-13	4	-5	-8	-3	1	4	4	-4	9	4	4	-1	-10	-12	-7	5	0
0336SC21	M336	1	1	-12	-4	6	6	-17	-16	1	-5	3	-5	-22	-7	-9	-3	-6	5	-5	8	7	-1
0337SC21	M337	1	1	11	19	15	17	10	14	1	9	-3	0	8	15	7	8	6	8	10	7	9	11
0338SC21	M338	1	1	1	-6	-5	2	-10	-10	1	-4	6	5	-8	-7	-9	-2	-3	-2	-4	-5	5	2
0339SC21	M339	1	1	2	10	16	-10	-7	-10	1	7	8	-1	-4	6	2	1	-5	10	9	9	-1	-4
0340SC21	M340	-1	1	1	5	0	9	-3	-3	6	3	5	-5	-2	-3	-3	4	-1	-6	-2	0	6	3
0341SC21	M341	1	1	2	3	4	7	-10	-10	5	10	1	-5	0	1	-3	7	0	-3	-3	4	5	5
0342SC21	M342	1	1	-10	-7	14	-9	-15	-16	-1	-3	-1	-4	-8	-9	-4	-7	-7	6	9	6	-1	-7
0343SC21	M343	1	1	0	-4	17	3	-5	-1	-1	3	-4	-2	11	-7	-6	-6	-6	12	10	12	8	1
0344SC21	M344	-1	1	-5	9	12	-7	-2	-4	-3	-3	7	-3	-2	3	1	2	-6	4	0	9	-5	-6
0345SC21	M345	1	1	9	8	11	3	-4	-1	2	2	8	5	9	-2	7	-3	-6	5	-6	10	7	0
0346SC21	M346	1	1	2	14	1	14	3	8	4	8	0	2	-5	9	6	6	4	-4	-3	2	7	5
0347SC21	M347	1	1	-9	3	1	-10	0	-3	0	0	3	-5	-10	-4	4	-2	-6	-3	-6	5	-5	-4
0348SC21	M348	1	1	11	11	16	5	0	-5	4	10	4	-5	12	7	-2	2	-1	4	12	13	3	4
0349SC21	M349	1	1	6	18	2	9	3	9	-2	0	5	-4	18	13	9	6	7	-2	-8	8	7	4
0350SC21	M350	1	1	-13	-2	10	13	-2	-1	-5	-2	-1	-1	-17	-6	-7	-5	-4	5	0	12	7	6
0351SC21	M351	1	1	3	-4	13	1	-2	-6	-1	-3	5	-4	15	5	-9	-6	-3	3	8	6	0	0
0352SC21	M352	1	-1	-3	-7	5	3	-1	-8	1	0	8	2	-9	-3	-6	1	0	8	0	2	-1	-6
0353SC21	M353	1	1	-4	-5	18	-7	-10	-10	-2	-1	5	-5	-10	-6	-6	-3	-5	8	11	7	-2	0
0354SC21	M354	1	1	5	15	6	-1	-13	-3	-1	2	5	4	8	15	5	-1	-4	-3	4	0	3	-1
0355SC21	M355	1	1	-9	-4	-5	2	-11	-4	-1	-7	1	-4	-16	-9	-6	-3	-6	-1	-8	-1	5	1
0356SC21	M356	1	1	-5	-5	0	5	-5	-9	-5	-3	6	1	-14	-7	-8	-5	-4	-7	-2	7	2	6
0357SC21	M357	1	1	-14	-15	-8	7	1	-3	0	-3	-1	-4	-18	-15	-6	-7	-5	-7	-8	-2	1	0
0358SC21	M358	1	1	-2	2	8	6	-14	-13	1	3	5	1	-13	-2	-7	0	-3	8	-2	10	6	5
0359SC21	M359	1	1	-1	4	7	7	-2	-11	5	9	8	5	-15	4	-9	-1	-7	4	-2	4	2	7
0360SC21	M360	141		0	-13	6	2	-3	-4	4	5	1	-3	-1	10	5	5	-3	5	3	1	1	6
0361SC21	M361	1	1	-11	1	16	7	4	-1	-2	-2	2	-3	-21	-8	-4	1	1	10	8	12	6	1

END #.

DATA (6) (20X,6F3.0)

0209SC21	F209	2	1	-7	-3	15	-3	-14	-14	1	8	3	-4	-16	-2	-4	0	-6	12	13	4	0	-2
0210SC21	F210	2	1	-12	6	19	9	-12	-10	-5	2	4	-4	-15	3	-7	3	1	12	13	13	6	7
0211SC21	F211	2	1	-12	-9	-1	5	-6	-10	1	4	-1	-4	-19	-15	-8	-6	-5	-5	-3	-2	0	5
0212SC21	F212	2	1	-11	2	4	12	-7	-8	1	6	9	-3	-19	-4	-5	-4	2	0	2	1	6	11

0214SC21	F214	2	1	-12	-12	-6	-12	-17	-16	5	9	-2	-4	-24	-8	-8	-2	-2	-1	-10	12	-4	-7
0215SC21	F215	2	1	-2	-11	1	-12	-19	-16	-6	-7	-10	-5	-24	-9	-9	-3	-7	2	9	0	5	-8
0216SC21	F216	2	1	-15	9	14	10	-17	-11	0	8	-1	-5	-21	2	-4	7	9	0	9	11	7	9
0217SC21	F217	2	1	-3	-4	-4	3	-5	-6	6	9	1	-1	-18	-8	-7	1	.	-1	-7	2	7	6
0218SC21	F218	2	1	-14	13	11	5	-7	-5	-6	1	-4	-5	-15	7	2	8	3	3	10	11	6	4
0219SC21	F219	2	1	-17	7	-9	3	-18	-14	-3	5	-3	0	-21	7	2	4	3	-7	-3	-11	1	3
0220SC21	F220	2	1	-15	3	8	7	-7		-1	4	-8	-3	-22		-6	-1	4	1	7	8	6	9
0221SC21	F221	2	1	0	15	5	10	4	3	-2	6	-1	-4		10	4	8	9	4	4	2	8	6
0222SC21	F222	2	1	-18	-12	-8	-4	-7	-7	-3	-3	1	-3	-23	-11	-3	-7	-4	-2	-5	-10	-2	-2
0223SC21	F223	2	1	2	8	3	1	-1	-4	2	2	4	2	-5	2	-7	4	0	1	-8	9	8	4
0224SC21	F224	2	1	-10	1	15	9	-13	-12	-1	7	-2	-4	-22	1	-9		12	11	3	7	6	6
0225SC21	F225	2	1	-14	-8	3	2	-7	-2	-2	-4	0	-1	-24	-12	-6	-7	-7	-1	-3	15	3	3
0226SC21	F226	2	1	-8	-3	0	1	-8	-8	0	6	-5	-3	-17	-1	-9	-3	-6	13	14	13	3	5
0227SC21	F227	2	1	-12	-14	1	1	5	-1	-1	1	.	5	-21	-15	-9	-6	-2	6	4		-3	0
0228SC21	F228	2	1	-4	14	14	7	-8	-5		7	-1	-2	-0	11	2	8	-1	3	7	11	6	3
0229SC21	F229	2	1	-7	6	9	3	-4	-12	1	7	4	-5	-11	2	-1	5	2	5	5		-3	
0230SC21	F230	2	1	-1	7	10	1	-2		0	2	8	1	-4	0	3	3	0	8	4	8	7	5
0231SC21	F231	2	1	6	2	11	3	-12	0	5	1	-1	-5	7	4	-6	5	8	1	7	-2	-3	4
0232SC21	F232	2	1	-6	8	16	3	-16	-3	1	3	-4	-7	7	7	6	2	9	9	3	-1	2	2
0233SC21	F233	2	1	-4	10	4	3	-15	-5	2	7	-5	-4	-6	6	0	6	1	0	4	-8	6	-4
0234SC21	F234	2	1	-5	-4	1	-5	-17	-14	4	8	6	-3	-19	-11	-7	1	1	-5	-4	-6	2	-4
0235SC21	F235	2	1	7	13	8	10	-1	-11	5	1	2	2	7	10	-1	7	2	5	2	6	6	3
0236SC21	F236	2	1	-5	19	3	6	-9	-6	2	9	2	-4	-8	5	3	3	2	5	6	-4	5	5
0237SC21	F237	2	1	-12	-2	13	-4	-14	-11	-1	1	3	-5	-17	-6	-9	-3	-2	5	12	4	-1	4
0238SC21	F238	2	1	-3	-3	12	4	-15	-12	-4	4	8	-4	-15	-3	-2	-2	9	9	7	7	6	6
0239SC21	F239	2	1	-12	2	14	1	-13	-13	-2	3	0	-4	-18	-4	-5	2	0	6	10	13	6	7
0240SC21	F240	2	1	-3	3	11	14	2	4	-2	-5	-6	0	-11	-3	-2	-3	-6	9	1	14	9	9
0241SC21	F241	2	1	-8	-4	17	-5	-17	-15	4	1	-6	-4	-13	-4	-9	0	0	10	13	2	1	-5
0242SC21	F242	2	1	-9	2	9	11	-5	-4	1	2	-2	-5	-17	-4	-8	1	3	3	7	-1	8	11
0243SC21	F243	2	1	-7	2	15	13	-2	2	2	7	-4	-5	-12	-9	3	-2	-4	5	12	11	8	11
0244SC21	F244	2	1	5	12	20	16	-5	-4	4	9	1	-1	4	6	-1	7	3	11	13	13	8	9
0245SC21	F245	2	1	-15	-9	14	8	0	-5	-2	3	-8	-1	-24	-9	-3	-4	-3	10	9	12	7	7
0246SC21	F246	2	1	-9	2	9	10	-14	-11	0	5	-2	-4	-11	3	-3	-2	-5	8	3	11	4	9
0247SC21	F247	2	1	2	-2	13	-14	-1	-15	3	7	1	-5	-7	-6	-9	-1	-4	6	8	3	-5	-6
0248SC21	F248	2	1	1	10	17	7	-7	-4	4	11	10	-4	-7	3	3	8	8	9	12	7	5	8
0249SC21	F249	2	1	-19	-18	-8	-5	-13	-7	-4	-2	-6	-4	-20	-11	-9	-6	-2	-3	0	-9	0	0
0250SC21	F250	2	1	-12	0	-2	11	-13	8	-6	.	-2	-4	-5	5	-3	6	4	6	4	-7	8	5
0251SC21	F251	2	1	-9	5	17	8	-4	0	-4	4	-1	-5	-2	6	-1	-2	-4	12	11	12	6	1
0252SC21	F252	2	1	9	7	14	4	-4	-7	4	9	8	13	4	-4	1	-1	6	7	10	1	3	3
0253SC21	F253	2	1	-12	2	9	6	-14	-11	3	9	-8	-1	-17	1	-4	0	-2	5	5	0	6	2
0254SC21	F254	2	1	-2	13	14	5	-8	-11	2	8	4	-4	-11	5	1	5	-4	8	9	12	2	5
0255SC21	F255	2	1	-10	10	-7	16	-12	9	-4	4	0	3	-20	3	6	5	4	-9	-7	1	7	9
0256SC21	F256	2	1	-9	1	8	4	-12	-13	2	-2	0	-5	-21	-7	-2	-2	-7	3	5	6	6	1
0257SC21	F257	2	1	-4	-4	6	3	-6	-6	2	3	4	-3	-9	-10	2	-4	-5	9	1	4	4	1
0258SC21	F258	2	1	2	1	17	13	1	-9	2	8	4	-4	-3	-4	-4	-2	-5	10	13	7	7	7
0259SC21	F259	2	1	-9	-1	8	5	-8	-14	5	5	-3	-5	-18	-7	-8	0	-1	3	9	3	6	6
0260SC21	F260	2	1	-2	-4	12	5	-3	-9	4	4	-3	-4	-7	-9	-8	-1	-4	12	1	5	6	6
0261SC21	F261	2	1	-13	-4	4	-3	-8	-6	2	2	-7	-5	-22	-12	1	-1	-1	-2	3	1	4	-2
0262SC21	F262	2	1	-3	12	17	19	-6	-5	1	9	4	4	-17	4	1	5	4	7	7	12	8	10
0263SC21	F263	2	1	-19	-9	-9	-4	-15	-9	-3	-3	-5	-4	-21	-2	-8	4	-1	1	-4	-12	-3	-1
0264SC21	F264	2	1	-2	11	9	13	5	3	0	2	3	-2	-12	3	3	4	1	5	1	11	3	8
0265SC21	F265	2	1	-11	1	17	-5	-5	-13	-6	0	3	-5	-17	-2	-7	1	-7	8	11	12	-2	0
0266SC21	F266	2	1	-7	-2	7	-3	-7	0	0	6	-6	-5	-14	-2		0	3	4	6	-5	6	-1
0267SC21	F267	2	1	-5	-2	13	6	-9	-12	4	11		-4	-16	-7	-7	3	9	7	8	2	3	3
0268SC21	F268	2	1	5	3	11	7	-17	-10	1	4	6	4	1	-1	-4	-4	-3	6	6	0	7	5
0269SC21	F269	2	1	-1	10	7			5	-2	-1	1	0	0	-2	0	0	0	2	13	-2	8	4
0270SC21	F270	2	1	-3	17	-8	3		8	-3	3	2	-5	-6	11	7	6	0	-4	-9	-13	7	1
0271SC21	F271	2	1	-5	1	2	9	0	-4	0	3	1		-9	-2	-4	2	-1	1	-4	11	7	7
0272SC21	F272	2	1	-14	-6	5	7	-11	-3	1	8	-10	-3	-20	-11	-7	-5	-4	2	11	2	3	6

0272SC21	F272	2	1	-8	13	20	1	0	10	1	6	-2	-3	-8	8	8	2	-3	12	13	10	-5	0
0273SC21	F273	2	1	-6	1	7	-6	-13	-5	0	2	-2	-4	-5	5	5	1	-5	5	-1	6	-4	2
0274SC21	F274	2	1	3	5	12	-8	-6	1	-1	3	1	1	6	7	1	1	-3	7	7	6	-4	-6
0275SC21	F275	2	1	5	9	16	10	-11	2	3	9	-2	-5	7	9	1	6	2	7	11	9	9	8
0276SC21	F276	2	1	-18	2	-11	-5	-16	-4	-2	5	-5	-5	-21	5	2	2	0	-4	0	-14	0	-3
0277SC21	F277	2	1	-17	-15	-14	-9	-11	-6	-4	-9	-2	-5	-21	-16	-5	-6	-5	-4	-11	-12	-6	-1
0278SC21	F278	2	1	-8	3	0	-5	-15	-6	2	7	7	4	-11	0	0	3	4	-3	-1	-13	-1	-8
0279SC21	F279	2	1	-16	-2	5	3	-18	-13	-3	2	-4	-3	-22	-3	-9	0	3	7	3	8	8	1
0280SC21	F280	2	1	-1	11	19	11	-5	-15	4	9	8	0	-9	3	-9	4	3	13	14	10	2	7
0281SC21	F281	2	1	-12	-4	7	14	-7	-13	5	9	-2	-5	-23	-10	-9	-2	0	1	3	14	2	11
0282SC21	F282	2	1	-3	5	20	17	-10	-10	4	9	0	-5	-9	6	-3	4	2	11	12	14	8	11
0283SC21	F283	2	1	-13	-8	9	-5	-12	-17	4	6	-6	-5	-15	-13	-8	-4	-5	7	11	0	2	-2
0284SC21	F284	2	1	-6	11	-3	6	-13	-5	-1	2	3	-4	-8	7	2	3	-4	4	-8	0	2	7
0285SC21	F285	2	1	-1	3	16	4	-7	-9	0	9	0	-2	-7	-4	-7	3	1	13	12	5	5	4
0286SC21	F286	2	1	-15	-14	-7	-5	-15	-11	1	0	-10	-5	-16	-11	-8	-7	-8	-11	2	-4	4	-1
0287SC21	F287	2	1	-18	-3	-5	9	-14	-8	-3	-4	-7	-4	-21	-9	-6	0	5	0	-5	-2	8	11
0288SC21	F288	2	1	-5	4	17	14	-11	-15	3	4	8	-3	-9	-2	-5	1	0	12	7	14	8	8
0289SC21	F289	2	1	-18	-12	-7	-15	-15	5	-4	-5	-9	-5	-19	-12	6	-7	-8	-9	-3	-2	-5	-10
0290SC21	F290	2	1	-4	1	6	6	-3	-7	0	9	-4	-5	1	2	-1	1	-1	-1	9	8	3	4
0291SC21	F291	2	1	-12	-10	6	2	-7	-9	-3	6	0	2	-24	-5	-9	-3	-2	3	9	10	1	-2
0292SC21	F292	2	1	-2	4	4	3	-6	-2	-2	7	7	-1	-7	0	-3	3	-1	-2	1	6	3	4
0293SC21	F293	2	1	-11	0	11	5	-17	-8	-1	-1	5	-3	-17	-4	-6	1	4	6	9	4	5	8
0294SC21	F294	2	1	-3	-1	18	13	9	-9	1	4	10	-4	-14	-10	-5	-1	-3	12	11	9	7	9
0295SC21	F295	2	1	-3	-6	12	6	-1	2	-3	0	7	-1	-9	-7	3	-4	-5	7	6	11	5	3
0296SC21	F296	2	1	-19	0	-17	-1	-13	-6	-4	-4	-3	-4	-21	4	3	6	-2	-9	-13	-12	0	-2
0297SC21	F297	2	1	-8	7	-11	-1	-11	-7	-2	1	-2	-5	-5	9	6	8	2	-7	-7	-5	3	-1
0298SC21	F298	2	1	-8	9	18	15	-13	-6	2	10	-6	-4	-14	6	4	1	1	9	13	10	6	10
0299SC21	F299	2	1	9	7	18	13	-8	-8	2	9	0	-3	9	4	-1	6	5	13	10	13	9	9
0300SC21	F300	2	1	-12	-7	14	-4	-10	-13	-1	3	-7	-5	-18	-8	-6	-4	-6	11	10	8	-2	2
0301SC21	F301	2	1	-16	-7	4	-4	-12	-10	-2	-2	-9	-5	-13	-15	-9	-8	-7	0	5	-4	0	-2
0302SC21	F302	2	1	-3	11	6	8	-15	-9	2	7	2	-5	-8	6	4	8	6	2	5	-5	5	7
0303SC21	F303	2	1	-14	-12	-2	-8	-12	-17	-4	-8	4	-5	-18	-9	-9	-7	-8	0	-9	2	-2	-5
0304SC21	F304	2	1	-10	-5	9	-5	-9	-11	3	4	7	-5	-18	-8	-9	-5	-4	4	5	3	-1	1
0305SC21	F305	2	1	-11	4	10	4	-6	-9	-1	3	-4	-4	-11	-3	-3	0	-3	9	12	3	6	2
0306SC21	F306	2	1	-13	-3	2	0	1	8	-5	1	0	-5	-15	-8	0	-2	-4	1	4	6	6	-3
0307SC21	F307	2	1	-2	9	16	10	-3	-12	-1	7	6	1	-5	-1	2	5	-1	7	10	12	2	9
0308SC21	F308	2	1	-8	-2	19	4	-11	-10	1	6	-4	-5	-15	-4	-7	-1	1	8	12	8	4	6
0309SC21	F309	2	1	1	11	14	9	-4	-6	4	10	6	-5	-4	7	2	6	3	11	9	7	0	10

END #.

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0001SC21	F001	2	2	-5	2	13	-8	-16	-16	0	5	-1	-1	-9	-3	-1	2	-1	7	12	5	-6	-6
0002SC21	F002	2	2	-9	11	9	12	-10	-2	5	11	2	-1	-19	5	3	8	6	7	4	8	9	6
0003SC21	F003	2	2	5	19	-2	-12	-14	-3	1	6	6	-4	10	16	7	7	5	-5	0	-6	-1	-10
0004SC21	F004	2	2	-4	11	7	6	-6	-2	3	9	7	-4	-9	7	2	6	5	1	2	11	0	6
0005SC21	F005	2	2	-9	12	-9	1	-1	-5	-4	-4	4	0	-8	12	0	8	7	-4	-9	3	5	-3
0006SC21	F006	2	2	2	8	12	-3	-12	-3	4	9	7	-4	-8	2	3	7	2	4	4	9	-5	-3
0007SC21	F007	2	2	-12	9	-2	-10	-14	-12	-5	-2	1	-5	-15	11	1	6	3	-2	-7	-5	-4	-4
0008SC21	F008	2	2	-5	5	-1	1	-1	-6	4	8	2	-1	-19	-3	1	5	6	0	4	0	2	3
0009SC21	F009	2	2	9	19	4	-8	-14	3	1	9	1	-2	15	17	9	6	1	0	5	2	-2	-4
0010SC21	F010	2	2	-12	12	3	6	-11	-8	0	8	-3	-3	-12	9	0	7	6	1	4	2	2	8
0011SC21	F011	2	2	-17	-2	-14	-7	-16	-9	-1	-6	7	-4	-21	-1	3	2	-3	-6	-13	-11	-3	-2
0012SC21	F012	2	2	-6	6	-5	11	-10	0	0	6	-7	-5	-10	1	-1	8	7	0	-3	-6	4	6
0013SC21	F013	2	2	4	10	-5	1	-11	-12	6	8	4	4	0	7	-3	5	1	-3	-8	-7	-6	3
0014SC21	F014	2	2	11	14	8	-5	-14	-12	5	7	10	-1	-1	9	3	8	-3	-4	4	6	1	-5
0015SC21	F015	2	2	0	7	-17	8	-12	3	1	8	-2	-5	-5	5	4	0	-7	-12	-7	-8	4	7
0016SC21	F016	2	2	7	3	8	12	-6	-4	4	9	6	3	8	1	3	7	3	9	8	-10	1	3
0017SC21	F017	2	2	3	3	-9	-8	-19	-9	6	8	3	-3	-8	7	-1	-1	-5	-10	-3	-13	-8	-4
0018SC21	F018	2	2	-7	3	8	3	-4	6	0	7	-6	-5	-11	2	-1	5	5	6	8	5	6	6
0019SC21	F019	2	2	-6	10	14	6	-11	-9	-1	1	-3	-3	-11	5	1	6	1	8	3	3	5	5

0021SC21	F020	2	2	-4	14	18	-11	-15	-16	2	8	-5	-5	-5	8	-2	5	-4	10	10	12	1	-2
0021SC21	F021	2	2	-18	6	-13	-8	-18	-7	-2	6	-6	-5	-23	9	6	6	1	-12	-6	-9	-4	-9
0022SC21	F022	2	2	7	16	7	8	-12	-8	6	10	6	-1	5	10	3	6	4	0	-6	6	3	2
0023SC21	F023	2	2	-7	8	-2	8	-18	-6	4	7	-1	-5	-12	4	2	7	2	1	-7	-7	6	5
0024SC21	F024	2	2	-7	-2	-18	0	-12	-3	0	0	-5	-4	-6	1	2	7	1	-11	-13	-14	2	-1
0025SC21	F025	2	2	6	13	20	10	1	-8	1	9	9	-5	3	8	-2	6	4	12	14	14	7	9
0026SC21	F026	2	2	-10	7	11	-10	-8	-10	-4	-2	9	-5	-18	2	-4	2	-5	6	7	13	-4	-3
0027SC21	F027	2	2	6	11	4	-1	4	-5	6	9	9	-3	-2	5	1	7	1	2	4	1	5	-2
0028SC21	F028	2	2	-10	8	-6	6	-15	-10	2	7	-4	-3	-12	5	3	6	3	-1	0	-9	5	5
0029SC21	F029	2	2	9	17	5	-3	-8	-5	2	9	9	2	10	16	2	6	4	4	6	-4	1	2
0030SC21	F030	2	2	-15	13	8	-4	-7	2	-6	-1	0	2	-21	11	1	6	5	4	7	11	5	-1
0031SC21	F031	2	2	-15	12	-1	5	-17	0	-3	6	-6	-3	-22	10	5	6	6	7	-2	7	3	4
0032SC21	F032	2	2	-1	18	16	-5	-10	-11	-1	5	9	-2	7	15	2	6	5	9	4	11	0	1
0033SC21	F033	2	2	11	17	18	-9	-13	-9	2	7	6	4	15	12	3	1	-2	9	10	10	-2	-6
0034SC21	F034	2	2	-15	14	-7	0	-15	-13	-5	-1	5	-5	-21	10	1	8	5	-8	-5	-5	0	-2
0035SC21	F035	2	2	1	15	-4	15	-8	11	1	8	-5	3	5	13	7	7	3	0	-6	-11	9	6
0036SC21	F036	2	2	9	11	16	6	-7	-5	4	9	-4	2	5	7	2	8	9	8	9	10	4	2
0037SC21	F037	2	2	-7	4	-5	12	1	-9	0	-1	-3	0	-8	6	1	6	9	2	-5	-4	7	9
0038SC21	F038	2	2	0	15	12	12	-5	1	3	7	8	-3	2	11	3	7	4	9	11	3	5	8
0039SC21	F039	2	2	0	-3	0	-5	2	-3	0	5	8	0	-4	0	1	7	4	6	-6	-6	-9	-3
0040SC21	F040	2	2	9	3	6	8	3	9	3	10	3	-2	2	-7	5	6	5	-2	7	8	5	1
0041SC21	F041	2	2	5	14	0	-12	-15	-8	1	8	8	-5	13	12	5	4	-1	7	-4	6	-3	-8
0042SC21	F042	2	2	3	12	4	-14	-15	-9	-2	9	0	-3	12	11	5	8	4	3	12	-10	-6	-9
0043SC21	F043	2	2	-15	-5	5	1	-8	-7	-3	3	-4	-4	-21	-8	-1	-1	0	5	3	2	1	
0044SC21	F044	2	2	5	9	9	5	-13	-6	4	9	1	-5	4	8	4	5	1	7	11	-6	0	6
0045SC21	F045	2	2	1	8	-6	-8	-13	-6	-1	1	1	-4	2	8	1	6	6	0	-5	-9	4	-9
0046SC21	F046	2	2	-10	8	4	10	-7	-5	-2	1	-1	-2	-9	5	-3	7	8	6	-3	8	5	6
0047SC21	F047	2	2	-14	8	14	-11	-11	-16	-2	4	-2	-5	-19	4	1	2	-6	3	8	9	-4	-2
0048SC21	F048	2	2	11	13	1	7	1	6	1	7	3	0	13	14	9	5	1	2	3	-6	0	2
0049SC21	F049	2	2	-4	5	-7	6	-8	9	-3	-7	2	-4	-9	4	5	2	3	-4	-6	-5	9	0
0050SC21	F050	2	2	2	5	-1	14	-7	-10	5	6	8	-3	-4	2	-4	6	3	-2	-6	-3	4	5
0051SC21	F051	2	2	-4	4	16	6	-12	-15	2	9	-2	-4	-10	4	-9	0	3	6	10	11	5	2
0052SC21	F052	2	2	6	8	1	3	-13	1	-1	-5	1	3	22	10	6	-1	-4	-2	-1	-2	4	-3
0053SC21	F053	2	2	-1	11	14	7	-14	-5	5	11	3	3	-10	8	-1	6	1	9	7	8	-3	10
0054SC21	F054	2	2	10	11	-1	-16	-13	-8	5	11	0	-5	18	15	7	2	-4	-6	4	-4	-3	-10
0055SC21	F055	2	2	2	0	8	-1	-16	-14	4	1	9	-5	0	-8	2	-2	-5	5	2	5	3	2
0056SC21	F056	2	2	3	13	-5	-7	-10	2	3	6	8	2	-2	9	6	2	-1	-6	-8	-5	0	-1
0057SC21	F057	2	2	-2	7	1	7	-7	-3	0	7	2	2	-5	10	-4	3	2	2	-2	-3	0	2

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0058SC21	M058	1	2	-5	11	16	2	-2	4	0	4	0	-3	-10	6	7	5	-2	9	7	13	8	-1
0059SC21	M059	1	2	-8	15	15	-3	-5	-11	-4	4	1	-2	-8	9	3	8	-4	8	8	9	-2	6
0060SC21	M060	1	2	4	14	10	-6	-11	-6	3	8	7	-5	-1	8	3	5	5	-1	8	-5	0	-3
0061SC21	M061	1	2	3	16	-2	0	-10	-3	3	8	7	-2	6	11	4	8	-4	-7	1	-8	1	-3
0062SC21	M062	1	2	-13	8	3	5	-14	-13	-2	5	-4	-4	-16	6	-5	8	0	-4	-3	2	0	6
0063SC21	M063	1	2	6	13	13	13	-4	4	4	9	2	-3	-3	7	-4	8	5	8	6	12	6	8
0064SC21	M064	1	2	3	15	11	-5	-17	-3	2	1	3	-2	8	15	1	6	1	2	-1	12	4	-4
0065SC21	M065	1	2	-13	-3	-9	-6	-18	-12	-2	-1	-3	-3	-17	-4	-1	0	-5	-4	-10	-12	1	-4
0066SC21	M066	1	2	9	16	11	10	8	0	3	3	8	1	10	13	3	8	1	2	-2	8	4	4
0067SC21	M067	1	2	-3	13	13	10	-3	8	2	3	1	-4	-4	10	4	8	1	7	3	8	5	5
0068SC21	M068	1	2	-6	6	-15	2	-8	-10	3	6	9	5	-20	8	-5	3	2	-7	-12	-10	3	-3
0069SC21	M069	1	2	7	17	-1	-8	-7	-2	1	4	1	-1	8	13	3	8	3	4	-2	-6	-9	-3
0070SC21	M070	1	2	-5	10	4	-7	-14	-6	0	1	3	1	-12	8	0	5	-5	0	-4	6	0	-5
0071SC21	M071	1	2	9	10	-4	6	-10	-2	1	6	8	0	8	11	-1	5	-2	-7	-5	-4	7	0
0072SC21	M072	1	2	-4	11	2	-3	1	-7	6	6	8	-5	-8	6	-2	3	-6	0	-4	-4	-6	2
0073SC21	M073	1	2	-14	2	-16	-10	-11	-6	-3	-3	-5	-5	-18	1	2	7	-1	-9	-14	-9	-5	-5
0074SC21	M074	1	2	13	8	-5	9	-4	-7	2	3	10	-4	18	8	-6	5	-2	-7	-8	0	3	3
0075SC21	M075	1	2	9	10	-14	-7	2	1	5	8	2	-3	11	10	2	7	1	-11	-9	-11	-6	-3
0076SC21	M076	1	2	-11	2	6	-8	-3	-5	-1	-4	7	-3	-10	0	4	7	-2	0	-5	4	-2	-3

0077SC21	M077	1	2	5	6	5	-2	-11	-14	2	3	5	1	7	6	2	-5	-1	-4	0	-2	1	-6
0078SC21	M078	1	2	-2	10	5	3	-11	-4	1	2	0	-3	0	12	2	8	4	2	-2	4	-1	5
0079SC21	M079	1	2	-7	13	11	8	-4	-9	-1	4	3	5	-13	8	-6	7	7	0	8	12	7	5
0080SC21	M080	1	2	-3	7	0	-2	6	-4	1	5	4	-4	-8	4	3	6	-4	1	-6	-3	0	-3
0081SC21	M081	1	2	5	8	13	-1	-17	-12	3	8	5	-3	6	9	2	0	-1	11	7	7	7	0
0082SC21	M082	1	2	-13	2	-4	6	-9	-10	-2	-7	8	-5	-16	1	5	7	0	-8	-9	8	5	1
0083SC21	M083	1	2	-14	3	-17	-9	-17	-10	-2	2	-3	0	-21	4	3	4	-4	-12	-11	-13	-5	-5
0084SC21	M084	1	2	-3	-3	-20	-12	-4	0	-4	-8	1	-5	-1	-5	4	2	-4	-13	-14	-13	-9	-8
0085SC21	M085	1	2	7	16	20	4	-2	-5	1	8	5	-4	11	15	5	-1	-5	9	12	12	6	4
0086SC21	M086	1	2	-13	10	-3	-4	0	0	-3	1	-8	-2	-8	11	6	2	-6	-8	1	1	-5	1
0087SC21	M087	1	2	2	19	14	16	1	3	-1	2	6	5	-1	8	7	8	6	9	4	14	5	9
0088SC21	M088	1	2	-8	7	9	8	-5	-11	-5	-10	0	-3	-7	6	3	3	2	2	0	9	7	9
0089SC21	M089	1	2	-2	3	-11	-9	-15	-12	0	-1	0	-5	0	3	-3	2	-1	-10	-6	-12	-7	-4
0090SC21	M090	1	2	17	11	-7	2	-1	-6	6	5	2	-2	24	13	3	-7	-3	-5	-8	-10	0	2
0091SC21	M091	1	2	-5	4	15	-17	-17	-16	-1	8	-2	-5	-13	1	-7	2	-2	3	7	2	-7	-7
0092SC21	M092	1	2	4	18	6	-5	-12	-8	2	5	9	0	5	14	4	8	2	-7	1	3	2	-6
0093SC21	M093	1	2	12	15	8	2	14	11	0	5	5	2	22	4	9	2	-1	3	3	5	4	-1
0094SC21	M094	1	2	12	16	-3	-8	-16	-7	3	4	8	-5	16	14	6	6	3	-6	-9	-10	0	-9
0095SC21	M095	1	2	-2	-5	-4	4	-9	-11	0	-1	8	-1	-5	-5	-1	-3	-4	-5	-7	-7	5	3
0096SC21	M096	1	2	-1	7	-4	-7	-1	3	1	0	7	-4	-4	2	1	3	-2	-4	-8	-1	-5	0
0097SC21	M097	1	2	-4	19	10	-8	-7	1	-1	1	-1	-3	4	15	9	4	-6	4	-1	6	-2	-3
0098SC21	M098	1	2	7	17	-1	-1	-9	-11	3	7	8	3	1	12	-1	7	3	-5	-5	6	-1	0
0099SC21	M099	1	2	-2	16	13	3	-13	-14	1	5	5	1	-8	10	-2	4	0	5	4	6	3	-1
0100SC21	M100	1	2	-5	6	-11	-9	-11	-2	1	-2	3	-4	-5	6	7	6	2	-5	-7	-13	-8	-6
0101SC21	M101	1	2	16	17	3	18	0	7	2	5	8	5	18	13	7	8	4	-2	-1	-2	7	10
0102SC21	M102	1	2	-2	15	0	2	-6	-6	-1	6	5	0	-1	10	-1	7	1	-1	-3	2	0	3
0103SC21	M103	1	2	-17	2	-15	-13	-15	-10	-2	-3	-1	-3	-16	2	2	2	-4	-14	-7	-14	-5	-9
0104SC21	M104	1	2	15	14	9	0	-1	3	4	7	9	1	20	13	-1	6	7	3	4	0	2	1
0105SC21	M105	1	2	-11	11	-5	-2	-16	-10	-5	0	7	-3	-13	8	4	6	1	2	-4	-13	2	-1
0106SC21	M106	1	2	9	6	-17	-1	-13	-9	6	7	4	4	9	3	1	8	-1	-11	-13	-12	0	-3
0107SC21	M107	1	2	2	0	-4	2	-11	-3	5	5	10	5	-12	-1	5	5	-3	-1	-12	4	2	-5
0108SC21	M108	1	2	12	11	-1	-2	-10	-5	5	3	6	2	10	12	1	5	2	-1	-5	-1	-1	2
0109SC21	M109	1	2	1	12	-8	-7	3	3	0	4	0	-5	4	11	4	6	-3	-7	-5	-12	-2	-4
0110SC21	M110	1	2	11	20	15	9	-5	-1	-1	5	8	4	18	17	5	6	2	5	4	13	9	3
0111SC21	M111	1	2	-6	7	-7	-3	-10	-3	1	7	0	-5	-11	7	3	4	-3	-4	-3	-8	3	-2
0112SC21	M112	1	2	7	14	13	2	-13	0	1	2	9	-1	7	12	4	6	1	7	4	5	6	-6
0113SC21	M113	1	2	2	12	-17	-18	-16	-9	1	0	5	-3	4	9	1	4	-4	-13	-14	-12	-6	-9
0114SC21	M114	1	2	7	16	6	5	-3	2	0	1	3	1	9	12	2	4	1	-1	2	-4	0	5
0115SC21	M115	1	2	14	15	17	8	0	10	3	6	0	4	19	13	2	7	6	5	6	7	2	4
0116SC21	M116	1	2	-1	2	6	-9	-16	-12	6	1	4	-5	-1	-1	1	1	-4	-2	-7	9	-3	-4
0117SC21	M117	1	2	0	16	14	9	-5	-9	-1	6	5	-4	-1	14	3	7	8	9	6	1	7	6
0118SC21	M118	1	2	-7	7	15	1	7	-1	-2	-2	5	-3	-11	5	2	5	0	9	9	8	4	1
0119SC21	M119	1	2	-1	16	-7	-3	-9	-7	1	3	2	-5	5	13	5	6	5	-3	-6	-6	-2	1
0120SC21	M120	1	2	-7	14	-12	-6	-6	-10	-2	0	7	-4	-9	9	3	7	0	-10	-10	2	-4	-6
0121SC21	M121	1	2	0	13	-11	1	-12	-7	-1	1	-2	-5	3	12	3	5	0	-10	-13	-1	4	2
0122SC21	M122	1	2	11	11	1	4	-8	-2	5	9	10	5	13	12	-1	8	6	0	-3	-5	1	0
0123SC21	M123	1	2	7	19	8	3	-13	-11	5	6	5	-5	14	15	0	6	-1	-1	1	5	4	2
0124SC21	M124	1	2	5	4	-5	-1	-11	-2	3	7	-1	1	19	8	3	1	0	-2	-6	-8	-4	-2
0125SC21	M125	1	2	-16	4	-11	4	-1	5	-4	-6	4	-5	-19	4	-1	6	0	-4	-11	-3	3	5
0126SC21	M126	1	2	-6	9	9	-8	5	-7	-4	0	4	-5	-5	5	5	-7	-8	0	0	8	-6	-1
0127SC21	M127	1	2	-10	16	1	0	-11	-11	-2	3	5	-5	-12	12	0	7	3	-3	3	-4	1	2
0128SC21	M128	1	2	5	13	15	1	4	-3	5	10	8	-5	3	13	1	8	2	5	9	13	1	1
0129SC21	M129	1	2	-3	17	10	4	-6	-7	0	-4	6	-3	2	14	1	5	2	3	1	-3	-1	9
0130SC21	M130	1	2	7	6	-4	-17	-5	-8	-1	-4	3	4	15	10	-3	5	-3	2	-5	-12	-7	-6
0131SC21	M131	1	2	2	0	-11	-1	-1	2	1	0	1	0	2	0	1	-1	-3	-7	-10	-7	-1	-1
0132SC21	M132	1	2	8	16	6	0	-13	-4	1	5	0	-2	18	14	9	3	-3	10	-5	4	2	-3
0133SC21	M133	1	2	0	12	1	1	-2	3	1	8	-6	-5	3	11	5	6	1	-1	4	-1	3	2
0134SC21	M134	1	2	6	8	-10	-3	-14	6	-3	2	-4	1	17	12	8	-2	-2	-5	-5	-3	2	-2
0135SC21	M135	1	2	6	11	-7	-14	-15	-7	1	1	-1	-4	14	12	7	-5	-4	-8	-6	-8	-1	-9

0137SC21	M136	1	2	3	9	-20	-14	-12	-8	3	-4	7	2	6	9	8	-4	-6	-14	-14	-14	-5	-11	
0138SC21	M137	1	2	8	10	-8	-1	-5	1	2	1	-2	-3	12	8	6	2	1	-3	-3	-8	-6	0	
0139SC21	M138	1	2	-17	-7	-14	-18	-19	-16	-1	-7	-8	-5	-19	-5	3	-8	-9	-9	-7	-13	-5	-9	
0140SC21	M139	1	2	7	4	4	3	0	-6	3	5	1	0	15	3	2	0	0	7	1	-3	1	-1	
0141SC21	M140	1	2	14	18	-12	6	-12	1	2	8	0	2	19	17	8	8	5	-11	-8	-4	7	0	
0142SC21	M141	1	2	-8	12	9	-2	-13	-11	-1	2	3	-5	-9	6	4	-2	-4	7	4	1	3	-3	
0143SC21	M142	1	2	11	16	9	4	-7	-9	1	5	5	-3	17	12	3	5	-2	0	1	9	4	2	
0144SC21	M143	1	2	7	7	-5	0	6	0	2	-4	8	-4	14	2	9	-5	-7	-5	-10	3	4	-4	
0145SC21	M144	1	2	-1	1	-14	-11	-11	-9	0	-3	-1	-3	7	0	4	-3	-7	-7	-8	-13	-3	-8	
0146SC21	M145	1	2	7	12	10	-2	-15	-4	2	6	2	-2	12	10	0	4	-4	-3	8	7	-2	-2	
0147SC21	M146	1	2	-2	11	12	-4	-5	-4	-0	6	6	0	1	11	6	5	2	4	4	4	-4	-3	
0148SC21	M147	1	2	14	6	6	1	6	5	-2	2	8	2	18	0	5	-1	-2	5	2	1	1	1	
0149SC21	M148	1	2	-4	8	-10	9	-6	4	-2	2	-3	0	-4	4	3	5	-2	-9	-6	0	0	4	
0150SC21	M149	1	2	3	-1	-18	-13	-12	0	-1	-6	7	4	9	5	7	-1	-3	-11	-13	-14	-7	-9	
0151SC21	M150	1	2	10	10	-11	-3	-4	-6	3	3	3	-4	19	11	5	4	2	-10	-5	-9	-4	-3	
0152SC21	M151	1	2	13	19	-7	-7	-11	-8	6	3	2	-2	18	14	7	7	-2	-9	-8	0	0	-7	
0153SC21	M152	1	2	10	7	-13	-9	-9	1	1	-4	5	-5	17	13	9	-2	-5	-11	-9	-11	-7	-2	
0154SC21	M153	1	2	13	3	-8	0	4	-1	2	0	8	2	12	3	6	-3	-2	-8	-6	-7	-6	-2	
0155SC21	M154	1	2	8	5	-1	-2	-4	-2	4	6	4	1	10	3	4	1	0	-5	-3	-1	0	-2	
0156SC21	M155	1	2	10	10	-12	-2	-6	-1	1	6	-1	-5	19	13	4	-3	-2	-10	-10	-7	1	-4	
0157SC21	M156	1	2	4	10	-6	4	6	5	-2	0	-1	-1	5	5	6	1	0	-4	-5	-1	3	-2	
0158SC21	M157	1	2	7	5	-3	-2	-2	2	0	-1	3	1	9	8	6	3	-1	0	-1	-3	0	-3	
0159SC21	M158	1	2	0	17	5	3	-4	-3	-1	-3	8	-3	8	11	7	7	-3	6	-2	3	0	2	
0160SC21	M159	1	2	7	13	-3	2	11	5	0	-1	4	5	11	15	7	7	3	-5	-1	4	4	-7	
0161SC21	M160	1	2	-4	6	-10	-16	-17	-7	-4	-4	-7	-5	7	6	5	-3	-8	-12	-10	-5	-4	-9	
0162SC21	M161	1	2	-9	-10	-14	-9	-8	-8	-3	-9	-3	0	-10	-8	0	0	-7	-3	-5	-9	-8	-5	-3
0163SC21	M162	1	2	6	8	-1	-1	2	-2	0	1	6	0	10	6	-1	-5	0	0	0	-6	-2	-3	
0164SC21	M163	1	2	7	3	-13	-6	-9	0	0	2	-1	1	4	7	8	-2	-2	-8	-6	-10	-4	-1	
0165SC21	M164	1	2	-4	5	1	2	-1	6	-2	0	-2	0	-2	-1	5	1	-3	2	-6	0	-2	4	
0166SC21	M165	1	2	-5	7	-12	-1	-5	-4	-2	0	-3	-5	0	9	6	2	2	-6	-5	-9	-2	-2	
0167SC21	M166	1	2	12	0	-3	-1	-3	-7	6	6	10	5	4	5	1	-2	-2	-4	-6	1	-5	5	
0168SC21	M167	1	2	3	4	7	-5	-3	-5	-1	1	6	1	2	0	5	-3	-5	-2	1	1	-7	-2	
0169SC21	M168	1	2	5	10	4	8	10	12	-1	-1	9	-1	6	1	9	-2	1	1	2	1	5	5	
0170SC21	M169	1	2	1	6	-15	-11	-7	-10	2	4	4	-5	-10	-1	2	-1	-7	-8	-10	-13	-5	-7	
0171SC21	M170	1	2	6	12	-7	-3	-5	-3	1	4	1	-4	8	9	7	4	2	-9	-3	-9	-4	-4	
0172SC21	M171	1	2	2	3	-5	5	-7	4	5	4	7	-4	0	-1	7	4	-1	-5	-6	-5	5	0	
0173SC21	M172	1	2	6	-9	-15	3	4	0	2	-2	4	4	1	-3	5	-6	-5	-11	-10	-10	0	-2	
0174SC21	M173	1	2	12	12	1	2	-5	-6	1	0	8	3	12	11	4	2	-2	6	-2	-4	6	-3	
0175SC21	M174	1	2	-6	4	-17	-5	-14	-6	2	4	5	-3	-11	2	4	0	-5	-9	-13	-12	-4	-1	
0176SC21	M175	1	2	12	9	4	-9	-5	-7	-1	4	4	2	19	10	2	-3	-5	3	-2	-3	-7	-5	
0177SC21	M176	1	2	10	15	6	-3	-11	-13	3	5	8	-2	15	16	4	6	-1	-1	-5	2	-1	-3	
0178SC21	M177	1	2	9	13	6	8	4	0	5	10	10	-3	13	8	4	7	0	-5	0	3	5	3	
0179SC21	M178	1	2	2	-9	-7	5	10	9	3	-1	1	-3	1	-7	3	-1	2	-8	-5	-10	-7	2	
0180SC21	M179	1	2	9	5	1	-11	-13	-3	-1	1	2	1	17	2	6	-1	-3	-3	1	-8	-4	-10	
0181SC21	M180	1	2	5	5	-14	-8	-6	-4	5	8	7	-2	1	-2	-1	6	-4	-9	-10	-11	-5	-5	
0182SC21	M181	1	2	2	12	-15	0	-13	0	-3	-3	3	-3	11	7	7	3	-2	-9	-12	-10	6	-6	
0183SC21	M182	1	2	2	2	-14	-9	-7	2	3	-1	-1	-2	0	8	5	7	-2	-5	-11	-13	-5	1	-8
0184SC21	M183	1	2	3	12	-12	5	2	-3	3	-2	-1	-5	10	12	3	4	1	0	-12	-12	4	1	
0185SC21	M184	1	2	2	2	-11	1	2	-1	1	-2	1	-4	-3	-1	6	-3	-6	-9	-10	-6	-1	0	
0186SC21	M185	1	2	8	4	-10	-4	-20	-6	4	-3	-3	-5	20	5	3	-4	-5	-3	-8	-12	-1	-5	
0187SC21	M186	1	2	0	9	-12	-3	-2	2	2	5	-1	-2	-2	11	2	4	-1	-8	-8	-9	3	-5	
0188SC21	M187	1	2	-9	-2	-3	-1	-7	-9	2	3	1	-4	-19	2	3	4	-4	0	-8	-4	-4	-2	
0189SC21	M188	1	2	0	9	-2	13	8	6	-2	-4	9	-3	11	5	8	6	0	-3	0	-5	7	5	
0190SC21	M189	1	2	4	8	11	3	1	-1	3	5	3	-4	2	7	-7	6	2	5	5	6	1	3	
0191SC21	M190	1	2	4	6	4	8	-13	-10	5	6	8	3	-5	4	-2	5	-1	-2	0	-5	7	5	
0192SC21	M191	1	2	1	8	-8	-2	-19	-11	2	2	-2	-4	10	11	4	-2	-2	-8	-7	-10	1	1	
0193SC21	M192	1	2	5	4	-12	-6	-7	-3	3	6	8	-1	1	4	4	2	1	-13	-9	-8	-3	-7	
0194SC21	M193	1	2	-2	8	-13	-14	-12	-7	-2	-5	1	-5	6	8	-3	-3	-6	-10	-12	-10	-2	-9	
0194SC21	M194	1	2	13	14	15	6	4	11	1	8	4	3	15	5	9	7	-1	11	8	6	7	-2	

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0195SC21	M195	1	2	7	-3	-12	-6	-7	-1	-3	-2	2	-4	15	-1	2	0	-3	-9	-10	-10	1	-5
0196SC21	M196	1	2	0	8	0	4	-5	5	-1	-3	1	3	-9	2	8	6	-4	4	-9	-1	5	-4
0197SC21	M197	1	2	14	18	3	11	-3	7	-2	8	6	4	18	16	3	8	6	1	-2	-1	7	4
0198SC21	M198	1	2	4	9	-10	-3	-11	-6	-3	4	3	-2	7	8	3	6	0	-3	-5	-12	-4	1
0199SC21	M199	1	2	-8	-8	-14	-10	-16	-10	-2	-5	-6	-5	-10	-5	-2	-6	-5	-11	-8	-9	-5	-6
0200SC21	M200	1	2	9	12	5	-2	5	8	-2	-6	5	1	7	7	6	3	-2	-5	-5	7	2	-5
0201SC21	M201	1	2	-1	6	-17	-17	-10	-8	2	2	1	-4	2	8	5	-6	-6	-11	-13	-14	-6	-11
0202SC21	M202	1	2	6	13	13	12	3	-2	-2	1	0	1	7	8	4	3	1	0	7	8	5	6
0203SC21	M203	1	2	-8	-9	-12	-15	-13	-19	-2	-4	-1	-4	-15	-12	-7	-7	-9	-2	-9	-14	-4	-7
0204SC21	M204	1	2	1	10	-6	-12	-9	-9	4	1	0	-4	4	12	3	2	-1	-9	-3	-10	-7	-8
0205SC21	M205	1	2	1	12	-8	3	-12	-2	1	2	-3	-4	7	11	5	3	-1	-8	-10	-6	7	0
0206SC21	M206	1	2	6	9	-5	7	1	10	4	4	5	1	0	1	6	6	-3	-5	-7	-1	8	-1
0207SC21	M207	1	2	-10	15	-5	-14	-16	-5	-5	-1	-6	-4	-1	14	9	7	-5	-2	-9	-3	1	-11

END #.

APPENDIX 5

WITHIN-GROUPS CORRELATION MATRICES FOR DISCRIMINANT ANALYSES

WITHIN-GROUPS CORRELATION MATRIX FOR DISCRIMINANT ANALYSIS
OF MALES AND FEMALES

	R	I	A	S	E	C
Realistic	1.000					
Investigative	0.498	1.000				
Artistic	0.184	0.222	1.000			
Social	0.194	0.201	0.352	1.000		
Enterprising	0.265	0.049	0.240	0.464	1.000	
Conventional	0.314	0.244	-0.044	0.346	0.542	1.000

WITHIN-GROUPS CORRELATION MATRIX FOR DISCRIMINANT ANALYSIS
OF ARTS AND SCIENCE

	R	I	A	S	E	C
Realistic	1.000					
Investigative	0.445	1.000				
Artistic	0.206	0.358	1.000			
Social	0.226	0.317	0.317	1.000		
Enterprising	0.372	0.124	0.148	0.399	1.000	
Conventional	0.334	0.239	-0.050	0.354	0.574	1.000

WITHIN-GROUPS CORRELATION MATRIX FOR DISCRIMINANT ANALYSIS
OF MALE ARTS AND MALE SCIENCE

	R	I	A	S	E	C
Realistic	1.000					
Investigative	0.432	1.000				
Artistic	0.184	0.412	1.000			
Social	0.302	0.303	0.354	1.000		
Enterprising	0.314	0.114	0.212	0.486	1.000	
Conventional	0.411	0.248	0.087	0.452	0.652	1.000

WITHIN-GROUPS CORRELATION MATRIX FOR DISCRIMINANT ANALYSIS
OF FEMALE ARTS AND FEMALE SCIENCE

	R	I	A	S	E	C
Realistic	1.000					
Investigative	0.468	1.000				
Artistic	0.391	0.310	1.000			
Social	0.219	0.347	0.241	1.000		
Enterprising	0.311	0.107	0.198	0.392	1.000	
Conventional	0.166	0.215	-0.182	0.279	0.421	1.000

WITHIN-GROUPS CORRELATION MATRIX FOR DISCRIMINANT ANALYSIS
OF MALE ARTS AND FEMALE ARTS

	R	I	A	S	E	C
Realistic	1.000					
Investigative	0.579	1.000				
Artistic	0.403	0.277	1.000			
Social	0.384	0.431	0.255	1.000		
Enterprising	0.406	0.172	0.170	0.438	1.000	
Conventional	0.291	0.334	-0.073	0.314	0.533	1.000

WITHIN-GROUPS CORRELATION MATRIX FOR DISCRIMINANT ANALYSIS
OF MALE SCIENCE AND FEMALE SCIENCE

	R	I	A	S	E	C
Realistic	1.000					
Investigative	0.347	1.000				
Artistic	0.189	0.463	1.000			
Social	0.189	0.227	0.337	1.000		
Enterprising	0.250	0.056	0.230	0.450	1.000	
Conventional	0.317	0.138	0.005	0.419	0.580	1.000

WITHIN-GROUPS CORRELATION MATRIX FOR DISCRIMINANT ANALYSIS
 OF MALE ARTS (Am), MALE SCIENCE (Sm), FEMALE SCIENCE (Sf),
 FEMALE ARTS (Af)

	R	I	A	S	E	C
Realistic	1.000					
Investigative	0.447	1.000				
Artistic	0.269	0.369	1.000			
Social	0.265	0.322	0.305	1.000		
Enterprising	0.311	0.111	0.206	0.445	1.000	
Conventional	0.306	0.234	-0.026	0.374	0.560	1.000

APPENDIX 6

CLASSIFICATION FUNCTION COEFFICIENTS USED TO DETERMINE
PROBABLE GROUP MEMBERSHIP

CLASSIFICATION FUNCTION COEFFICIENTS USED TO DETERMINE
PROBABLE GROUP MEMBERSHIP FOR THE MALE-FEMALE
DISCRIMINATION

Personality Scale	Males N=202	Females N=158
Realistic	-0.011	-0.113
Investigative	0.150	0.104
Artistic	-0.024	0.060
Social	0.041	0.129
Enterprising	-0.083	-0.220
Conventional	-0.101	-0.060
Constant	-0.941	-2.042

CLASSIFICATION FUNCTION COEFFICIENTS USED TO DETERMINE
PROBABLE GROUP MEMBERSHIP FOR THE ARTS-SCIENCE
DISCRIMINATION

Personality Scale	Arts N=154	Science N=206
Realistic	-0.134	-0.059
Investigative	0.055	0.242
Artistic	0.071	-0.047
Social	0.051	-0.057
Constant	-0.739	-1.068

Note: Missing scales were not significant enough for
inclusion in the stepwise discriminant analysis.

CLASSIFICATION FUNCTION COEFFICIENTS USED TO DETERMINE
PROBABLE GROUP MEMBERSHIP FOR THE MALE ARTS-MALE
SCIENCE DISCRIMINATION

Personality Scale	Male Arts N=53	Male Science N=149
Investigative	0.034	0.225
Artistic	0.040	-0.073
Social	0.029	-0.062
Constant	-0.208	-1.088

Note: Missing scales were not significant enough for inclusion in the stepwise discriminant analysis.

CLASSIFICATION FUNCTION COEFFICIENTS USED TO DETERMINE
 PROBABLE GROUP MEMBERSHIP FOR THE FEMALE ARTS-FEMALE
 SCIENCE DISCRIMINATION

Personality Scale	Female Arts N=101	Female Science N=57
Realistic	-0.251	-0.155
Investigative	0.072	0.264
Artistic	0.145	0.031
Social	0.056	-0.049
Constant	-1.641	-1.353

Note: Missing scales were not significant enough for inclusion in the stepwise discriminant analysis.

CLASSIFICATION FUNCTION COEFFICIENTS USED TO DETERMINE
PROBABLE GROUP MEMBERSHIP FOR THE MALE ARTS-FEMALE
ARTS DISCRIMINATION

Personality Scale	Male Arts N=53	Female Arts N=101
Realistic	-0.043	-0.214
Artistic	0.069	0.153
Social	0.105	0.199
Enterprising	-0.083	-0.213
Conventional	-0.071	-0.029
Constant	-0.644	-2.773

Note: Missing scales were not significant enough for
inclusion in the stepwise discriminant analysis.

CLASSIFICATION FUNCTION COEFFICIENTS USED TO DETERMINE
 PROBABLE GROUP MEMBERSHIP FOR THE MALE SCIENCE-FEMALE
 SCIENCE DISCRIMINATION

Personality Scale	Male Science N=149	Female Science N=57
Realistic	0.064	0.001
Artistic	-0.011	0.048
Social	0.032	0.102
Enterprising	-0.163	0.274
Constant	-0.555	-1.448

Note: Missing scales were not significant enough for inclusion in the stepwise discriminant analysis.

CLASSIFICATION FUNCTION COEFFICIENTS USED TO DETERMINE
 PROBABLE GROUP MEMBERSHIP FOR THE MALE ARTS-MALE
 SCIENCE-FEMALE SCIENCE-FEMALE ARTS
 DISCRIMINATION

Personality Scale	Am N=53	Sm N=149	Sf N=57	Af N=101
Realistic	-0.041	0.005	-0.072	-0.148
Investigative	0.044	0.217	0.210	0.013
Artistic	0.056	-0.058	0.011	0.113
Social	0.077	-0.017	0.062	0.162
Enterprising	-0.114	-0.137	-0.246	-0.246
Constant	-0.545	-1.438	-2.249	-2.350

Note: Missing scales were not significant enough for inclusion in the stepwise discriminant analysis.

APPENDIX 7

UNSTANDARDIZED DISCRIMINANT FUNCTION COEFFICIENTS USED TO
OBTAIN DISCRIMINANT SCORES FOR SUBJECT PLACEMENT ALONG
AXIS OF THE FUNCTION(s)

UNSTANDARDIZED DISCRIMINANT FUNCTION COEFFICIENTS FOR EACH
OF THE MALE-FEMALE, ARTS-SCIENCE, MALE ARTS-MALE SCIENCE
DISCRIMINATIONS

Personality Scale	Comparisons		
	M-F	A-S	Am-Sm
Realistic	-0.039	0.026	-
Investigative	-0.018	0.066	0.078
Artistic	0.032	-0.041	-0.046
Social	0.034	-0.038	-0.037
Enterprising	-0.052	-	-
Conventional	0.015	-	-
Constant	-0.376	-0.193	-0.575

Note: Missing scales were not significant enough for
inclusion in the stepwise discriminant analysis.

UNSTANDARDIZED DISCRIMINANT FUNCTION COEFFICIENTS FOR EACH
OF THE FEMALE ARTS-FEMALE SCIENCE, MALE ARTS-FEMALE ARTS,
AND MALE SCIENCE-FEMALE SCIENCE DISCRIMINATIONS

Personality Scale	Comparisons		
	Af-Sf	Am-Af	Sm-Sf
Realistic	0.033	-0.059	0.038
Investigative	0.066	-	-
Artistic	-0.039	0.029	-0.035
Social	-0.036	0.032	-0.042
Enterprising	-	-0.045	0.068
Conventional	-	0.014	-
Constant	0.237	-0.834	0.398

Note: Missing scales were not significant enough for
inclusion in the stepwise discriminant analysis.

UNSTANDARDIZED DISCRIMINANT FUNCTION COEFFICIENTS FOR THE
 MALE ARTS-MALE SCIENCE-FEMALE SCIENCE-FEMALE ARTS
 DISCRIMINATION

Personality Scale	Comparison Am-Sm-Sf-Af	
	Function 1	Function 2
Realistic	0.034	-0.029
Investigative	0.050	0.053
Artistic	-0.040	-0.003
Social	-0.041	0.011
Enterprising	0.022	-0.070
Conventional	-	-
Constant	0.062	-0.849

Note: Missing scales were not significant enough for inclusion in the stepwise discriminant analysis.

APPENDIX 8

IDEAL DESCRIPTIONS OF EACH OF HOLLAND'S SIX PERSONALITY TYPES

IDEAL DESCRIPTIONS OF EACH OF HOLLAND'S SIX PERSONALITY TYPES

The extreme model of each of Holland's six types can be described in the following ways (SCII Manual, Campbell, 1974, p. 31):

REALISTIC. Persons of this type are robust, rugged, practical, and physically strong; somewhat uncomfortable in social settings; have good motor co-ordination and skills but lack verbal and interpersonal skills; usually perceive themselves as mechanically and athletically inclined; are practical, stable, natural, and persistent; prefer concrete to abstract problems; see themselves as aggressive; have conventional political and economic goals; rarely perform creatively in the arts or sciences, but do like to build things with tools. Realistic types prefer such occupations as mechanic, engineer, electrician, fish and wildlife specialist, crane operator, tool designer, and various technical positions.

INVESTIGATIVE. This category includes those with a strong scientific orientation; they are usually task oriented, introspective, and asocial; prefer to work independently; prefer to think through rather than act out problems; have a great need to understand the physical world; enjoy ambiguous tasks; have unconventional values and attributes; usually perceive themselves as lacking in leadership or persuasive abilities, but are confident in their scholarly and intellectual abilities; describe themselves as analytical, curious, independent, and reserved;

especially dislike repetitive activities. Vocational preferences include astronomer, biologist, chemist, technical writer, and zoologist.

ARTISTIC. Persons of artistic type prefer free, unstructured situations with maximum opportunities for self-expression; resemble investigative types in being introspective and asocial, but differ in having less ego strength and greater need for individual expression, in being more impulsive, and in suffering more frequently from emotional disturbances; they are creative, especially in artistic and musical media, show aversions to problems that are highly structured or require gross physical strength and skills; prefer dealing with problems through self-expression in artistic media; perform well on standard measures of creativity, and highly value aesthetic qualities; see themselves as expressive, disorderly, non-conforming, introspective, and independent. Vocational preferences include artist, author, composer, writer, musician, director, and symphony conductor.

SOCIAL. Persons of this type are social, responsible, humanistic, and religious; like to work in groups, and enjoy being central in the group; have verbal and interpersonal skills; avoid intellectual problem-solving, physical exertion, and highly ordered activities; prefer to solve problems through feelings and interpersonal manipulation of others; enjoy activities that involve informing, training, developing, curing, or enlightening others; perceive themselves as understanding, responsible, idealistic, and helpful. Vocational preferences include

school teacher, marriage counselor, speech therapist, clinical psychologist, and missionary.

ENTERPRISING. Persons of this type have verbal skills suited to selling, dominating, and leading; prefer to be strong leaders; have strong drive to attain organizational goals or economic aims; tend to avoid work situations requiring long periods of intellectual work; differ from conventional types in having greater preference for ambiguous social tasks and an even greater concern for power, status, and leadership; see themselves as aggressive, popular, self-confident, cheerful, and sociable; generally have high energy level; show an aversion to scientific activities. Vocational preferences include business executive, political campaign manager, real-estate sales, stock and bond sales, television producer, and retail merchandising.

CONVENTIONAL. Conventional people prefer well-organized environments and like systematic verbal and numerical activities; are usually conforming and prefer subordinate tasks, but avoid ambiguous situations and problems involving interpersonal relationships or physical skills; describe themselves as conscientious, efficient, obedient, calm, orderly, and practical; identify with power; value material possessions, and status. Vocational preferences include bank examiner, bookkeeper, clerical worker, financial analyst, quality control expert, statistician, and traffic manager.

APPENDIX 9

ABSTRACT OF

DIFFERENTIATION OF UNIVERSITY FRESHMEN IN ARTS
AND SCIENCE ON THE BASIS OF THEIR SCORES ON THE
SIX 'GENERAL OCCUPATIONAL THEMES' OF THE STRONG-
CAMPBELL INTEREST INVENTORY, 1974

ABSTRACT OF

Differentiation of University freshmen in Arts and Science on the basis of their scores on the Six 'General Occupational Themes' of the Strong-Campbell Interest Inventory, 1974*

Personality types of Arts and Science freshmen were compared in terms of their scores on the six General Occupational Theme scales of the SCII, 1974. The manifestation of statistically significant raw score differences on these scales with respect to both Curriculum and Sex constituted the core of this investigation. Discriminant- and classification-function coefficients were established for each of the six scales in seven different discriminant analyses, for use both in discriminating and classifying individuals in terms of group membership. The predictive accuracy of the discriminant-function based classifications was assessed by the percentage of correct identifications.

The Strong-Campbell Interest Inventory, (SCII, Campbell, 1974) was completed by 360 freshmen enrolled in the Arts and Science Curricula at the University of Ottawa.

* Peter E. Meuser, Master of Arts thesis presented to the School of Graduate Studies of the University of Ottawa, Ontario, Canada, November, 1975, x - 160 pages.

Six two-group stepwise discriminant-function analyses were conducted, followed by a stepwise, four-group multiple discriminant-function analysis involving Male Arts, Male Science, Female Science, and Female Arts groups. A probability level of .01 was accepted as the minimum significance standard in all cases.

In each of the seven analyses, significant differences in terms of scores or patterns of scores on the six General Occupational Theme scales of the SCII were found to exist, leading to the rejection of the null condition for each analysis. Significant differences were determined between Arts and Science groups, as well as between Sexes within these Curricula. The most important and comprehensive of the analyses, the four-group discrimination, provided two highly significant Functions, one and two, which accounted for 88 and 12 per cent of the total variation in scores, respectively. Function 1 was delineated as a "scientific" versus "nonscientific" continuum, with Male Science at the scientific pole, and Female Arts at the nonscientific end. The second Function separated Male Arts and Female Science groups along a continuum labelled "commercial" versus "non-commercial, with Male Arts being more towards the commercial pole than their counterparts.

Prediction of group membership on the basis of derived classification function coefficients provided correct classifications of a far larger magnitude than could be expected merely by chance on the basis of prior group size.

These findings were presented and discussed with the ultimate goal of application to counseling settings in mind. Suggestions for further research centered mainly around establishing "missing-links" of data that are deemed necessary before useful application of these findings may be made to counseling purposes.