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A Longitudinal Study of the Effects of Selected Personality and Interest Testing on Curricular Choice and Progress Level of Students

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A LONGITUDINAL STUDY OF THE EFFECTS OF SELECTED PERSONALITY AND INTEREST TESTING ON CURRICULAR CHOICE AND PROGRESS LEVEL OF STUDENTS

by

Rosa Stone

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Rosa Stone

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Rosa Stone, Ed.D.

Western Michigan University, 1978

The purpose of this study was to assess the roles of the Strong-Campbell Interest Inventory and the Myers-Briggs Type Indicator in their relationships to grade point average, length of persistence, and study area selected. Incoming freshmen were routinely tested in a new core curriculum in a residential college (N = 450).

Longitudinal perspective data included academic ability (IQ) as derived from college entrance test scores. Progress level was defined as a combination of grades and rate of program completion. Progress level was crosstabulated with IQ, study area, and a scale composed of interest and personality congruencies. MBTI and SCII results were crosstabulated with the student's area of study. A Regression Analysis on high school and SCII data (dependent variable: college GPA) completed the six statistical computations. A subgroup of test takers, utilized in all statistical computations, was further divided into dropouts and persisters for comparisons within the sample. The Statistical Package for the Social Sciences (SPSS) computer program was utilized.

Findings of this study were: Congruencies of interests and personality, as scaled here, lacked reliable statistical

significance as progress level predictors. College entrance tests and high school rank had predictive value for grades earned. MBTI personality factors related to GPA and program completion rate. Some disciplines had higher progress levels than others. MBTI and SCII tests showed significance as predictors of study areas. Omitted informational data characterized dropouts.

Supportive literature and findings of the study warrant the following conclusions: Matching student personality types to suitable programs increases probabilities for higher achievement and persistence. Student body personality-type profiles are selectively affected by curriculum offerings. Recruitment efficiency can be increased by intentionally seeking student matches of person and program to increase probabilities of retention and higher achievement. More research is needed on combinations of congruencies to increase effectiveness of currently used predictive variables.

CHAPTER I

INTRODUCTION

The purpose of this study was to establish the need to incorporate personality and interest testing into admissions data for college freshmen since these factors relate to the student's selection of an area of study and their consequent progress through a program. The particular tests utilized were the Strong-Campbell Interest Inventory (SCII) and the Myers-Briggs Type Indicator (MBTI) that matriculating freshmen at Goshen College took in 1973 and 1974 as a routine part of a new core curriculum. These test results were added to the cumulative file of student information.

This chapter will delineate the problem basis, the rationale of the study, its significance, the theoretical-operational definitions of the variables that are utilized, and finally, it will point out some major environmental and personal factors that are not school controlled and are not included as further significant variables. In addition, the chapter states the research questions and summarizes the resulting hypotheses. A summary concludes the chapter.

Statement of the Problem

Current validated prediction of success in college is limited

to the prediction of the grade point average (GPA) the student is likely to attain. Prediction is made on the basis of the high school grade point average, rank, and the college entrance tests. Little attention is given to whether the predictors have a relationship to the rate of progress and consequent attrition factors. The student with higher intelligence is presumably capable of undertaking greater levels of academic or intellectual responsibility. Despite presumed capability, progress and attrition data suggest that success and achievement are not assured. Osipow (1973) reviewed the theories of career development and said

> What vocational psychology needs at the present time is a collection of miniature theories, each dealing with circumscribed, explicit segments of vocational behavior, to be woven into a broad theory after the smaller theories have been shaped by empirical findings. A miniature theory describing the decision-making process, a theory explaining job satisfaction, a theory explaining how career development is related to self-concept implementation, could all be developed independently, and when the details are in order, connected by other theoreticians to a larger conception of how the human personality develops and functions.

There is a continuing need for comprehensive, empirically testable theories addressing the relationship between career choice and career success. This study addresses an added variable in the form of a personality theory that has a satisfactory instrument devised for testing an innate predisposition of persons for expending their psychic energies in certain set manners. The personality theory of C. G. Jung forms the basis of the MBTI

personality inventory. Other theorists with other constructs for measuring personality dimensions have been unsuccessful in devising instrumentation for validating the theories and establishing an empirical base. (Ginsberg, Ginsberg, Axelrad, & Herma, 1951; Holland, 1973; Super & Crites, 1962.) This study investigated the usefulness and validity of both the SCII and the MBTI in their relationship to the progress level of the student who is pursuing an undergraduate program. Personality types, interests, and the agreements or congruencies these tests have with the chosen area of study were assessed to determine relationships of compatibilities and progress.

Rationale for the Study

The indicators now used for predicting success in college consist of the achievement (GPA) scores and intelligence test scores such as the scores the Scholastic Aptitude Test (SAT) produce. Additional or even multiple indicators of success ought to facilitate decision-making processes in selecting an area of study.

Colleges urgently need to retain their matriculants. Students frequently need specialized assistance in making career choices. Faculty advisors are repeatedly solicited for help beyond their level of expertise in advising. Finally, budget-conscious institutions need to determine the benefits of their allocation of money for testing programs. Examination and

analysis of the possible roles and functions of the MBTI and SCII test results in these areas are the intent of this study. Career selection and student retention implications are uppermost.

Significance of the Study

Variables impinging on student success and achievement are difficult to isolate and therefore complicate Social Science research. Underlying order and structure in human behavior and motivation are also difficult to assess. Since a sufficiently large sample of students (450) participated in both of the specialized tests that were a part of this study, trends and directions of effects were assessed. Higher education can make use of refinements of current methodologies as well as extensions and/or revisions of the methodologies used for recruiting students. The significance of this study lies in discovering whether the SCII interest and the MBTI personality tests had potential advantages for influencing retention and satisfaction as well as facilitating progress through the undergraduate program.

Combining the rate of course credit accumulation with grade point average creates an interval variable that is essentially different from GPA alone which is commonly used as the measure of achievement. In a four-year undergraduate residence school which has many out of state students that need to complete programs in four years, this combination of rate of credit accumulation and GPA is particularly advantageous. The contributions of personality

testing and the outcomes of comprehensive progress level measures are investigated as focal points in this particular study. Although it is recognized that other variables impact on student success and achievement, they are not a concern of this study. In an extensive literature search, no evidence was found that this procedure of combining GPA with the rate of course credit accumulation had been used by any other institution before the conduct of this study.

Theoretical-Operational Definitions

Identification and definition of terms as used in this study follows:

Intelligence Quotient (IQ). IQ is the measured potential of the student's ability to achieve in school. The score is derived through testing. College entrance testing scores or developmental tests are converted to percentile scores that approximate the intelligence quotient. Although the IQ is referred to as an overall measure of ability, the SAT recognizes specific aptitudes within this overall measure which are differentiated as verbal and math scores. Another common college entrance test is the American College Test (ACT), which has further divisions beyond the verbal and math abilities including such areas as social studies and science. Test scores will be referred to as measures of IQ in this study since they are measures of academic potential.

Grade Point Average (GPA). GPA is an achievement record derived by translating alphabetical grades into numbers for each course completed. In this study, as in many institutions, the four-point scale is used where an A is 4, a B is 3, and a C is 2. An average of the grades for the courses completed constitutes the GPA. The high school GPA is used widely as one of the determinants for college entrance. College GPA is used throughout this study as a basic component of the student's progress level. In specific sections of this study, GPA alone will be used as a measure of the progress level.

Interests. Interests, as measured by the SCII instrument, consist of a selective preference of one concept or activity over another. More broadly, interests imply a willingness to give attention and energy in the form of a sustained focus over a period of time. Interests include a repeated and voluntary return to the focus. The definition of interests used in the study includes the expressed initial interest and the area of study the student selected.

Personality type. Personality type refers to a recognizable innate predisposition toward expending psychic energy in certain set manners. In this study it is presumed to be this basic orientation, measured by the Myers-Briggs instrument, that has unique characteristics of eight measurable qualities that form 16 combinations of types. A cognitive style emerges from these

combinations in the form of delineated perceptual and affective dimensions that constitute a particular type. As used here, it applies only to the normal dimensions of any population. Appendix D has further details.

Curricular choice. This refers to the selection of an area of study which contains a commitment to a specific core of courses and leads to a degree named accordingly on the diploma. Interchangeable terms found in the literature and used throughout the study are major, academic area, area of study, and curriculum.

Progress level. Progress level here is a term used as an enlargement of "success level." Although GPA alone will be used at times for computational purposes as interval data, a combination of GPA with the number of credit hours accumulated will be used as a more comprehensive ordinal measure of the student's progress toward program completion. A student proceeding at a normal rate will accumulate approximately 30 credit hours in a year of study. The specialized use of progress level in this study combines the GPA with the rate of program completion. This forms a more comprehensive measure based on a norm of approximately 30 credit hours a year.

Limitations of the Study

Social and personal environmental factors that are not school controlled influence the student's academic progress. Major

factors not included in this study are: The student's health or handicap status, socio-economic status, family pressures and shaping effects, race or ethnic group status, and, in addition, common temporary personal crisis events. These crises include such things as: Loss of a parent or loved one, peer relationship upheavals, mental health problems, accidents and/or injuries. These factors are not all the causal factors affecting a student's attrition or academic failure but they do highlight the nature of the major environmental influences beyond school control that deter or facilitate a student's movement through a program. This study investigates interests and personality factors in the context of their relationships to curricular choices and the progress made toward program completion.

Research Questions

Two research questions present the base for testing for the knowledge that is being sought concerning curricular choices and program completion. The two questions are

1. What influences do personality, study area, academic potential, and interests have on student achievement and program completion?

2. What influences do personality and interests have on curricular choices?

Four hypotheses generated from the first research question explore congruency factors, correlational factors, personality

clustering, and variabilities of achievement between study areas. These four factors are explored as they relate to the achievement of grades and the progress toward program completion. Two hypotheses are generated from the second research question. These hypotheses address the tested personality and interest scores as they relate to curricular choices.

Summary

Student data accumulated over a four year period was investigated for purposes of this study. An effort was made to determine the predictive contribution the SCII and MBTI interest and personality tests had for these students. Elements of the problem included: Ordinary attrition, difficulty in curriculum selection, and general satisfaction level. Significance of the study lies in the unique features of the dimension that is added by using an empirically validated personality test and progress level measures that include the rate of movement toward program completion.

In operationalizing the variables, intelligence was defined as the measured potential to achieve with the grade point average as the achievement record. Interests were the preferred focus of attention. Personality type was defined as a predisposition to certain attitudes and behaviors. Curriculum choice was commitment to a core of courses. Progress level measured the combination of GPA and a normal rate of accumulating credits. The variables of

IQ, GPA, interests, and personality type were combined in order to statistically answer the research questions concerning the factors that influence the student's progress level and the student's ability to operate in the curriculum selection process. Environmental factors consisting of family and social influences or personal crisis events were not included in this study.

CHAPTER II

REVIEW OF SELECTED RELATED LITERATURE

This literature explored studies reporting results pertinent to the two major research questions. Four factors relating to the progress level (congruencies, intelligence, personality, and major study area) and two factors influencing the selection of an area of study (personality and interests) constitute six divisions used for grouping the studies reviewed.

The chapter contains an historical overview, a discussion of the state of the art, and a discussion of the uniqueness of this study. Studies in the literature addressing the topics of congruency of interests, intelligence factors, personality factors, and student achievement in different subject matter majors were reviewed for evidence of previous treatment of the first research question. Literature relating to the topics of interests and personality types as they relate to student selection of an area of study were examined for evidence of treatment of the second research question. Less commonly known aspects received a larger portion of review focus than the more familiar aspects. The summary includes a transition into the next chapter.

Historical Overview

The development of routine measurements of learning outcomes

aided in systematizing the education process (Erikson & Wentling, 1976). Binet (Bayley, 1970) began measuring learning potential around the turn of the century. The process of measuring learning potential became a part of the history of measurement in education. This change to measurement of learning potential, now known as intelligence testing, made achievement prediction possible. Ultimately, achievement prediction preceded the development of measurement and evaluation procedures. Later, specific aptitude, ability, and interest testing also gained popularity following the development of the standardization of the intelligence quotient (IQ). Currently interest testing can provide a reason for student contact by career counselors. In addition, interest testing has provided a source for much empirical research (Rothney & Schmidt, 1959). Unlike achievement testing, personality testing, historically, has resisted standardization and empirical validation (Osipow, 1973).

State of the art. Prediction of achievement success or failure can result only as an outcome of analytic searches for the best combinations of ability, achievement, interests, and personality factors which influence the social environment (Lavin, 1965). Lavin's literature search on evaluation reviewed available literature in 1965 to find the determinants of academic achievement. As a result, he found interest testing had gained more popularity than usefulness. In addition, invalid or incomplete personality testing was diminished in frequency and importance. In the decade

since Lavin's work, predictive equations have remained essentially the same and the search for predictive skills continues. This study is part of this ongoing process.

Uniqueness of this study. The MBTI, as an empirically validated personality test, has formed a basic component in many dissertations since the Educational Testing Service made it available in 1962. The approaches utilizing trait-factors, psychological needs, values, and personality styles routinely lacked significance according to Osipow's 1973 review of career theories. He did not include a review of the work done on the MBTI. The MBTI test has established an empirical base for a personality theory that was not accomplished before. This study is unique because it utilizes the MBTI personality profile and a progress level which combines the rate of program completion with the GPA.

Congruency of Interests and Progress Level

In reviewing literature relating to the first research question, the underlying assumption was that personality, study area, academic potential, and interests will influence achievement and persistence. The congruency studies, however, showed conflicting results for both the variable of interests and the variable of personality in their influence on progress.

Elton and Rose (1971) found no differences between vocationally undecided students and students who selected an area of study and remained in it. Stephenson (1970) investigated the achievement

profile of students in upper division changes of subject matter major and found the changes not related to personality congruencies. Caple (1970) investigated group cohesiveness and academic achievement of students assigned to living units according to Holland's six personality patterns. He found no significant differences in achievement between students placed into groups at random and those placed in homogeneous personality pattern groups. Laudeman (1975) concluded that congruency of interest according to Holland types does not result in career satisfaction which is also a measure of adjustment to the subject matter discipline selected. Marks, Vairo, and Zeigler (1962) utilized the Strong Vocational Interest Blank (SVIB) and the Bernreuter Personality Inventory (BPI) in designing a study to measure scholastic aptitude, interest, and personality traits in journalism students. No achievement or attrition trends were discernible.

Walsh (1976) using the Vocational Preference Inventory (VPI), concluded that the students making choices of an area of study congruent with their personality, tended to be better adjusted academically. Schieber (1969) investigated the field dependence-independence factor and concluded that interest congruency is greater in men characterized as field independent and that their academic achievement was significantly higher than that of men characterized as field dependent. For women in her sample the results were inconclusive in that field dependent-independent factors did not reflect the same differences in achievement. The

field dependency studies relate directly to phenomenology and only indirectly to congruency factors. Stanfiel (1966) investigated field dependency and Jungian typology relationships and found that no significant relationship existed between Jungian introversion traits and field dependence as tested by the Rod and Frame test. Field dependency appears to measure a variable that is distinct from the factors included in the MBTI test.

Witkin, Moore, Oltman, Goodenough, Friedman, Owen, and Raskin (1977), in this recent longitudinal study, found interest and cognitive personality style congruencies conducive to remaining in a discipline. They also found that persons in a discipline incongruent with their personality style tended to change to a more congruent discipline. Although field dependence-independence was their primary focus, the ancillary finding of interest here was the achievement improvement in discipline/cognitive style congruence.

Lunneborg (1975 and 1976) twice found that indecisive students who lacked congruency between interests and discipline choice, had lower grade point averages. Ashby, Wall, and Osipow (1966), contrary to Lunneborg, found the undecided students to have more dependent personalities. However, they were academically equal to the most-decided students of their group. Consistent with Ashby, Smith (1976) found that the discriminating features between area of study persisters and withdrawers were not academic features but that the differences lay in their personality characteristics. Walsh and Barrow (1971) found no personality

variables that were associated with the consistency of interests in students. Stricker, Shiffman, and Ross (1965) juxtaposed the MBTI with grade point averages and college entrance tests and found the combination of the three increased the accuracy of the predictive ability when applied to freshmen GPA and prediction of attrition in freshmen. Although statistically significant, this narrow focus on freshmen limits the importance of this contribution to the purposes of this study.

Of the 13 studies cited, Walsh, Scheiber, and Witkin concluded that interest and personality congruencies affected higher achievement and adjustment levels. Only Lunneborg found lower grade point averages in undecided students selecting vocational disciplines. The Walsh, Barrow, and Stephenson studies found no personality differences in achievement for the congruent and incongruent (interests and study discipline) while the Smith and Stricker studies found personality did function as a significant variable in that congruent students had greater academic success. Although Smith found personality variables significant, his and five other studies found no difference in achievement levels. Ashby, Elton, Caple, Laudeman, and Marks all found results that indicated no differences in the academic or achievement levels of congruent and incongruent students. The Swerbinski (1977) SCII study was characterized by mixed results when exploring interest factors and these personality-interest-achievement studies also produce mixed results. Currently these studies provide little basis for certainty.

Intelligence and Progress Level

The basic assumption concerning intelligence and academic progress is that the IQ determines or significantly influences achievement in the form of the grade point average. In this study, the potential for achievement was measured by the SAT test. The findings in the literature reviewed support an IQ and achievement relationship.

Lavin (1965) cites the studies of Cronbach (1949), Henry (1950), Anderson (1954), Henderson (1956), Klugh and Bierley (1959), and Jackson (1955) which provide examples of many validations of ability testing for predicting achievement in college. Some of the more recent studies are those of Hanson and Taylor (1970) who used Multiple Discriminate Analysis techniques leading to their conclusion that ability influences success in college and personality influences attrition. They found the academic and personality variables to be independent of each other. Fincher (1974) found the SAT useful for achievement prediction but in need of supplementation. David (1976) found the undergraduate science grade used along with the Medical College Admissions Test (MCAT) increased the accuracy of predicting performance in medical school. Goldman and Widowski (1976) maintain, on the basis of their study, that the high school GPA is a more efficient predictor than SAT scores for minority students.

The exceptions to college entrance scores that need to be made under special circumstances, such as the minorities

investigated by Goldman, do not negate the broad and established base of the usefulness of ability testing for prediction of college performance. The six older studies identified above and the four of this decade confirm the significant correlation between intelligence and achievement with a great deal of certainty.

Personality and Progress Level

The basic assumption concerning personality and progress is that a given person will succeed academically in a discipline that is congruent with the innate characteristics of his/her personality type. The literature reviewed here verifies this basic assumption.

McCaulley (1973 and 1974) found that excellence was achieved in different ways by different students. One student succeeds in art and another in science. Occasionally individuals are able to excel in diverse disciplines. Smith, Irey, and McCaulley (1973) did a study on the effects of programmed learning with engineering students and found that certain personality types of students liked to work alone, other personality types preferred to work in groups. Certain personality types preferred the traditional teaching styles and others did not. The MBTI test discriminated between those personality types whose learning style preferences differed from one another within the group of engineering students. This has implications for subject matter content of any career chosen. Smith and Irey (1974) did a follow-up study that confirmed the 1973 study.

Rezler (1975) found that persistent high achievement correlated with introversion and a planned orderly lifestyle. Rezler and French (1975) investigated the relationships between personality types and learning preferences of students in health occupations with the assumption that students will succeed academically if their learning style preferences are consistent with the content of the discipline chosen. They constructed a Learning Preference Inventory (LPI) for correlating learning style preferences with the MBTI test. They found a distinct preference in this group for explicit directions, teacher-structured classes, and specific practical tasks. Rezler, Mrtek, and Manasse (1975) did a similar analysis of career options within a pharmacy curriculum. They constructed a Pharmacy Career Pathway Indicator (PCPI) instrument and correlated this with the MBTI test. Significant differences were found between the MBTI personality types who chose hospital pharmacy and those who chose to enter research. Williams (1975) investigated relationships of Nursing State Boards scores with the MBTI test results and found significant differences in the scores of differing personality types. May (1971) found eighth grade sensing (S) trait type students significantly higher in their math scores than the intuitive (N) trait type students. Barberousse (1965) found both the personality types and creativity factors significantly related to the measured intelligence level of eighth grade students. McGinn (1976) evaluated the MBTI as a tool for increasing the understanding of

talented adolescents but found it less effective in the role of discriminating personality differences for this unique "non-normal" group. Helton (1964) and Morris (1964) both studied persistence and attrition factors of intellectually superior students and found introversion (I) and intuition (N) positively related to persistence in the math-science areas of study.

The 12 studies of these 12 authors, using the MBTI as a major part of their study designs, confirm the personality typology theory which can be defined as an innate and yet developed tendency to perceive and act in distinguishable ways that differ from person to person. The Helton and Morris studies differentiate attrition probabilities in highly academically capable students on the basis of personality characteristics. Personality tests that do not use the MBTI are so heterogeneous in nature and in results that no attempt was made to include them. These studies cited also tend to highlight some of the limitations of the MBTI instrument such as its inaccuracy in predicting success with students who were unusually creative or unusually talented. The MBTI test results clearly indicate the trends for specific personality types to gravitate into specific disciplines where they prefer distinct learning styles and tasks to facilitate their progress. These studies indicated that attrition probabilities are increased when mismatching occurs and this implies an importance for matching of persons with disciplines.

Major and Progress Level

The basic assumption underlying this final combination of variables relating to the first research question is that certain cognitive skills, generally developed by specific personality types, are required for high achievement in select disciplines. Some disciplines appear to be more academically oriented and to require higher levels of intellectualization than other disciplines. The studies reviewed here explore more factors than intelligence alone.

Baird (1969) found that the more intellectual the student, the less likely he is to select a vocational discipline. McCaulley (1974) found that the extravert-feeling types with sensing (ESF traits) were uninterested in engineering and mathematics and tended to prefer education, nursing, and physical education. Engineering and mathematics require an aptitude for abstrations and the use of symbols that are commonly considered intellectual. The opposite of the types with the ESF traits (the introverted thinker with intuition or INT traits) was found to be uninterested in education or business but did prefer science and engineering. Because learning styles of average ability students may not be congruent with intellectualizing capability, Skipper (1976) recommends that special attention be given to the average ability students in the high ability schools. He does not mention the specifics which probably consist of a need for vocational alternatives to higher education since "average ability" seems to denote

limitations of academic potential. Tillman (1976) found his sample of 50 Upward Bound (limited ability?) students contained fewer intuitive (N) type traits and fewer feeling (F) type traits. This data would suggest that certain personality types or types with certain traits would have less probability of success in higher education.

These four studies highlight the rationale dealing with the vocations versus professions dichotomy. The types of skills needed in any discipline vary from one subject matter major to another and a student needs proficiency in the types of skills a discipline requires in order to achieve a satisfactory progress level whether the proficiency calls for the abstracting ability of math, the symbolizaton ability of language, or the creativity of art. Not only are certain disciplines considered more academically oriented and academically capable students tend to select these disciplines, but a personality type with certain characteristics also needs to be matched to a discipline that requires skills that are viewed as less academic if the student is to achieve success. These studies support the assumption that basic differences in academic abilities and personality types are found in the various areas of work or study.

Personality and Major

In reviewing literature related to the second research question, the contributions of personality tests and interest

tests as they affect curricular selections were investigated. The basic assumption underlying the second research question was that curricular choices will relate to definable personality traits and interests. The studies reviewed in this section include investigations of personality traits found in humanities students, law school students, art students, and even racial and ethnic groups. These selected studies highlight the clustering tendency of similar personality traits in a variety of groupings.

Hockert (1975) found that Holland's descriptions of personality types correlated with the traits in the Jungian personality theory as utilized by the MBTI. She used the Kuder Occupational Interest Survey (KOIS) groupings which are similar to the groupings of the SCII. There were differences in statistical significance in the male and female outcomes. All but one of the six groupings were the same as the predicted Jungian types. Stroops (1971) found clusters of personality types in the health and physical education groups to have a predominance of extravert-sensation-feeling-perceptive (ESFP) traits. The types that predominated in the home economics group were the extravert-sensation-thinking-perceptive (ESTP) types. Story (1972) found that math teachers not only differed significantly from other teachers but that the more intuitive (N) trait math teachers differed from other math teachers in that they preferred teaching higher education levels of students. Hill (1974) found that Black lab technicians had introvert-sensation-thinking-judging (ISTJ)

type traits predominating while White technicians were more widely dispersed among personality types and tended to concentrate on the introvert-intuitive-feeling-judging (INFJ) traits in the predominating types. Dunning (1970) found the humanities students to be predominantly introvert-intuitive-feeling-perceptive (INFP) types.

Burt (1965) analyzed paintings of artists and found a predominance of intuitive (N) traits in the types. He found many artists with feeling (F) traits and few with thinking (T) traits. Greenfield (1968) found Protestant ministers predominating in extraversion, feeling, and judging (EFJ) traits. Only the sensation-intuition (S-N) factor was divided evenly among the ministers. Yura (1971) found more guidance students with feeling (F) trait types. Carlyn (1976) found that feeling (F) trait type teachers preferred lower level students to teach. Extravert-thinking (ET) trait types were more administratively oriented, extravert-intuitive (EN) trait types liked to plan projects, and intuitive (N) trait types preferred small groups with greater frequency than did the sensing (S) trait types.

McCaulley's surveys in Florida found 60 percent or more of the students who selected childhood education, business administration, and psychology had the extravert (E) trait. Introverted (I) trait type students were attracted to electrical engineering, art, zoology, philosophy, and forestry. Sensation (S) trait type students were attracted to childhood education, accounting, physical therapy, nursing, building construction, and physical

education. Intuitive (N) trait types preferred history, forestry, sociology, architecture, occupational therapy, psychology, chemistry, journalism, English, and art. Thinking (T) trait types were attracted to building construction, electrical engineering, political science, and business. Feeling (F) trait types preferred education, health related occupations, English, sociology, and art. Sixty percent or more of the students attracted to electrical engineering, accounting, nursing, veterinary medicine, physical therapy, engineering, and childhood education had the judging (J) trait. The perceptive (P) trait preferences predominated in forestry, psychology, history, journalism, English, art and occupational therapy.

Academic settings such as colleges and universities readily accomodate group testing procedures. In a series of studies focused on nonacademic settings, racial, ethnic, and counseling situations were studied. These studies revealed a clustering of personality typologies. Levy, Murphy, and Carlson (1972) found a predominance of extravert-sensation-thinking-judging (ESTJ) typologies in a Howard University population. Hostetler (1974) found the Hutterite religious group decidedly extravert-sensation-feeling-judging (ESFJ) while his work with the Amish religious group (1969 and 1974) twice reported a predominance of introvert-sensation-feeling-judging (ISFJ) typologies in the population samples of Amish. Neville (1971), while studying the counseling setting, found that intuitive-feeling (NF) types were attracted

to marital enrichment groups whereas sensing-thinking (ST) types generally were not found in marital enrichment groups.

Without the benefit of the MBTI empiricism, Kleinfeld (1973) isolated cultural differences in cognitive strengths and concluded that measures of general intelligence were Western-culture biased. This leads, he says, to such assumptions as the "dumb Eskimo" stereotype which he claims is unfair.

Roberts (1975) investigated the community college setting and found that the community colleges attract students with traits that differ from the traits of their teachers. Students in these colleges were largely sensing and judging (SJ) types while their teachers were high on intuition and perception (NP) traits. Miller (1967) hypothesized that attrition in law schools is not due to academic aptitude but to perceiving a law career as incompatible with one's personality or lifestyle. He found the introvert-sensation-thinking-judging (ISTJ) types in greater proportion in law schools than in liberal arts colleges. These ISTJ type law school students also had the lowest attrition rate whereas the extravert-sensation-feeling-judging (ESFJ) types had the highest attrition rate of this group of students. In addition, the ESFJ types were the most underrepresented of the personality types in law schools. Myers and Davis (1965) studied attrition rates of different personality types with identical aptitude test scores and found that those whose dominant process was perceptive (extraversion with perception and introversion with

judging) dropped out at the rate of 3.1 percent while those whose dominant process was judging (extravert with judging and introvert with perception) dropped out at the rate of 5.0 percent. Unlike the Miller study which was done on law school students and found the ESJF types with the highest attrition rate, this study was done on medical school students and found a different type, the extravert-sensation-thinking-judging (ESTJ) type, had the highest attrition rate.

These 20 citations support the concept of the natural clustering of similar personality types according to careers, racial, and ethnic groupings. A predominance of certain typologies was found within law school students, humanities school students, art school students, and in the racial and religious-ethnic groups reviewed. The characteristics measured by the MBTI, as used in these citations, are manifest as lasting preferences for one or an another type of career activity. Subsequently, they also constitute a personal cognitive style that is not amenable to experimental changes. Characteristics of the traits, as found in the literature, clustered in reoccuring chains (either singly or in combinations with other traits) in a pattern of consistently reoccuring clustering of like traits specific to particular areas of study. According to the studies reviewed, these personality traits apparently remain as requisites for satisfaction and high performance in the selected areas of study.

Interests and Majors

The basic assumption underlying SCII interests juxtaposed with subject matter majors is that interests will have a definite relationship to the major the student selects. This assumption is readily established in the reviews of the literature. Consequently, only a few representative citations are presented.

Campbell (1971) reviews the developmental history of the SCII which began under the patronage of Stanford University. The review traced the development from the twenties until 1963 when the patronage of the test moved to the University of Minnesota. The SCII was developed in the university atmosphere and is supported by a solid background of research confirming the relationship between what the test measures and what the person taking the test does vocationally. Many of these studies establishing the validity and reliability of the SCII are reported in the manual Campbell wrote. Some of the most significant of these studies subsequently reported in periodicals are Berdie (1960 and 1965), Campbell (1966), Harmon (1969), Hoyt, Smith and Levy (1957), King (1957), McArthur and Stevens (1955), Steward (1964), and Strong (1929). Morrow (1970) found that students who followed their SCII identified interest in mathematics were satisfied in college but those who followed their SCII identified interest in sociology were not satisfied. Shart (1970) found that SCII interest was a greater determinant of occupational decisions than the person's ability. Lavin (1965) found that interest

measures were less capable of predicting performance in professional areas than in nonprofessional areas.

Although the SCII has a confirmed and valued place in the stimulation of thinking about vocations, Swerbinski (1977) found that when the SCII was used with only a computer printout and no personal interpretations, the test had much less predictive value than was anticipated. The reporting or sharing of interest test results provides an opportunity for counseling contacts. This may be the greatest value of the test. According to these studies, the disciplines in which persons profess an interest are the disciplines they tend to enter for study or work.

Summary and Transition

Prediction of success and achievement evolved from traditional evaluation processes during this century. Current prediction procedures include the use of ability test results, achievement data, and other miscellaneous indicators. Interest testing has been popularized but fails to yield high levels of predictive accuracy. This study adds the MBTI personality type test results as another variable in the normative data combinations in statistical computations. Literature related to the research questions reflect mixed results on the issue of achievement as it relates to congruencies of interests and personality. The natural tendency of the clustering of types with various areas of study and the occurance of preferences within an area of study were largely

confirmed by the literature reviewed. Relationships between intelligence and achievement are well established. Occupations or careers vary in the amount of intellectual activity required. Studies designed to test the gravitation of personality types with specific disciplines containing activities which provided outlets for their preferences were also confirmed. In contrast, studies designed to change the personality style or to effect matches of types of persons, were generally unsupported. A significant shift has taken place in the use of interest tests. Rather than remaining a criterion for vocational decision-making, interest tests are now considered a stimulus for vocational counseling. Concerning the choice of study area, reviews show that students who have developed certain cognitive skills tend to enter disciplines that utilize those skills.

This review of the literature which shows conflicting results from some of the studies and confirmations of other studies, serves as comparative data to determine whether this sample population coincides with those samples used in other studies under review. The studies that report conflicting results are the issues for which this study seeks to provide further clarification.

CHAPTER III

METHODOLOGY

This chapter describes the research design utilized in this study. In addition, it describes the variables and instrumentation utilized. The sample population, data collection procedures, and general procedures are described. The hypotheses are stated with accompanying testing methodology. A summary is given.

Research Design

This study utilizes a methodology incorporating ex post facto research. This methodology is widely used in medicine because the kind of technological experimentation that would be required to yield the necessary data is not advisable. It is a search for causes "after the fact" which Mouley (1970) described as

> experimentation in reverse: instead of taking groups that are equivalent and exposing them to different treatment with a view to promoting differences to be measured, the ex post facto experiment begins with a given effect and seeks the experimental factor that brought it about.

This one-group sample contains discrete and continuous multivariate variables with scales in nominal, ordinal, and interval form. The discrete, or nominal variables consist of interests and personality. The continuous, or interval, variables are achievement, intelligence, and the GPA portion of the progress

level. Recoding these variables or creating new categories with them yields ordinal scales at various points. A Regression Analysis supplements the crosstabulations. Computations were done at the Western Michigan University computer center using the Statistical Package for the Social Sciences (SPSS) programs.

Description of the Variables

The features of the variables that affect the research are:

Nominal Data

Interests. The "major," area of study or discipline, the student selects is one of three types of interests utilized but is a primary component of the study. Related to the major, but of lesser importance, is the initial area of study interest the student expressed before entering college. The three highest SCII basic interest areas substantiate the direction of the interests and add confirmation to the measurement of these three types of interests.

Personality. The measurement of personality used here yields eight scales that divide into four bipolar scales. These four-letter configurations generate 16 different typologies. The typologies and/or their component parts form the bases for analysis and comparisons at various points in the statistical computations. (See Instrumentation, p. 35.)

Interval Data

Achievement. The grades recorded on the student's transcript constitute the major measure of the student's achievement. Class rank is also a measure of achievement.

Intelligence. SAT scores are utilized as a measure of intelligence. Another less reliable measure of intelligence is the SCII index of academic potential, the Academic Achievement (AACH) score.

Grade point average. The grade point average is used as interval data for computations at certain points.

Ordinal Data

When progress level is combined with the number of credit hours accumulated, an eleven point ordinal scale from zero to ten is developed. When interests are scaled from one to five on a match-nonmatch basis, the scale becomes ordinal data. Credit hours, SAT scores, high school rank, and GPA are recoded into ordinal scales for use at various points.

Instrumentation

Strong Campbell Interest Inventory (SCII)

The SCII, a computer scored test, contains 325 items for which the responses usually fall into the categories of "Like," "Indifferent," or "Dislike." Completing the inventory takes 25 to

35 minutes. Items are inoffensive, cover day-to-day activities or occupational tasks, and are effective with students as low as sixth grade level. Scores can be categorized into 124 Occupational Scales and can be combined in the 23 Basic Interest Scales. Both of these scales are grouped into the six General Themes developed by Holland (1966) and utilized by Strong. These six themes are (a) realistic, (b) investigative, (c) artistic, (d) social, (e) enterprising, and (f) conventional. The six General Themes will be utilized throughout this study. Appendix E illustrates the manner of grouping the study areas and personality types into these six themes.

Reliability test-retests on a 30-day interval yielded correlations from .79 to .96 on 54 occupations. Thirty of these were .90 and above. Even a 10-day span test-retest yielded correlations of .39 to .70. Twenty of these 54 occupations were .60 and above while only two were below .50. Validity studies using a narrow focus of precise occupations were less valid than those utilizing the broad areas of occupations. One 18-year follow-up study with Stanford students who took the test showed 80 percent of the students with highest ratings on the physician scale were practicing physicians or in related occupations. Those scoring next-to-highest on the physicians scale had 62 percent of this population engaged as physicians or working in related occupations.

Myers-Briggs Type Indicator (MBTI)

The MBTI is a forced-choice 166 item inventory designed for normal adults. It can be administered effectively to students in grade eight or higher. Forty-five to 60 minutes are required for testing. Scoring and converting the eight raw scores into the four bipolar letter scales (I-E, S-N, T-F, and J-P) can be done either by computer or manually.

The four interacting preferences of introversion or extraversion, sensing or intuition, thinking or feeling, and judgment or perception are used to generate the 16 types. This ordering of tendencies allows for structure for apparent random variations in human behaviors. It is a dynamic concept, however, and the four scales are not equal in their contributions since the contribution of a single preference depends on the total configuration. In addition, a single preference depends on the numerical strength of the individual score. The configuration shows that in some personality types a perceptive process is dominant and is aided by an auxiliary judging process. In others, a judging process is dominant and is aided by an auxiliary perceptive process. In addition, both of these processes are found in either the introverted or extraverted attitude.

The MBTI manual describes the Extraversion-Introversion (E-I) index as an orientation that gives a primary allegiance to the outer environment (E) or to the inner world of ideas (I). The Sensation-Intuition (S-N) index distinguishes a perception

preference for the familiar process of sensing directly (S) or preferring the less obvious, more intuitive process of associations which the unconscious adds to the outer perceptions (N). The Thinking-Feeling (T-F) index indicates a judging reliance on a true-false impersonal logic (T) or to a tendency to make discriminations on the bases of the valued and non-valued (F). The Judgment-Perception (J-P) index reflects whether the person relies primarily upon a judging (J) or perceptive (P) process in their uses of thinking, feeling, sensation, or intuition. Appendix D, Tables D-6 through D-11, contains further information on how these scales function with persons in specific situations and gives selected frequency distributions.

Under the aegis of the Educational Testing Service, the MBTI split-half reliability studies were conducted that showed correlations mostly in the .70 to .80 range. Levy, et al (1972) did test-retest reliability studies on a two-month interval and found these same correlations. Validity testing was done with the Gray-Wheelright Psychological Type Questionnaire which also has a Jungian Personality theory base similar to the MBTI. Correlations on the first three MBTI scales were .79, .58, and .60. The GPTQ did not measure the fourth MBTI bipolarity of judgment versus perception.

Both the SCII and the MBTI are self-report instruments. Both tests have had satisfactory reliability and validity studies done.

The SCII also identifies invalid responses on the part of the test taker.

Sample-Population Characteristics

Freshmen matriculating in 1973 and 1974 compose the sample's data base and are followed through to graduation, attrition, or a current status as continuing students in the summer of 1977. Potentially these matriculants graduate in 1977 and 1978. No additions are made to this original group in the form of transfers. A variety of factors reduce the original computational N's and much of the analysis deals with the test-taking population from the incoming N of 450 students.

The student body of nearly 1200 students consists predominantly of 18 to 22-year-olds. Indiana, the site of the study where Goshen College is located in a relatively small midwestern town, supplies slightly less than half of the incoming freshmen. Most students reside west of the Alleghenies with Ohio, Pennsylvania, Illinois, and Michigan (respectively) most represented as residential locations.

The percentage of students of non-Mennonite family background may reach as high as 35 percent. Women form the majority of students although a 50-50 ratio of the sexes is sought. Subjects in this study sample are a ratio of 35 males to 65 females. Academic qualifications are high. The mean SATV for the students in the study is 504 (S.D. 106) while the national mean for the

SATV is reported as 430. The median of this group on the SATM was 520 compared to the median math score for the National that is in the 470's. A third of the Goshen students consistently rank in the top 10 percent of their graduating classes in high school. Class profiles and sample frequencies appear in Appendix B.

Data Collection Procedures

Written permission was obtained from the Dean of Students for using the student data (Appendix A). The process devised for assuring student anonymity was agreed upon. A semi-retired Records Clerk collected the data at her convenience during the summer. Data sheets with name and student identifications were used during data collection and these identifications were severed from the sheet upon completion. A code number was placed on both parts of the data sheet before the severance. In coding the sheets for the computer, 10 percent had information missing. This was easily supplied because of the unique coding procedure. The severed identifications remain in the Personnel Office.

The data sheet prepared for collecting this primary data had 13 numbered items listed but the number of computer tabulations to be done on each item ranged from one to six. Twenty-nine variables were coded on the sheets from these 13 items. Some auxiliary details were collected for use in case further refinements were decided upon or appeared necessary. The sample sheet and a portion of the SPSS program appear in Appendix C.

Numbered items on the sheet were (1) gender, (2) age, (3) matriculating year, (4) credit hours completed and/or attrition date plus the number of credit hours the GPA is based on, (5) initial interest as expressed in high school or during testing, (6) area of study, (7) GPA, (8) SAT scores, (9) SCII interests and their scores, (10) Academic Achievement (AACH) score, the SCII index of academic potential, (11) OIE, the SCII index of Introversion-Extraversion, (12) MBTI typology, and (13) high school rank and the size of the high school.

Item 3 on the matriculating data and item 4 on the hours completed combine to make matriculating class distinctions throughout the study on those students of 1973 who can be expected to have 120 credit hours completed at the time of the data collection and those students of 1974 who can be expected to have 90 credit hours completed. Differences in initial interest (item 5) and the area of study (item 6) plus differences in either of these and the SCII interests (item 9) combine to designate the degrees of matching or congruency in the interests. A further match of these is done with personality type (item 12).

Item 7, high school GPA, is the measure of achievement of the student and has a high correlation with the high school rank. The college GPA is computed only from the actual grades given in courses. A credit-no credit option was open to these students which some selected. The measure of intelligence that was used, the SAT scores (item 8), was related to the SCII index of academic

potential, (AACH, item 10). Items such as gender and age are indirectly useful in that they delineate characteristics of the sample-population.

General Procedures

Computer cards were punched from the 450 data sheets that had been coded numerically for ease of computation. Basic Interests were coded on the sheets into the six SCII General Themes. Initial interest and the area of study were also coded into these six themes with three exceptions: Psychology, Nursing, and Inter-disciplinary were recognized as groups 7, 8, and 9 respectively. An SPSS program (Appendix C) was written with the 29 variables labeled and frequencies were computed on the raw data. Based on the initial analysis of the data, new variables or categories were created by (I), grouping variables, (II) computing percentile ranks with compute cards, and (III) recoding variables. These ordering and categorizing procedures facilitated the understanding of the mass of data. The decision rules are as follows:

I Grouping Variables

1. A personality grouping was created by classifying the 16 personality configurations into their most likely preference of the six General Themes of the SCII (Instrumentation, p. 33). These were assigned as follows: (1) ESTJ, realistic; (2) INTP, INTJ, and ENTP, investigative; (3) INFJ and ENFP, artistic;

(4) INFP, ENFJ, ISFJ, ESFP, ISFP, social; (5) ESTP, ESFJ, ENTJ, enterprising; and (6) ISTJ and ISTP, conventional.

2. The original nine groupings of areas of study selected and initial interests indicated were condensed into the six General Themes of the SCII for purposes of testing congruencies. The combinations were nursing with social: group 8 = group 4, psychology with investigative: group 7 = group 2, interdisciplinary = 0 since interdisciplinary is inherently incongruent with any of the SCII categories. (Appendix Table E-1)

3. Realistic and conventional areas of study had some basic interests recorded but no students were majoring in either of these areas. Consequently, these categories were omitted and the six groupings were further reduced to four. The closest approximations for personality types resulted in combining the realistic (1) group with the investigative (2) group and placing the conventional (6) group with the enterprising (5) group. This procedured prevented excessive empty cells in the crosstabulation grids.

4. Another variable, a match-nonmatch scale of the congruency of interests and personality was created by combinations as follows: Matches between major, personality, initial interest, and two of the three basic interests constituted a score of 5. A match of major, initial interest, and two of the three basic interests constituted a score of 4. A match of major and basic interests constituted a score of 3. A match of major and initial interest constituted a score of 2. When there were no matches of

the major with personality or interests, this constituted a score of 1.

5. A measurement combining GPA and rate of program completion was the variable created for improving GPA accuracy. If a senior had 106 or more credit hours or a junior had 76 or more credit hours and a grade of A, a score of 10 was assigned. The same classification and credit hours with a grade of B constituted a score of 9. The same classification and hours with a grade of C constituted a score of 8. If a senior had from 76 to 105 hours or a junior had 61 to 75 hours and a grade of A, a score of 7 was assigned. The same classification and hours with a grade of B constituted a score of 6. The same classification and hours with a grade of C constituted a score of 5. If a senior had from 31 to 75 hours and a grade of A, or if a junior had 31 to 60 hours with a grade of A, a score of 4 was assigned. The same classification and hours with a grade of B constituted a score of 3. The same classification and hours with a grade of C constituted a score of 2. If either a junior or senior had 16 to 31 hours and a grade of D or C-, a score of 1 was assigned. Zero was assigned to students who were dropouts with less than 16 hours and a grade of D or no GPA due to taking their courses credit-no credit.

II Compute Cards

6. The high school rank was divided by the high school size, multiplied by 100 to avoid decimals, and rounded off to the nearest

whole number. This created a variable yielding a percentile graduating rank for each student.

7. The total accumulated credit hours were divided into the number of credit hours the GPA was based on to find the percentage of credits taken for grades. Again, the result was multiplied by 100 to avoid decimals and rounded to the nearest whole number. This created a variable that indicated the extent of the use of the credit-no credit option.

III Recodes

8. The credit hours both for the total hours and the GPA based hours were regrouped into 10 divisions as 1 = 0-15, 2 = 16-30, 3 = 31-45, 4 = 46-60, 5 = 61-75, 6 = 76-90, 7 = 91-105, 8 = 106-120, 9 = 121-135, and 10 = 136-165.

9. SAT scores for both verbal and math were put into the following categories: 1 = 200-250, 2 = 251-300, 3 = 301-350, 4 = 351-400, 5 = 401-450, 6 = 451-500, 7 = 501-550, 8 = 551-600, 9 = 601-650, 10 = 651-700, 11 = 701-750, 12 = 751-800.

10. The academic potential AACH index was put into seven groups as 1 = 30-35, 2 = 36-40, 3 = 41-45, 4 = 46-50, 5 = 51-55, 6 = 56-60, 7 = 61 through highest.

11. The SCII introversion-extraversion (OIE) scale was dichotomized as 2 = 1-50 and 1 = 51 through highest.

12. Grade point averages were grouped into six groups as 1 = .5-1.5, 2 = 1.51-1.999, 2 = 2-2.5, 4 = 2.51-2.999, 5 = 3-3.5, 6 = 3.51 through highest.

13. The computed high school rank into a percentile score was recoded into 1 = 1-10, 2 = 11-25, 3 = 25-33, 4 = 34-50, 5 = 51 through highest.

14. The percentage of credit hours for the GPA computation was recoded as 1 = 0-10, 2 = 11-20, 3 = 21-30, 4 = 31-40, 5 = 41-50, 6 = 51-60, 7 = 61-70, 8 = 71-80, 9 = 81-90, 10 = 91 through highest.

Whenever new categories were formed, value labels were entered on program cards to identify the category and to facilitate reading of printouts.

Hypotheses and Hypotheses Testing

First research question. What influences do personality, study area, academic potential, and interests have on student achievement and program completion?

The basic assumption was that intelligence, grade point average, personality type, and interest congruencies will have a statistically significant relationship to the progress level of the student. After these factors were tested in combination, personality and interests (in the form of the major selected) were analyzed to see whether they were independently associated with the progress level.

Hypothesis 1. The proportion of students in the congruency catagories will be the same in all the progress levels.

The alternative hypothesis was that the progress level will be maximized when congruency of interests and personality are higher. Symbolically the null hypothesis was represented by

$$H_o: P_{pc} = P_{p\cdot} P_{\cdot c}$$

where P represents probability
p represents the progress level column and
c represents congruency rows in a contingency table.

The statistical test, the chi-square, determines whether the expected frequencies are confirmed by the observed frequencies in the crosstabulation. An alpha level of .05 was used to confirm or reject the null hypothesis. Crosstabulations on a further subdivision into dropouts and continuing students indicate how the differences cluster in the two groups composing the total group.

Hypothesis 2. There will be no relationship between the progress level GPA and the SATV, SATM, AACH, and high school rank.

This method tested the variables-in-combination in interval form and utilized a Regression Analysis with an alpha of .05.

Hypothesis 3. The proportion of students in the personality groupings will be the same in all the progress levels. Symbolically this is represented by

$$H_o: P_{pt} = P_{p\cdot} P_{\cdot t}$$

where P represents probability,
p represents the progress level (column), and
t represents the personality type (row) in a contingency table.

Again, the chi-square was used to determine whether the expected frequencies are confirmed by the observed frequencies in the crosstabulation and an alpha level of .05 was used to confirm or reject the null hypothesis.

Hypothesis 4. The proportion of students in the areas of study will be the same in all the progress levels. Symbolically this is represented by

$$H_o: P_{pm} = P_{p\cdot}P_{\cdot m}$$

where P represents probability,
p represents the progress level (column), and
m represents the major (row) in a contingency table.

The format of the procedure for statistically testing whether the expected frequencies fall equally in any row or column was identical with the format of the third hypothesis. The chi-square with an alpha level of .05 will be used to confirm or reject the null hypothesis.

Second research question. What influences do personality and interests have on curricular choices?

The basic assumption is that personality and interests are related to the selection of a major as well as to progress level. This assumption was examined in two hypotheses.

Hypothesis 5. The proportion of students in the personality type groups is the same for all the majors. Symbolically this is represented by

$H_o: P_{mt} = P_{m\bullet}P_{\bullet t}$

where P represents probability,
m represents the major (columns), and
t represents the personality type (rows) in a contingency table.

The SCII interests, categorized in the six General Themes format, (realistic, investigative, artistic, social, enterprising, and conventional) and the majors, categorized in the same six groupings, were crosstabulated. Testing will follow the procedure of hypothesis 4.

Hypothesis 6. The proportion of students in the area majors will be the same in all the SCII interest areas. Stated symbolically, this is represented by

$H_o: P_{mi} = P_{m\bullet}P_{\bullet i}$

where P represents probability,
m represents the major (columns), and
i represents the interests (rows) in a contingency table.

Categorizing and testing will follow the procedure of hypothesis 5.

Computations were done in four groups by also utilizing a subgroup of students taking both the MBTI and SCII tests. This subgroup was further divided into dropouts and persisters.

Summary

This ex post facto research study containing two nominal scales (interests and personality); and two interval scales (achievement and intelligence); and some created ordinal scales,

seeks to investigate the relationships among these variables. The SCII and the MBTI, used for measuring interests and personality, have satisfactory reliability and validity. Goshen College freshmen matriculants of 1973 and 1974 compose the sample. Permission was obtained for using the student data anonymously. From the prepared data sheet of 13 items, 29 variables were coded for the computer. The 450 computer cards were punched and an SPSS program was written and run at Western Michigan University. Additional variables were created for grouping raw data into meaningful categories and for condensing personality and interests into theme-groupings of the SCII for comparisons. The progress level was designed as a separate ordinal variable to include progress toward program completion and value labels were assigned to facilitate printout reading.

CHAPTER IV

PRESENTATION AND ANALYSIS OF THE DATA

This study investigates the longitudinal perspective of the personality and interest testing relationships on the progress level of the student and the area of study s/he selects. Incoming freshmen in the fall of 1973 and 1974 routinely completed the Myers-Briggs Type Indicator (MBTI) and the Strong-Campbell Interest Inventory (SCII). Much of the statistical analyses in this study was performed on the subgroup of students who completed both tests. This chapter contains a demographic description of the sample-population, a description of the number of persons included in the various statistical computations, a description of specific hypotheses and their test results, and a summary of the chapter.

Characteristics of the Sample

Official class profiles for 1973, 1974, and 1977 are included in Appendix B. These profiles show class rank and SAT scores which were consistently higher than the National means of the scores of high school students taking the SAT tests. In addition to the information on the profiles, Table B-1 shows a gender distribution of 158 males and 292 females (in a ratio of 35 males to 65 females) taken from 222 incoming students in 1973 and 228

in 1974 in this sample. Table B-2 shows the composite high school rank of the sample in which one out of three students was in the top ten percent of their graduating class. Table B-3 portrays the distribution of size of high schools from which the students come. The mode is 201 to 300 with a median within the size of 151 to 200 students category. Three out of four of these 450 students were 18 years of age and their mean high school GPA was 2.981. Differences in the means and standard deviations of persisters and dropouts (test takers) are shown in Table B-4.

As shown in Table 4:1, the mode of the categories of study areas of the sample was "social" under the six general themes of the SCII which are realistic, investigative, artistic, social, enterprising, and conventional. Table 4:1 divides the total sample and the students who took the two tests. There is little

Table 4:1

Frequencies: Area of Study Distribution

Total Sample	Investi-gative	Art	Social	Enter-prising	Miscel-laneous[a]	N
Frequency	70	72	187	44	75	448
Percent	15.6	16	42[b]	10	16.7	100.3
MBTI, SCII Test Takers						
Frequency	48	47	133	35	51	314
Percent	15.3	15	42.3	11.1	16.2	99.9

[a]Undecideds, dropouts, and interdisciplinary

[b]Nurses account for 42% or 79

difference in the percentage outcomes of the two groups. The realistic and conventional categories did not contain students which reduced the six groups to four. The miscellaneous category was created for persons who did not fit into any of the general themes categories. Nursing students accounted for a large portion of the social category.

The differences in the frequency distribution of the 16 personality types are most evident in Table 4:2 where the types are displayed in rank order. The types cluster naturally into four groupings according to their percents of the total students. The upper quarter of Table 4:2 contains four typologies. Each typology contains more than 10 percent of the tested sample and, combined, these four types account for 55 percent of the students. In contrast, the lowest quarter of the table contains four typologies wherein each, singly, represents less than two percent of the total sample. When combined, these four lowest incidence types account for 6.9 percent of the students. The second quarter contains from five to eight percent of the students in each of the four typologies for a total of 25 percent in that quarter. The third quarter, with approximately three percent in each typology, has a total of 12 percent of the students in this quarter.

Further examination of traits in the typologies of Table 4:2 shows that the double mode falls into the ISFJ and INFP types. The modal introvert-sensing-feeling-judging (ISFJ) type and the introvert-intuitive-feeling-perceptive (INFP) type together

Table 4:2

Frequencies: Clustering of Typologies

	Typology	Frequency	Percent	Percents by Quarters	Percents by Halves	MBTI & SCII Test Takers Frequency	MBTI & SCII Test Takers Percent
Upper Quarter	ISFJ	67	15.5			56	17.8
	INFP**	67	15.5			40	12.7
	ENFP	57	13.2			35	11.1
	ESFJ**	47	10.9			41	13.1
				55.1%			
Second Quarter	ISFP**	34	7.9			29	9.2
	ESFP	30	6.9			21	6.7
	INFJ	27	6.2			19	6.1
	ENFJ**	21	4.8			17	5.4
				25.8% 80.9%			
Third Quarter	INTJ	14	3.2			11	3.5
	ESTJ*	14	3.2			10	3.2
	ISTJ	13	3			9	2.9
	INTP*	12	2.8			7	2.2
				12.1%			
Fourth Quarter	ESTP	8	1.8			4	1.3
	ENTJ*	8	1.8			7	2.2
	ISTP*	7	1.8			5	1.6
	ENTP	7	1.6			3	1.0
				6.8% 19.0%			
Totals		433	99.9	99.9%	99.9%	314	100

*Thinking is the dominant function, sensing or intuition are auxiliary (total of 9.4 percent)

**Feeling is the dominant function, sensing or intuition are auxiliary (total of 39.1 percent)

account for 31 percent of the population. The I and the F traits are both present in these two groups. While ISFJ is a predominantly sensing (S) type with feeling (F) as the auxiliary function, the INFP is a predominantly feeling (F) type with intuition (N) as the auxiliary function. The four typologies (in all) with the feeling (F) function predominant over the sensing (S) or intuition (N) functions, represent 39.1 percent of the total sample. Of the eight possible typologies with thinking (T), none is represented with more than 3.2 percent of the total. Only 19 percent of the students fall into the half of the typologies which contain the thinking (T) rather than the feeling (F) function. Of this 19 percent, slightly less than half (9.4%) have the thinking (T) trait, as a judging process, predominant over either sensing (S) or intuition (N) which form the auxiliary perceptive functions for these. (See Instrumentation, p. 35.)

Further demographics of the sample using the MBTI testing are contained in Appendix D. Table D-1 shows the frequencies and percentages of the sample on the MBTI "Type Table." Table D-2 is a histogram showing the male-female distributions of the 16 types. Table D-3 shows the frequency of each of the eight MBTI traits as they occur in the subject majors plus the frequencies of the status of each of the areas of study. Each student is represented once on one or the other of the polarized traits in Table D-3. Goshen's distribution of dropouts are shown on the type table in Table D-4. Tables D-5 and D-6 present frequencies

of selected percentages of populations other than the Goshen College sample which highlights the uniqueness of this student body. Tables D-7 through D-11 contain further descriptions of the Myers-Briggs typologies taken from the manual.

Appendix E presents the demographics of the sample according to the groupings of the SCII. Table E-1 shows the SCII basic interests under the six general theme groupings along with the Goshen College majors as they were placed into these groupings, and the MBTI personality typologies as they, too, were placed into the groupings. A matrix of the types on the type table according to their area of study, and the frequency distributions of the various areas of study are presented in Table E-2. Tables E-3 through E-8 present the type table distributions of the students in the areas of the investigative, artistic, social, enterprising, nursing, and interdisciplinary majors. Tables E-9 and E-10 show how the tested basic interests relate both to the area of study chosen and the initial expressed interests. Table E-11 shows the relationship of the initial interests and the personality type.

Composition of the Number of Cases in Statistical Runs

Seven factors reduce the number of cases that were utilized in various statistical computations. Beginning from the sample-population of 450, 17 did not complete the MBTI test, 117 did not complete the SCII, and 36 did not have recorded SAT scores. In

addition to these tests, 34 students had no high school rank recorded and 40 did not indicate an initial study area interest before entering college. A school policy that allows students to take courses for a credit-no credit option instead of grades accounts for eight missing GPA scores. Condensing the areas of study into the six general themes of the SCII resulted in a reduction of 76 students who fell into none of the specifically designated categories since they were undecided or interdisciplinary majors. The following factors identify the reductions:

FACTORS	NUMBER MISSING
MBTI	17
SCII	117
SAT	36
High school rank	34
Initial interest	40
Grade Point Average	8
Grouping majors into SCII categories	76

Both tests were taken by 315 students and 110 of these dropped out. The condensed study groupings, used to coincide with the SCII General Themes categories, left 67 dropouts. In the REGRESSION ANALYSIS, the GPA and high school rank factors reduce the N and there were 88 dropouts in this case.

Results of Hypothesis Testing

The presentations and analyses of the first four hypotheses are designed to answer the first research question "What influences do personality, study area, academic potential, and interests have on student achievement and program completion?"

Hypothesis testing, with the exception of Hypotheses 2 and 6, was performed on four groups composed of the total sample of students, a subgroup of students who took the MBTI and SCII tests, and a division of this subgroup into dropouts and continuing students. Hypotheses 2 and 6 utilized MBTI and SCII test takers only.

Hypothesis 1. The proportion of students in the congruency categories is the same in all the progress levels. Symbolically this is represented by

$$H_o: P_{pc} = P_{p\bullet} P_{\bullet c}$$

where P represents probability
p represents progress level
c represents congruency

The progress level consisting of a combination of the grade point average and the speed of movement toward program completion was crosstabulated with the total number of congruencies formed by the agreements of personality and interests each student had. The chi-square (shown in Table 4:3) utilizing all students in the sample was significant (0.015) while the chi-squares of the subgroup and the divisions of the subgroup did not show significance at the .05 alpha level. The polarized clustering,

particularly when crosstabulating dropouts and continuing students, resulted in empty cells in the tables.

Table 4:3

Chi-squares of Progress Level and Personality-interest Congruencies

	Chi-square	Number of Cases
Total group	.1051*	366
Test takers	.1812	260
Continuing and Graduated	.3703	166
Dropouts	.1161	93

*Significant chi-square

Table 4:4 presents the composite frequency distribution of all four groups. The mode for all the groups was Medium-C of the Progress Level and, in the case of the Dropouts, 85 of the 93 students fell in or below this mode. For the continuing or graduated students, 161 of the 166 fell into or above this mode. In addition, on the ordinal scale, the higher Progress Levels show a clustering toward the category of the All-matches end of the congruency scale. Thus the frequencies found in the higher levels consist mostly of continuing or graduated students while the No-matches category clustering that occurs at the lower level portion of the Progress Level consists mainly of the dropouts.

Table 4:4

Progress Level and Interest Personality Congruencies

	All Matches	Interests and Personality Match	Only Study Area and Interests	Study Area and Initial Interests Match	No Matches	Totals
Drops						
Total Group	2	5	12	14	15	48
Test Takers	2	5	0	9	12	28
Continuing Students	0	0	0	0	0	0
Drop-out Students	2	5	0	9	11	27
Low						
Total Group	2	3	0	5	1	11
Test Takers	2	1	0	1	0	4
Continuing Students	0	0	0	0	0	0
Drop-out Students	2	1	0	1	0	4
Low-C						
Total Group	6	6	3	6	13	34
Test Takers	6	5	2	2	10	25
Continuing Students	2	0	0	0	0	2
Drop-out Students	4	5	2	2	10	23
Low-B						
Total Group	2	5	3	8	8	26
Test Takers	2	4	1	5	5	17
Continuing Students	2	0	0	0	0	2
Drop-out Students	0	4	1	5	5	15
Low-A						
Total Group	2	1	1	1	3	8
Test Takers	1	0	0	1	3	5
Continuing Students	0	0	0	0	1	1
Drop-out Students	1	0	0	1	2	4
Medium-C						
Total Group	17	27	6	19	20	89
Test Takers	17	25	3	10	17	72
Continuing Students	16	21	3	9	11	60
Drop-out Students	1	4	0	1	6	12
Medium-B						
Total Group	3	8	2	4	5	22
Test Takers	3	5	1	2	4	15
Continuing Students	2	2	1	1	4	10
Drop-out Students	1	3	0	1	0	5
Medium-A						
Total Group	2	3	2	3	1	11
Test Takers	2	2	0	1	1	6
Continuing Students	0	2	0	1	1	4
Drop-out Students	2	0	0	0	0	2
High-C						
Total Group	0	7	1	6	1	15
Test Takers	0	6	1	3	1	11
Continuing Students	0	6	1	3	1	11
Drop-out Students	0	0	0	0	0	0
High-B						
Total Group	9	15	3	16	11	54
Test Takers	8	14	2	9	6	39
Continuing Students	8	14	2	9	6	39
Drop-out Students	0	0	0	0	0	0
High-A						
Total Group	14	14	2	13	5	48
Test Takers	14	14	1	6	3	38
Continuing Students	14	13	1	6	3	37
Drop-out Students	0	1	0	0	0	0
Totals						
Total Group	59	94	35	93	83	366
Test Takers	57	81	11	49	62	260
Continuing Students	44	58	8	29	27	166
Drop-out Students	13	23	3	20	34	93

The significance of the chi-square obtained on the total students may represent a bias in the selection procedures. It was not confirmed by a significant chi-square on the crosstabulation of the 260 test takers group. The null hypothesis was accepted that the congruencies do not significantly affect the progress levels. The clustering on the composite frequency table presents a strong bias, however, in addition to the one significant chi-square.

Hypothesis 2. There is no relationship between the progress level GPA and the SATV, SATM, AACH, OIE, and high school rank.

A summary table from the REGRESSION ANALYSIS of the dependent variable (GPA) is shown in Table 4:5 where the F ratios, Multiple R, R Square, and RSQ change are compared for the total group of test takers, the continuing or graduated students, and the dropouts. The verbal portion of the SAT test has the most significance and the high school rank is a close second to this. Continuing students had three F-ratios of significance while the dropouts had only one F-ratio (SATV) of significance. Neither of the SCII variables (AACH and OIE) reached significance in any of the areas. The F-ratios form the basis for rejecting the null hypothesis of no relationship between the grades and these selected variables. However, only the SAT scores and the high school rank show significant relationships with the GPA so that accepting the alternative hypothesis was a qualified acceptance that included only the SATV, SATM, and high school rank. The SCII (AACH and OIE) scores were not shown to serve a predictive function in this case.

Table 4: 5

F-Ratios and Summary Tables of the GPA as the Dependent Variable for Continuing, Drop-out, and Total Group Students

Variable	N	F-Ratio	Multiple R	R Square	RSQ Change
Total Test Takers					
SATV	268	20.367**	.51702	.26731	.26731
H.S. Rank	268	19.321**	.56632	.32071	.05340
SATM	268	8.588*	.58842	.34624	.02552
AACH	268	3.066	.59872	.35847	.01223
OIE	268	2.151	.60307	.36369	.00523
Continuing Students					
SATM	180	9.644*	.54210	.29387	.29387
SATV	180	12.704*	.59405	.35290	.05902
H.S. Rank	180	13.971*	.63150	.39879	.04589
OIE	180	.860	.63462	.40274	.00395
AACH	180	.343	.63554	.40392	.00117
Drop-out Students					
SATV	88	8.800*	.47303	.22376	.22376
AACH	88	1.184	.49479	.24482	.02106
H.S. Rank	88	2.119	.51059	.26071	.01589
OIE	88	1.108	.51816	.26849	.00778
SATM	88	1.038	.52691	.27764	.00915

** Highly significant
* Significant

Hypothesis 3. The proportion of students from each personality group is the same in all the progress levels. This is represented by

$$H_o: P_{pt} = P_{p.} P_{.t}$$

where P represents probability
p represents the progress level
t represents the personality type.

In doing crosstabulations of the progress level that included the GPA and the rate of credit accumulation with the condensed grouping of the personality types, the only chi-square of significance (.0379) was the computation performed on the total group with an N of 432.

This significant chi-square, shown in Table 4:6, constituted the basis for the rejection of the null hypothesis of no relationship between personality and progress level. Instead, the alternative hypothesis of a relationship between personality and progress level was accepted.

Table 4:6

Progress Level and Personality

Group	Chi-square	Number
All	.0379*	432
Test takers	.2826	314
Continuing (Gr.)	.3964	205
Dropouts	.2847	109

*Significant chi-square

Table 4:7, a composite frequency table, was constructed to show the clustering effects of the groups. In the crosstabulation for the total group there were four empty cells and in the test-taking group there were five. For continuing and dropouts there were more empty cells but their locations were polarized with empty cells falling predominantly in the lower levels of the ordinal scale categories for continuing students and predominantly in the higher level categories for dropout students. The continuing students had a total of 21 empty cells and 17 of these were located below the mode of Medium-C. The dropouts had a total of 17 empty cells and 14 of these were located above the mode of Medium-C.

The personality measurement utilized here is the MBTI type as placed under the SCII General Themes according to Appendix E-1. In this student sample, the percentages displayed in Table 4:8 show that slightly over half (50.5%) fell into the category designated as social. The artistic and enterprising categories accounted for nearly one-fifth each (19.4% and 19.2%) of the N. Investigative comprised slightly over one-tenth (10.9%). The variations in the percentages of these groupings were shown as the sample was broken down more selectively into the subgroup that took both the MBTI and the SCII tests. This test-taking subgroup was divided into continuing and dropout groups. The continuing and dropout groups are compared with the total sample composition to see whether there is an increase or decrease in the percentage of students who drop out or continue in their program.

Table 4:7

Frequency Distribution of Progress and Personality Types

	Investigative	Artistic	Social	Enterprising	Totals
Drops					
Total Group	3	13	30	8	54
Test Takers	1	6	19	4	30
Continuing Students	0	0	0	0	0
Drop-out Students	1	6	19	4	30
Low					
Total Group	2	5	4	1	12
Test Takers	1	0	2	1	4
Continuing Students	0	0	0	0	0
Drop-out Students	1	0	2	1	4
Low-C					
Total Group	8	1	28	9	46
Test Takers	6	0	20	9	35
Continuing Students	0	0	3	0	3
Drop-out Students	6	0	17	9	32
Low-B					
Total Group	5	5	14	4	28
Test Takers	1	4	11	3	19
Continuing Students	0	0	2	0	2
Drop-out Students	1	4	9	3	17
Low-A					
Total Group	0	2	3	2	7
Test Takers	0	2	1	2	5
Continuing Students	0	0	0	1	1
Drop-out Students	0	2	1	1	4
Medium-C					
Total Group	15	17	44	28	102
Test Takers	10	12	38	22	82
Continuing Students	9	10	32	19	70
Drop-out Students	1	2	6	3	12
Medium-B					
Total Group	0	5	12	4	21
Test Takers	0	3	10	3	16
Continuing Students	0	2	8	0	10
Drop-out Students	0	1	2	3	6
Medium-A					
Total Group	0	4	7	0	11
Test Takers	0	2	5	0	7
Continuing Students	0	2	3	0	5
Drop-out Students	0	0	2	0	2
High-C					
Total Group	2	5	7	3	17
Test Takers	1	3	5	3	12
Continuing Students	1	3	5	3	12
Drop-out Students	0	0	0	0	0
High-B					
Total Group	5	12	46	15	78
Test Takers	5	9	35	12	61
Continuing Students	5	9	34	12	60
Drop-out Students	0	0	1	0	1
High-A					
Total Group	7	17	23	9	56
Test Takers	6	13	17	7	43
Continuing Students	6	12	17	7	42
Drop-out Students	0	1	0	0	1
Totals					
Total Group	47	84	218	83	432
Test Takers	31	54	163	66	314
Continuing Students	21	38	106	42	205
Drop-out Students	10	16	59	24	109

The social and enterprising types accounted for greater percentages of the dropouts while the artistic type accounted for a lesser percentage. The investigative were also lower in the percentage of dropouts.

The Progress Level category most frequently earned by the social type group was High-B (21.1%). That of the artistic type group was High-A (20.2%). For the enterprising type group it was Medium-C (33.7%) and for the investigative it was also Medium-C (31.9%). The artistic types were unique in another respect. They not only had the highest Progress Level category mode of the types but the percentage of the artistic types in the lowest category was also greater than in any of the other three types.

Table 4:8

Composition of the Sample (in Percentages) of Types

	Social	Artistic	Enterprising	Investigative	N
Total Group	50.5	19.4	19.2	10.9	432
Mode of Progress Level	High-B (21.1%)	High-A (20.2%)	Medium-C (13.7%)	Medium-C (31.9%)	432
Percent in Lowest Category of Progress Level	13.8%	15.5%	9.6%	6.4%	
Test Takers	51.9	17.2	21.0	9.9	314
Continuing Students	50.7	18.5	20.5	10.2	205
Drop-out Students	54.1	14.7	22	9.2	109

Hypothesis 4. The proportion of students from each area of study is the same in all the progress levels. Symbolically this is represented by

$H_o: P_{pm} = P_{p\bullet} P_{\bullet m}$

where P represents probability
p represents progress level
m represents the major or area of study

The four groupings using the GPA plus the rate of credit accumulation were crosstabulated with the condensed study area groupings. A highly significant chi-square (Table 4:9) was the result of the crosstabulation in the total sample. This forms the basis for rejection of the null hypothesis that students perform equally well in every area of study. Instead, the alternative was accepted that students in some areas show higher achievement than students in other areas.

Table 4:9

Chi-squares of Progress Level and Areas of Study

	Chi-square	Number of cases
Total group	.0030**	374
Test takers	.0755	253
Continuing and Graduated	.1476	195
Dropouts	.3029	67

**Highly significant

The composite frequencies of the four groups in Table 4:10 show the incidences of the personality types in the various areas of study and also show the differences when the sample is divided

Table 4:10

Progress Level and Area of Study

	Investigative	Artistic	Social	Enterprising	Totals
Drops					
Total Group	4	8	12	7	31
Test Takers	1	5	6	3	15
Continuing Students	0	0	0	0	0
Drop-out Students	1	5	6	2	14
Low					
Total Group	2	0	9	1	12
Test Takers	0	0	4	0	4
Continuing Students	0	0	0	0	0
Drop-out Students	0	0	4	0	4
Low-C					
Total Group	5	8	23	1	37
Test Takers	4	4	18	0	26
Continuing Students	0	0	3	0	3
Drop-out Students	4	4	15	0	23
Low-B					
Total Group	3	10	7	0	20
Test Takers	5	4	5	0	12
Continuing Students	0	0	2	0	2
Drop-out Students	3	4	3	0	10
Low-A					
Total Group	0	2	3	0	5
Test Takers	0	1	0	0	1
Continuing Students	0	0	0	0	0
Drop-out Students	0	1	0	0	1
Medium-C					
Total Group	14	14	34	13	90
Test Takers	10	11	38	12	71
Continuing Students	8	11	36	11	66
Drop-out Students	2	0	2	1	5
Medium-B					
Total Group	5	5	8	3	21
Test Takers	3	4	4	3	14
Continuing Students	1	3	2	2	8
Drop-out Students	2	1	2	1	6
Medium-A					
Total Group	3	2	5	0	10
Test Takers	3	1	3	0	7
Continuing Students	3	1	1	0	5
Drop-out Students	0	0	2	0	2
High-C					
Total Group	2	0	13	3	18
Test Takers	2	0	7	3	12
Continuing Students	2	0	7	3	12
Drop-out Students	0	0	0	0	0
High-B					
Total Group	14	10	40	13	77
Test Takers	11	6	32	11	60
Continuing Students	11	6	31	11	59
Drop-out Students	0	0	1	0	1
High-A					
Total Group	18	14	17	4	53
Test Takers	11	11	15	4	41
Continuing Students	10	11	15	4	40
Drop-out Students	1	0	0	0	1
Totals					
Total Group	70	73	186	45	374
Test Takers	48	47	132	36	263
Continuing Students	35	32	97	31	195
Drop-out Students	13	15	35	4	67

into continuing and dropout students. Further details concerning the SCII test are given in Appendix E.

When utilizing the area of study the student selected rather than the basic personality type of Hypothesis 3, some differences emerge. The sample population numbers are fewer due, in part, to undeclared majors. This missing information concerning study area selection is located in the dropout group at a much higher rate (35.3%) than it is in the continuing students (4.8%). The combination of these two groups had a 16.5 percent rate of missing information. The high numbers of empty cells in the continuing and dropout crosstabulations were again polarized with the empty cells in the lower progress level categories for continuing students and in the higher progress level categories for the dropouts as Table 4:10 shows.

In examining the progress level modes of the various groups, two of them were bimodal as shown in Table 4:11. The investigative study area group had the highest mode (High-A) with 25.7 percent of the students in this study area achieving in this highest progress level category. Second in rank order were the students studying in the art study area whose bimodal frequency was split between High-A and Medium-C (19.2%). Third in rank was the group of students studying in the enterprising area with a bimodal Medium-C and High-B (28.9%). Social was the final study area and Medium-C (26.3%) was the mode for the persons in this discipline. The investigative study area group not only has the

highest progress level category mode of any of the four but they also have the smallest percentage of their students in the lowest category. By comparison, in hypothesis 3, the highest progress level group (artistic types) also had the highest percentage of types in the lowest progress level category of any of the types.

Table 11

Composition of the Sample (in Percentages) of the Areas of Study

	Social	Art	Enterprising	Investigative	N
Total Group	49.7	19.5	12	18.7	374
Mode of Progress Level	Medium-C 26.3	Medium-C High-A 19.2	Medium-C High-B	High-A 25.7	374
Percent in Lowest Category of Progress Level	6.5	11	15.6	5.7	374
Test Takers	50.2	17.9	13.7	18.3	263
Continuing Students	49.7	16.4	15.9	17.9	195
Drop-out Students	52.2	22.4	6	19.4	67

Hypotheses 5 and 6 are formulated to answer the second research question on "What influence do personality and interests have on curricular choice?"

Hypothesis 5. The proportion of students in each personality type is the same for all the majors.

$$H_o: P_{mt} = P_{m\bullet}P_{\bullet t}$$

where P represents probability
m represents the major
t represents the personality type.

Of the four crosstabulations done here on the condensed personality types with the condensed areas of study, chi-squares

were significant in all with the exception of the dropouts. A marked progression toward nonsignificance was in evidence as the N's became smaller. The two highly significant chi-squares (.0003, .0050) and the one other significant chi-square (.0259) form the basis for rejecting the null hypothesis of no relationship between personality type and area of study (Table 4:12). The alternative hypothesis that the area of study and personality are related was accepted.

Table 4:12

Personality and Area of Study

Group	Chi-square	Number
All	.0003**	357
Test takers	.0050**	262
Continuing	.0259*	195
Dropouts	.2065	67

**Highly significant
*Significant

Table 4:13 shows the frequencies of the typologies in the areas of study. All the typologies have a higher incidence of persons in the "social" study area category than in any other area.

Hypothesis 6. The proportion of students in each subject major is the same in all the SCII interest areas.

Table 4:13

Frequency of Personality by Area of Study

	Investigative	Artistic	Social	Enterprising	Totals
Investigative					
Total Group	15*	6	16	2	39
Test Takers	10	2	12	2	26
Continuing Students	7	2	8	2	19
Drop-out Students	3	0	4	0	7
Artistic					
Total Group	19	15*	36	4	74
Test Takers	10	14	21	3	48
Continuing Students	7	10	18	3	38
Drop-out Students	3	4	3	0	10
Social					
Total Group	24	42	91*	19	176
Test Takers	22	25	70	16	133
Continuing Students	19	16	50	14	99
Drop-out Students	3	9	20	2	34
Enterprising					
Total Group	9	8	35	16*	68
Test Takers	6	6	29	4	55
Continuing Students	2	4	21	12	39
Drop-out Students	4	2	8	2	16
Totals					
Total Group	67	71	178	41	357
Test Takers	48	47	132	35	262
Continuing Students	35	32	97	31	195
Drop-out Students	13	15	35	4	67

*Congruency of type and Study Area

$$H_o: P_{mi} = P_{m\bullet} P_{\bullet i}$$

where P represents probability
m represents the major
i represents the interests

Crosstabulations were computed on each of the three most preferred basic interests of the SCII with the condensed area-of-study groupings. The chi-square results, as shown in Table 4:14, was 0.0000 for the first basic interest, 0.0000 for the second basic interest, and 0.0005 for the second interest, and 0.0080 for the third. The dropouts had chi-squares of 0.0000 for the first

basic interest, 0.0077 for the second interest, and 0.0338 for the third interest. This showed a progression that tended toward nonsignificance in the dropout portion of this population. The results were similar when the expanded groupings of study areas were used. Table E-9 in the appendix displays the frequencies of the persons in the study areas and the incidences of the first, second, and third basic interests expressed.

Table 4:14

Study Area and SCII Interests

	Interests 1	Interests 2	Interests 3	N
Total Group	.0000**	.0000**	.0000**	262
Continuing and Graduated	.0000**	.0003**	.0080**	194
Dropouts	.0000**	.0077**	.0338*	68

**Highly significant

*Significant

Since all of these results were highly significant beyond the .05 alpha level, they constitute a basis for rejecting the null hypothesis that the area of study and the interest areas are independent, nonassociated entities. Instead, the alternative was accepted which states that these two factors, majors selected and tested interests, are related.

Summary

Incoming freshmen of 1973 and 1974 constituted a ratio of 35 men to 65 women (7 to 13) in this sample which had a bimodal distribution for the MBTI typologies. Missing information on the testing, high school rank, initial interest, and grade point averages reduce the N's in various statistical computations. The first research question generated four hypotheses. The first hypothesis was tested by crosstabulating interest congruencies with progress level. On the basis of potential for bias, these results were questioned although a significant chi-square was obtained. A Regression Analysis was used to test the second hypothesis with the college GPA as the dependent variable. Significant correlations were found with the SATV, SATM, and high school rank. The third hypothesis related personality and progress level and the crosstabulation produced a chi-square that was statistically significant. Hypothesis four related the areas of study to the progress level and these two, in crosstabulation, had a chi-square of significance. Hypotheses five and six addressed the second research question and had highly significant statistical relationships between the areas of study and personality and the areas of study and interests. The computations were performed on all students with the exception of hypotheses two and six. In addition, a subgroup of students who took both the MBTI and the SCII special tests was utilized and the subgroup was further divided into continuing students and dropouts. Hypotheses two and six utilized

only the test takers and the subsequent divisions. For hypotheses one, three, four and five, composite frequency tables were constructed to show where the differences clustered in the four specified groupings. The next chapter will summarize these results, suggest conclusions, discuss the findings in relation to the literature, and discuss implications of the study.

CHAPTER V

SUMMARY, DISCUSSION, AND IMPLICATIONS

This chapter summarizes the purposes and findings of the study, suggests conclusions, discusses previous related studies, and presents the implications of the findings.

Summary and Findings

This study investigated the variables of congruency, academic ability, personality, and study area as they related to the progress level of the undergraduate in a private four-year residential college. In addition, the influence of interests and personality test results on study areas were explored. Normative student data was collected which included the Strong-Campbell Interest Inventory and the Myers-Briggs Type Indicator. In a longitudinal perspective that followed the student through to graduation, attrition, or continuing status as a student, the variables were crosstabulated either singly or in combinations to detect trends of significance. Crosstabulations were performed with the total group of students and with a subgroup of students who took both the SCII and MBTI special testing. This subgroup was further divided into dropouts and persisters. A Regression Analysis was performed using the college grade point average as the dependent variable to determine the predictive value of college admissions data.

The research questions consisted of

1. What influences do personality, study area, academic potential, and interests have on student achievement and program completion?

2. What influences do personality and interests have on curricular choices?

The findings of the six null hypotheses were as follows:

Hypothesis 1, the testing of no relationship between congruency factors and progress level, was not rejected because of the potential for bias in the congruency scale formulation. The evidence in the composite frequency table of the four groupings (p. 58) was strong even though only one significant chi-square was obtained. Because of insufficient evidence, the relationship or influence of congruency on progress level was not established by the means used in this study.

Hypothesis 2, the testing of no predictive value of admissions data on grades achieved, was rejected on the basis of the F-ratios obtained in the Regression Analysis that indicated significant relationships between the dependent variable, college GPA, and the college entrance test scores and high school rank of the student. The Regression Analysis included two SCII indicators (AACH and OIE) which were not found to be significant as predictors in any of the groups. For the dropouts group, only the verbal portion of the college entrance test was significant.

Hypothesis 3, the testing of no relationship between personality type and progress level, was rejected on the basis of the significant chi-square obtained in the crosstabulation of these two factors which computed on the total group. The other three groupings did not produce significant chi-squares. The composite frequency table of the four groupings (p. 63) further confirmed this rejection. A significant chi-square did appear, thus establishing a relationship between personality type and progress level.

Hypothesis 4, the testing of no relationship between the study area and progress level, was rejected on the basis of the significant chi-square in the crosstabulation for the total group. Again, significant chi-squares were not found for the other three groupings. However, the highly significant chi-square on the total group indicates there is a relationship between the study area and the progress level. The composite frequency table of the four groupings (p. 66) shows where these groupings lie.

Hypothesis 5, the testing of no relationship between the MBTI personality test and the area of study, was rejected on the basis of two highly significant chi-squares. These chi-squares were found in the total group and in the subgroup of test takers. A significant chi-square was also obtained in the continuing student group. Only the dropouts group did not show a significant chi-square from that crosstabulation. The composite frequency table of the four groupings (p. 70) demonstrates

where these groupings lie. The alternative to the hypothesis, that personality types cluster into distinct areas of study, was accepted.

Hypothesis 6, the testing of no relationship between the SCII interest test and the area of study, was rejected on the basis of highly significant chi-squares for all the groupings which established the relationship between these tested interests and the study areas that were chosen.

The findings from this research vary in the strength of their evidence but, in rank order of assurance, it can be noted that:

1. College entrance tests and high school rank remained secure as having some predictive value for the GPA's that were earned in this sample.

2. Tested interests on the SCII were highly related to curriculum decisions made by these students.

3. In this sample, the MBTI personality types clustered in the various areas of study.

4. Progress level, combining GPA and rate of program completion as defined in this study, was ordinally higher in artistic and investigative study areas than in the social and enterprising study areas.

5. For this sample, investigative MBTI personality types tended to achieve higher category levels and persist longer than other types.

6. Although the evidence is limited, there was a measurable relationship between congruency of interests and personality that affects higher levels of achievement and persistence.

Two more trends appeared that were not hypothesized but post hoc analysis of the data showed that (a) a unique and distinct student body typology profile emerged; (b) students for whom all data was available had a higher probability of persistence.

Conclusions

Based on the findings of this study and supportive data, probable conclusions can be stated for individuals, for general tendencies, and for recruitment policies. In addition, the conclusions indicate further research suggestions.

On an individual basis, personality and interest test results serve as predictive indicators for students making curriculum decisions. Since the MBTI personality types cluster into study areas, an effort to match students with the academic program which large numbers of similar trait students have elected, would increase the probabilities of satisfaction for the student so matched.

As a general tendency, since the prsonality types tend to gravitate into specialized areas, the course offerings of a college will have a screening effect on who is attracted and who is not attracted by recruitment efforts. Since course offerings function as a screening device, they should be suitable for

attracting the members of the pool from which potential students are solicited.

From the results of this study, since the probabilities of persisting were higher in this sample for certain distinguishable personality types, if the MBTI were administered along with the intelligence testing in recruitment for college students, a match of student type and college program could lessen the attrition probabilities. Not only does the student need to be matched to the college but also needs to be matched to the program congruent with his/her needs.

Since completeness of student information increases the probabilities of predicting persistence, recruitment could selectively seek the students for whom information is complete.

Although there were patterns in attrition and persistence in relationship to congruency of interest and personality factors, the evidence was not as conclusive as was hoped and further research in this area is indicated. Intellectual factors for prediction were confirmed. However, prediction was not substantially improved by the findings. Further work is indicated in the area of congruency.

Discussion

In the reviews of the literature related to the first hypothesis on congruency and progress level, previous researchers were divided on the influences personality and interests had on

persistence and achievement. Witkin et al, (1977) found cognitive style related to achievement whereas the investigations by Lunneborg (1975 and 1976) showed that student indecision was related to lower grade point averages. Elton and Rose (1971) could not distinguish any differences in the vocationally undecideds and those who remained in an area of study. Walsh and Barrow (1971) could find no personality variables that were associated with the consistency of interests in students. The Witkin field dependency studies present an empirically testable variable that does not duplicate the MBTI typology and, although not incorporated into this study, offers another lead for investigation. In this sample there is some evidence to indicate that when a number of congruencies are scaled using the methodology of this study, those persons with the larger number of congruencies persist longer and achieve higher grade point averages. The composite frequency table of page 58, comparing the group and subgroup divisions, visually demonstrates that the all-matches category tends to cluster in progress level categories above the mode while the no-matches category tends to cluster in the lowest categories of the progress level. It appears that single factor testing, performed on such items as indecision or personality alone, is less predictive but the precise combination of congruency factors that would have consistent predictive value was not established in this sample.

In Hypothesis 2, dealing with the predictive relationships of intelligence and grades earned, the literature was consistent over a period of time in confirming the predictive value of recorded achievements and testing with the actual GPA that was earned. Cronbach in 1949 and Davis in 1976 represent studies done over a 30-year period that confirm these findings. The variables confirmed by this study were the college entrance tests and high school rank. The SCII variables included in the test did not improve the predictive value.

MBTI personality studies relating to the Hypothesis 3 relationships of personality type and progress level, have come from a number of sources such as those done by Rezler (1975) and Williams (1975). These studies confirm the ongoing work of Mary McCaulley at the University of Florida Typology Laboratory where the achievement levels of the various types, the areas of study they tend to enter, and their learning styles are being investigated for significant relationships. In this study, too, there was a significant difference in the achievement levels of certain MBTI personality types. Those in the artistic type category were distinctive in that their highest frequency incidence fell into the highest progress level category while their second highest category fell into the lowest progress level. The other types were clustered in the center of the progress level categories in this sample.

Studies done previously that relate to Hypothesis 4, which tested the study area and progress level relationships, indicate that certain areas of study require higher academic aptitude or capability. In this sample the students in some academic areas achieved higher GPA's than students in other academic areas. Baird (1969) also found these results in his study. In this study, for undetermined reasons, students in the investigative category tend to have higher GPA's. In addition, these students are more likely to persist than students in other areas.

Hypothesis 5 tested the relationships of personality types and academic majors. The clustering effect of MBTI personality types has been investigated both directly and indirectly. Stroops (1971) and Story (1972) found differences between academic majors and also between the elementary and higher education levels within the same discipline. Preferences for teaching higher education levels were associated with the intuitive (N) trait in the Story study. Racial and ethnic groups have been investigated and clustering effects were found. Levy et al, (1972) included racial aspects in his study. Hostetler and Huntington (1974) investigated an ethnic group. In this study a unique student profile emerged. This particular student body profile was divided between the configuration Dunning (1970) found to predominate in humanities people and that which Hostetler and Huntington found to predominate in the ethnic group they studied. As in previous studies, this sample contains a clustering of personality types and the

students in the sample cluster into academic study areas according to their typology traits.

Literature dealing with Hypothesis 6 relationships of the SCII interests and study area decisions has been well documented and confirms the findings of this study. The manual for the SCII instrument cites many examples. Other studies also confirm that professed interest correlates highly with academic study area decisions. Shart (1970) found interest a greater factor than ability in making occupational decisions. This study, too, found highly significan. relationships between the SCII interest tests and the disciplines the students selected.

Post hoc analysis reveals that the dropouts, as a group, had more information data missing, had lower college entrance test scores and lower high school rank. The grades they earned were lower in college. Table B-4 shows the differences in the means and standard deviations of the grades earned by the dropouts and persisters.

Findings of the hypotheses tests and confirmations of the literature provide the basis for making generalized statements as follows:

1. Interest-personality congruencies have, as yet, undetermined value in predicting the probabilities of persistence and achievement.

2. The limited predictive value of college entrance tests and high school rank have not been substantially improved.

3. Persistence and achievement were related to the MBTI personality typology.

4. Students in some academic areas of study achieved-persisted at higher levels than those in other majors.

5. Both the MBTI personality and the SCII interest test results were related to the study areas the students selected.

Implications

Implications from the findings of this study, when viewed in the context of the relevant literature, indicate that limited improvements can be effected now to augment the predictive value of current college recruitment criteria. Recruitment efforts can be expended on students for whom data is complete. Students whose typologies are congruent with the college's program, (whenever typology testing results are known) can be solicited.

The typology profile of the student body indicates the student typology traits that are likely to be attracted by the programs the school offers since curriculum functions as a screening device. The predominant typology profile of students clustered in a specific study area within the school serves to indicate the student typology traits that have a higher probability of persistence and achievement in that area. Colleges seeking to change the student body typology profile in a given direction need to offer programs to attract the chosen profile. For private colleges, their pool configuration limits the types of students

they can attract in sufficient numbers.

Typologies incongruent with particular colleges or college groupings, tend to pull away from their unlike settings and join groups characterized by their own innate features. This accounts for a portion of the dropouts and also for some of the movement from one major study area to another. Law schools and medical schools have been shown to selectively attract a specific MBTI personality profile of students. In addition, a higher attrition rate was found for those who deviated from this type. For recruitment, the probabilities of persistence and high achievement are increased when the student's measured typology is matched to a congruent program. Lynn (1977) advocates research to distinguish personality factors to supplement the Graduate Record Exams which he views as insufficient in determining graduate schools admission.

Inherent implications for further research lie, with highest priority, in the area of congruency matches of interest factors and personality factors as they influence the student's achievement, persistence, and program completion rate. Variables viewed as potentially effective in the congruency list could consist of items such as Witkin's field dependence-independence studies. These factors are empirically testable with the Rod and Frame test and do not duplicate the MBTI traits (p. 15). Additional explorations are needed that juxtapose student MBTI types and specific programs. The screening effects of curriculum offerings in many and varied college settings need further study. In particular,

the personality types who drop out at higher rates in any given study area need analysis.

If refinement of prediction and recruitment procedures is preferable to exploratory broad-spectrum course offerings, then additional empirically based studies of this type are recommended.

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APPENDICES

APPENDIX A: Authorization for the Study

Goshen COLLEGE GOSHEN, INDIANA 46526 PHONE (219) 533-3161

June 1, 1977

TO WHOM IT MAY CONCERN:

This is to certify that Mrs. Rosa Stone, a member of the Goshen College faculty, has received full approval to conduct her proposed research employing data obtained from confidential student files in the Student Development Office. We are satisfied that her methods of data gathering are appropriate and do not violate the confidentiality rights of students. All data are to be analyzed on a group basis rather than individually. Through the use of a coding system, the personal identity of the research subjects will not be known to the researcher. Mrs. Stone has our permission to use the name of Goshen College in reporting the results of her research if she wishes to do so.

Sincerely,

Russel A. Liechty

Russel A. Liechty, Ph.D.
Dean of Students

RAL/bn

Figure A-1

Authorization Letter

Educational Leadership Department

Use of Human Subject Approval

Answer each of the following questions fully. Attach pertinent materials, e.g., copies of the data collection devices, full descriptions of an experimental treatment and description of the data storage and retrieval mechanisms.

Name(s) of principal investigator(s) Rosa Stone

Reason for investigation (i.e., class project or dissertation) Dissertation

Faculty sponsor (if applicable) Dr. Richard E. Kunsterman

1. Does the study involve the collection of data from or about human beings? Yes (If the answer is no, you do not need to submit this form.)

2. In what way will the data be gathered? A former Records Clerk (now retired) will collect the data on an information sheet which requires utilizing Registrar and Personnel Office records. Identification will be removed when data collection is completed, only control will remain in case some information is eventually needed.

3. What are the procedures to be followed in obtaining informed consent for the subjects (include text of the statement to the subjects; if the consent is implied, explain)?

4. Are there any risks to the subjects? If yes, explain how the subjects are made aware of the risks. No.

5. Methods utilized for the safety and well-being of the subjects? Information collected will be used as group data. No individuals will be analysed.

6. If information is anonymous, how will you protect anonymity? Data collection sheets have names and identification numbers on while information is being collected. These will be removed before the material goes into the hands of the researcher. This gives complete anonymity to the collected materials. A numbering system for the completed portion and the identification portion can give the usual researcher-precautions for returning to his data in case unforseen problems should arise.

7. If information gathered is confidential, but not anonymous, explain how confidentiality is protected:

   (a) during the study?

   (b) after the study?

Approval Dr. Ronald A. Lively
Dean of Students

Letter Sent 6/1/77 (Date)

Figure A-2

Authorization Form

APPENDIX B: Class Profiles and Sample Frequencies

Table B-1

N = 450 Goshen College Frequency Distribution of Sample

Class	Males	Females	Totals
1973	84	144	222
1974	74	148	228
Totals	158	292	450

Table B-2

N = 450 GC Student High School Rank

Category	Frequency	Percentage	Cumulative Totals
Upper Tenth	141	31.3%	31.3%
Upper Fourth	127	28.2%	59.5%
Upper Third	40	8.9%	68.4%
Upper Half	65	14.4%	82.8%
Missing and Remainder	77	17.1%	99.9%

Table B-3

N = 416 GC Student High School Size

Category	Frequency	Percent
1- 25	10	2.4%
26- 50	32	7.7%
51- 75	63	15.1%
76-100	32	7.7%
101-150	65	15.6%
151-200	36	8.7%
201-300	75	18.0%
301-400	72	17.3%
401-600	17	4.1%
601-999	14	3.4%

Table B-4

Comparison of Means and Standard Deviations in the Test-taking Group Total and in the Division of this Group into Persisters and Drop-outs

	N	GPA	SATV	SATM	AACH	OIE	H.S. RANK
Test-takers Means	268	3.0120	510.3769	524.4149	45.1306	53.7351	34.2500
Standard Deviation		.5323	105.1807	107.0331	11.4002	12.9948	41.9107
Persisters Means	180	3.1328	519.1167	532.3611	46.2389	53.5000	28.6667
Standard Deviation		.4724	108.7548	107.6914	11.4469	12.8778	38.7226
Drop-outs Means	88	2.7651	492.5000	508.4659	42.8636	54.2159	45.6705
Standard Deviation		.5645	95.5805	104.4948	11.0237	12.0530	45.9257

Table B-5

Freshman Class Profile
1973-74

I. Total Matriculants - 273
Men 102
Women 171

II. Rank in Secondary School

	No.	%
Top 1/10	83	30.4
Top 1/4	173	63.4
Second 1/4	51	18.7
Total Top 1/2	224	82.1
Third 1/4	30	10.9
Lower 1/4	5	1.8
No Class Rank	14	5.1

III. CEEB Scholastic Aptitude Test Scores

	Men		Women	
	Verbal	Math	Verbal	Math
750-800	0	2	1	0
700-749	1	9	6	5
650-699	4	17	4	7
600-649	7	16	19	14
550-599	17	18	27	21
500-549	15	13	29	33
450-499	26	6	31	30
400-449	11	4	20	18
350-399	7	3	13	14
300-349	4	5	9	15
250-299	3	2	3	5
200-249	0	0	2	2
No Scores	7	7	7	7
Totals	95	95	164	164
Mean Scores	491.5	569.3	500.8	485.7

IV. Financial Aid for Freshmen

	Men	Women
Aid Applicants Enrolled with Aid	66	106
Scholarships	$27,915	$45,000
Grants	20,629	51,992
Loans	20,840	44,340
Employment	11,780	26,979
Totals	$81,164	$168,311
Percentage of Need Met as Measured by P.C.S.	100%	100%

V. Geographical Distribution

Brazil	2
Colorado	2
Ethiopia	2
Florida	2
Iowa	5
Illionis	35
Indiana	90
Kansas	2
Michigan	9
Minnesota	5
Nebraska	2
New Mexico	2
New York	5
Ohio	45
Ontario	3
Oregon	5
Pennsylvania	35
South Dakota	2
Virginia	3
Wisconsin	2

1 from each of the following: Alberta, British Columbia, England, Haiti, Idaho, Indonesia, Kenya, Kuwait, Manitoba, Maryland, Montana, New Guinea, New Jersey, Vietnam, Zaire.

VI. Church Affiliation

GC Mennonite	27
Mennonite	140
Other Related Mennonite	5
Church of the Brethren	12
United Methodist	18

Apostolic Christian 1, Baptist 9, Brethren Church 4, Church of God 1, Congregational 1, Episcopal 2, Lutheran 9, Missionary Church 1, Nazarene 1, Presbyterian 7, Roman Catholic 5, United Church of Christ 2, Inter or Non-Denominational 9, Other 13, None 6.

Table B-6

GOSHEN COLLEGE
Freshman Class Profile
1974-75

I. **Total Matriculants - 284**

Men	108
Women	176

II.

Rank in Secondary School	No.	%
Top 1/10	98	34.5
Top 1/4	159	56.0
Second 1/4	74	26.1
Total Top 1/2	233	82.1
Third 1/4	20	7.0
Lower 1/4	10	3.5
No Class Rank	21	7.4

III. CEEB Scholastic Aptitude Test Scores

	Men		Women	
	Verbal	Math	Verbal	Math
750-800	0	3	1	0
700-749	1	9	4	3
650-699	4	8	6	9
600-649	11	16	14	12
550-599	11	18	17	28
500-549	20	13	24	33
450-499	16	7	32	27
400-449	13	9	23	13
350-399	10	3	16	16
300-349	4	5	13	9
250-299	0	1	7	8
200-249	3	1	2	1
No Scores	15	15	17	17
Totals	108	108	176	176
Mean Scores	487.5	555.2	476.6	488.3

IV. Financial Aid for Freshmen

	Men	Women
Aid Applicants Enrolled with Aid	76	121
Scholarships	$22,570	$53,105
Grants	47,847	43,982
Loans	39,600	60,850
Employment	13,891	20,527
Totals	$123,908	$178,454
Percentage of Need Met as Measured by P.C.S.	100%	100%

V. Geographical Distribution

Illinois	25
Indiana	112
Iowa	11
Kansas	4
Michigan	11
Nebraska	2
New York	14
Ohio	41
Ontario	3
Oregon	2
Pennsylvania	31
Puerto Rico	3
Virginia	5

1 from each of the following: Arizona, Belguim, California, Colorado, Florida, Georgia, Indonesia, Jamaica, Lebanon, Malaysia, North Dakota, Nigeria, New Jersey, South Carolina, Tokyo, Texas, Utah, Vietnam, Vermont, Zaire.

VI. Church Affiliation

GC Mennonite	20
Mennonite	166
Other Related Mennonite	1
Unaffiliated Mennonite	1

Baptist 7, Brethren Church 4, Church of the Brethren 5, Church of God 1, Congregational 1, Episcopal 1, Luthern 6, Missionary Church 1, Nazarene 1, Presbyterian 3, Roman Catholic 12, United Church of Christ 5, United Methodist 16, Inter or non-denominational 8, Other 22, None 3.

Table B-7

GOSHEN COLLEGE
Freshman Class Profile
1977-78

I. Total Matriculants - 303
Men 137
Women 166

II. Rank in Secondary School

	No.	%
Top 1/10	109	36
Top 1/4	179	59
Second 1/4	70	23
Total Top 1/2	249	82
Third 1/4	34	11
Lower 1/4	9	3
No Class Rank	11	4

III. CEEB Scholastic Aptitude Test Scores

	Men		Women	
	Verbal	Math	Verbal	Math
750-800	3	6	2	1
700-749	5	5	3	1
650-699	8	20	10	8
600-649	16	21	19	19
550-599	17	14	21	12
500-549	21	23	22	27
450-499	20	18	16	32
400-449	19	12	34	22
350-399	8	2	17	21
300-349	5	3	7	11
250-299	2	3	7	6
200-249	3	0	2	0
No Scores	10	10	6	6
Totals	137	137	166	166
Mean Scores	513	555	493	478

IV. Financial Aid for Freshmen

	Men	Women
Aid Applicants Enrolled with Aid	97	130
Scholarships	$49,474	$69,018
Grants	81,499	86,744
Loans	60,775	80,748
Employment	26,483	34,655
Totals	$218,231	$271,165
Percentage of Need Met as Measured by P.C.S.	100%	100%

V. Geographical Distribution

Arizona	2
Colorado	3
Florida	2
Iowa	3
Illinois	38
Indiana	114
Michigan	10
North Dakota	5
New York	10
Ohio	51
Ontario	2
Oregon	3
Pennsylvania	37
Puerto Rico	2
Somalia	3
Virginia	6

1 from each of the following: Arkansas, California, Louisiana, Massachusetts, Maryland, Missouri, Montana, North Dakota, Texas, British Columbia, Haiti, Japan

VI. Church Affiliation

Mennonite	203
GC Mennonite	15
Other Related Menn.	5

Apostolic Christian 1, Baptist 14, Brethren 1, Church of the Brethren 12, Church of God 2, Episcopal 1, Lutheran 5, Missionary 3, Presbyterian 4, Roman Catholic 5, United Church of Christ 3, United Methodist 7, Other 16, Inter/Non-Denomination 4, None 2.

APPENDIX C: Data Sheets and SPSS Program

_____(Name)

1. Male____Female____ ( )
2. Age (at testing)____ ( )
3. Matriculating year: '73____'74_____ ( )
4. Graduated____total hours_____ ( )
or: attrition date_____hours_____ ( )
or: hours completed as current student____
5. Initial interest_____ ( )
6. Area of study_____ ( )
7. GPA_____based on # of hours_____ ( ) ( )
( )
8. SAT scores: V_____ ( )
M_____ ( )
9. Highest Strong Vocational Basic Interest Scores:
score number_____area_____( ) ( )
_____ _____( ) ( )
_____ _____( ) ( )
10. AACH_____ ( )
11. OIE_____ ( )
12. Myers-Briggs Personality types_____ ( )
13. High School class: Rank_____Size_____ ( )

Special Circumstances:

Figure C-1

Initial Data Collection Form

Table C-1

DISTRIBUTION OF CODING DONE ON A SAMPLE SHEET
29 Variables on 13 Items

Item	Variable	Label	
	1	Coded identification	
1.	2	Gender (male-female)	1. Male____Female____ ( )
2.	3	Age at testing	2. Age (at testing)____ ( )
3.	4	Matriculating year	3. Matriculating year: '73____'74____ ( )
4.	5	Status of student	4. Graduated____total hours_____ ( )
	6	Hours completed	or: attrition date_____hours_____ ( )
	7	Date of attrition (month)	or: hours completed as current student_____
	8	Year of attrition	
5.	9	Initial Interest	5. Initial interest_____ ( )
6.	10	Major	6. Area of study_____ ( )
7.	11	Grade Point Average	7. GPA_____based on # of hours_____ ( ) ( )
	12	Hours GPA is based on	( )
8.	13	SAT verbal	8. SAT scores: V_____ ( )
	14	SAT math	M_____ ( )
9.	15	SCII score (highest)	9. Highest Strong Vocational Basic Interest Scores: score number_____area_____ ( ) ( )
	16	SCII interest area	_____ _____ ( ) ( )
	17	SCII score (second)	_____ _____ ( ) ( )
	18	SCII interest area	
	19	SCII score (third)	10. AACH_____ ( )
	20	SCII interest area	11. OIE_____ ( )
10.	21	AACH (academic potential)	12. Myers-Briggs Personality types_____ ( )
11.	22	OIE (introversion-extraversion scale)	13. High School class: Rank_____Size_____ ( )
12.	23	MBTI I-E (introversion-extraversion scale)	
	24	MBTI S-N (sensation-intuition scale)	
	25	MBTI T-F (thinking-feeling scale)	
	26	MBTI J-P (judging-perceptive scale)	
	27	MBTI Matrix (16 types)	
13.	28	High school rank	
	29	High school size	

```
14-SEP-77 W.M.U. KL10B 603        SPRINT VERSION 2A(1101)-4 RUNNING ON CDR100
$JOB SIMPLE [10130,10133] /TIME:5:00
END OF JOB ENCOUNTERED
610 CARDS READ
BATCH INPUT REQUEST CREATED

*****
BATCON VERSION 13(1071)-4 RUNNING SIMPLE SEQUENCE 2429 IN STREAM 1
INPUT FROM DSKB:SIMPLE.CTL[10130,10133]
OUTPUT TO  DSKB:SIMPLE.LOG[10130,10133]
JOB PARAMETERS
TIME:00:05:00   UNIQUE:YES      RESTART:YES


.LOGIN 10130,10133 /SPOOL:ALL/TIME:300/LOCATE:10/NAME:"STONE R"
JOB 34 W.M.U. KL10B 603 TTY140

QUOTA = $ 50.00 APPROX. BAL. = $ 30.14
1540    14-SEP-77        WED
     FOR A LISTING OF THE COMPUTER CENTER HOURS TYPE:
              .TYPE SYS:HOURS       OR CALL    383-4086

..RUN SPSS [470,470]


SPSS - EXPERIMENTAL, VERSION 6.02 (OF 14-SEP-76)
(PLEASE NOTIFY THE COMPUTER CENTER OF ANY MALFUNCTIONS)
*=LPT:=TTY:/SPACE:5K
>ALLOCATE       TRANSPACE=4000
>RUN NAME       COUNSELING FILE  R. STONE
>VARIABLE LIST  VAR001 TO VAR029
>INPUT FORMAT   FIXED(F3.0,F1.0,F2.0,2F1.0,F3.0,F2.0,3F1.0,F3.0,
>               3F3.0,F2.0,F1.0,F2.0,F1.0,F2.0,F1.0,2F2.0,4F1.0,F2.0,2F3.0)
>INPUT MEDIUM   CARD
>N OF CASES     450
>COMPUTE        VAR104=RND((VAR026/VAR029)*100)
>COMPUTE        VAR105=RND((VAR012/VAR006)*100)
>RECODE         VAR011 (.5 THRU 1.5=1)(1.51 THRU 1.999=2)(2 THRU 2.5=3)
>               (2.51 THRU 2.999=4)(3 THRU 3.5=5)(3.51 THRU HIGHEST=6)
>RECODE         VAR013,VAR014 (200 THRU 250=1)(251 THRU 300=2)
>               (301 THRU 350=3)(351 THRU 400=4)(401 THRU 450=5)
>               (451 THRU 500=6)(501 THRU 550=7)(551 THRU 600=8)
>               (601 THRU 650=9)(651 THRU 700=10)(701 THRU 750=11)
>               (751 THRU 800=12)
>RECODE         VAR020,VAR012 (1 THRU 15=1)(16 THRU 30=2)
>               (31 THRU 45=3)(46 THRU 60=4)(61 THRU 75=5)
>               (76 THRU 90=6)(91 THRU 105=7)(106 THRU 120=8)
>               (121 THRU 135=9)(136 THRU 165=10)
>RECODE         VAR104 (1 THRU 10=1)(11 THRU 25=2)(26 THRU 33=3)
>               (34 THRU 50=4)(51 THRU HIGHEST=5)
>RECODE         VAR105 (0 THRU 10=1)(11 THRU 20=2)(21 THRU 30=3)
>               (31 THRU 40=4)(41 THRU 50=5)(51 THRU 60=6)
>               (61 THRU 70=7)(71 THRU 80=8)(81 THRU 90=9)
>               (91 THRU HIGHEST=10)
>IF             (VAR027 EQ 13)VAR100=1
>IF             (VAR027 EQ 6 OR 4 OR 12)VAR100=2
>IF             (VAR027 EQ 3 OR 11)VAR100=3
>IF             (VAR027 EQ 7 OR 15 OR 2 OR 10 OR 8)VAR100=4
>IF             (VAR027 EQ 9 OR 14 OR 16)VAR100=5
>IF             (VAR027 EQ 1 OR 5)VAR100=6
>IF             (VAR029 EQ 9) VAR101=0
>IF             (VAR009 EQ 1) VAR101=1
>IF             (VAR029 EQ 2) VAR101=2
>IF             (VAR009 EQ 3) VAR101=3
>IF             (VAR009 EQ 4) VAR101=4
>IF             (VAR009 EQ 5) VAR101=5
>IF             (VAR029 EQ 6) VAR101=6
>IF             (   VAR029 EQ 8) VAR101=4
>IF             (   VAR029 EQ 7) VAR101=2
>IF             (VAR010 EQ 9) VAR102=0
```

Figure C-2

SPSS PROGRAM

```
>IF          (VAR010 EQ 1) VAR102=1
>IF          (VAR010 EQ 2) VAR102=2
>IF          (VAR010 EQ 3) VAR102=3
>IF          (VAR010 EQ 4) VAR102=4
>IF          (VAR010 EQ 5) VAR102=5
>IF          (VAR010 EQ 6) VAR102=6
>IF          (VAR010 EQ 7)VAR102 =2
>IF          (VAR010 EQ 8)VAR102 =4
>IF          (VAR004 EQ 3 AND VAR006 GE 8 AND VAR011 EQ 6)VAR106=10
>IF          (VAR004 EQ 3 AND VAR006 GE 8 AND VAR011 EQ 5)VAR106=9
>IF          (VAR004 EQ 3 AND VAR006 GE 8 AND VAR011 EQ 3 OR 4)VAR106=8
>IF          (VAR004 EQ 3 AND VAR006 EQ 6 OR 7 AND VAR011 EQ 6)VAR106=7
>IF          (VAR004 EQ 3 AND VAR006 EQ 6 OR 7 AND VAR011 EQ 5)VAR106=6
>IF          (VAR004 EQ 3 AND VAR006 EQ 6 OR 7 AND VAR011 EQ 3 OR 4)VAR106=5
>>IF          (VAR004 EQ 3 AND VAR006 EQ 3 OR 4 OR 5 AND VAR011 EQ 6)VAR106=4
>>IF          (VAR004 EQ 3 AND VAR006 EQ 3 OR 4 OR 5 AND VAR011 EQ 5)VAR106=3
>>IF          (VAR004 EQ 3 AND VAR006 EQ 3 OR 4
>            AND VAR011 EQ 3 OR 4)VAR106=2
>IF          (VAR004 EQ 3 AND VAR006 EQ 2 AND VAR011 EQ 1 OR 2)VAR106=1
>IF          (VAR004 EQ 3 AND VAR006 EQ 1 AND VAR011 EQ 0 OR 1 AND
>            VAR005 EQ 2)VAR106=0
>IF          (VAR004 EQ 4 AND VAR006 GE 6 AND VAR011 EQ 6)VAR106=10
>IF          (VAR004 EQ 4 AND VAR006 GE 6 AND VAR011 EQ 5)VAR106=9
>IF          (VAR004 EQ 4 AND VAR006 GE 6 AND VAR011 EQ 3 OR 4)VAR106=8
>IF          (VAR004 EQ 4 AND VAR006 EQ 5 AND VAR011 EQ 6)VAR106=7
>IF          (VAR004 EQ 4 AND VAR006 EQ 5 AND VAR011 EQ 5)VAR106=6
>IF          (VAR004 EQ 4 AND VAR006 EQ 5 AND VAR011 EQ 3 OR 4)VAR106=5
>IF          (VAR004 EQ 4 AND VAR006 EQ 3 OR 4 AND VAR011 EQ 6)VAR106=4
>IF          (VAR004 EQ 4 AND VAR006 EQ 3 OR 4 AND VAR011 EQ 5)VAR106=3
>IF          (VAR004 EQ 4 AND VAR006 EQ 3 OR 4 AND VAR011 LE 4)VAR106=2
>IF          (VAR004 EQ 4 AND VAR006 EQ 2 AND VAR011 EQ 1 OR 2)VAR106=1
>IF          (VAR004 EQ 4 AND VAR006 EQ 1 AND VAR011 EQ 0 OR 1 AND
>            VAR005 EQ 2)VAR106=0
>IF          (VAR102 EQ VAR100 AND VAR101 AND VAR016 AND VAR018 OR VAR020)
>            VAR103=5
>IF          (VAR102 EQ VAR101 AND VAR016 OR VAR018 OR VAR020 AND
>            VAR102 NE VAR100)VAR103=4
>IF          (VAR102 EQ VAR016 AND VAR018 OR VAR020 AND VAR102 NE
>            VAR100 AND VAR101)VAR103=3
>IF          (VAR102 EQ VAR101 AND VAR102 NE VAR100 AND VAR016 AND
>            VAR018 AND VAR020)VAR103=2
>IF          (VAR102 NE VAR101 AND VAR100 AND VAR016 AND VAR018 AND
>            VAR020)VAR103=1
>VAR LABELS  VAR001,ID NUMBER/
>            VAR002,SEX/
>            VAR003,AGE AT TESTING/
>            VAR004,MATRICULATING YEAR/
>            VAR005,STATUS LEVEL
>            VAR006,HOURS/
>            VAR007,MONTH OF ATTRITION/
>            VAR008,YEAR OF ATTRITION/
>            VAR009,INITIAL INTEREST/
>            VAR010,AREA OF STUDY/
>            VAR011,GPA/
>            VAR012,NO. OF HOURS/
>            VAR013,SAT VERBAL/
>            VAR014,SAT MATH/
>            VAR015,SCII-SCORE-NO.1/
>            VAR016,SCII-AREA  NO.1/
>            VAR017,SCII-SCORE NO.2/
>            VAR018,SCII-AREA  NO.2/
>            VAR019,SCII-SCORE NO.3/
>            VAR020,SCII-AREA  NO.3/
>            VAR021,AACH SCORE/
>            VAR022,CIE  SCORE/
>            VAR023,MBTI TYPE- FIRST/
>            VAR024,MBTI TYPE SECOND/
>            VAR025,MBTI TYPE THIRD/
>            VAR026,MBTI TYPE FOURTH/
>            VAR027,MBTI MATRIX LOCATION/
>            VAR028,HIGH SCHOOL RANK/
>            VAR029,HIGH SCHOOL SIZE
>            VAR100,MBTI CONVERSION
>            VAR101,CONCERNS INTEREST
>            VAR102,CONCERNS STUDY
```

Figure C-2, Continued

```
>               VAR103,MATCHES
>               VAR104,HS RANK
>               VAR105,GPA-PCT-HOURS
>               VAR106,PROGRESS LEVEL
>VALUE LABELS   VAR002(1)MALE(2)FEMALE/
>               VAR004(3)1973(4)1974/
>               VAR005(1)GRAD(2)DROPOUT(3)STUDENT/
>               VAR009,VAR010(1)REALISTIC(2)INVESTIGATIVE(3)ARTISTIC
>               (4)SOCIAL(5)ENTERPRISE(6)CONVENTIONAL(7)PSYCHOLOGY
>               (8)NURSING(9)INTER-DISP/
>               VAR016,VAR018,VAR020,VAR100,VAR101,VAR102(1)REALISTIC(2)INVESTI
>>               GATIVE(3)ARTISTIC(4)SOCIAL(5)ENTERPRISING(6)CONVENTIONAL/
>               VAR103(5)ALL MATCH(4)INTEREST MATCH(3)AREA-INTERESTS
>               (2)AREA-INITIAL(1)NO MATCH/
>               VAR104(1)U-TENTH(2)U-FOURTH(3)U-THIRD(4)U-HALF(5)L-HALF/
>               VAR105(1)0-10(2)11-20(3)21-30(4)31-40(5)41-50
>               (6)51-60(7)61-70(8)71-80(9)81-90(10)91-HIGHEST/
>               VAR106(10)HIGH-A(9)HIGH-B(8)HIGH-C(7)MED-A(6)MED-B
>               (5)MED-C(4)LO--A(3)LO--B(2)LO--C(1)LO-/
>               VAR006,VAR012(1)1-15(2)16-30(3)31-45(4)46-60(5)61-75(6)76-90
>               (7)91-105(8)106-120(9)121-135(10)136-165/
>               VAR011(1)D(2)C-(3)C(4)C+(5)B(6)A/
>               VAR013,VAR014(1)200-250(2)251-300(3)301-350(4)351-400(5)401-450
>>               (6)451-500(7)501-550(8)551-600(9)601-650(10)651-700
>               (11)701-750(12)751-800/
>               VAR023 TO VAR026(1)I(2)E(3)N(4)S(5)T(6)F(7)J(8)P/
>               VAR027(1)ISTJ(2)ISFJ(3)INFJ(4)INTJ
>               (5)ISTP(6)ISFP(7)INFP(8)INTP
>               (9)ESTP(10)ESFP(11)ENFP(12)ENTP
>               (13)ESTJ(14)ESFJ(15)ENFJ(16)ENTJ
>MISSING VALUES VAR001 TO VAR029,VAR100,VAR101,VAR102,VAR104,VAR105(0)
>READ INPUT DATA
>001210420240845003,166210555847063462260236472368110020037
>002124420300846442,933030000000744744674544400000012211
>003210430004999002,413040300045000357455237650000000015039
>004210420121240333,0000006480649000000000000000130037036073
>005110420391252221,8640390000000000000000001367032111101
>006210411103999443,037000530510575564534245513670302200
>007117430059992292,913058306600654654051136314600062250096
>008110430097999332,093660308520733764604534514670206767524
>009217431112999003,34464900000065461460237621467020019072
>010210420660006443,36365558049065406546044662136007007193
>011210430959990023,421070740600672661654626813670030014270
>012210420510006492,285020430460634612573500672457130042089
>013200420190045292,10501923020000000000000259214670202702050
>014100430749990053,200046590545731172572522372460100016042
>015117430069997422,030659460067060468565344853145701009259
>016210430079990053,155850640530000000000000001467020009103
>017217430959994083,180066647035067464260452312457130031175
>018210420500046093,285021550470581586574317414600000007053
>019210430006999253,462054450430636600453426612467140012063
>020210420510046292,794034445410600263462249591467020006116
>021221430959990093,200058417520000000000000001467020000000
>022210430949990002,964057410390712674654575314670202034369
>023210420000124291,000000340440000000000000001450051130410
>024210430949992223,397070520670731064600159432367150011243
>025210420520460002,054037410350002674633414424601000099342
>026219420210460343,000012340320001593594400200000001135200
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```

Figure C-3, Continued

APPENDIX D: MBTI Characteristics and Typology Frequencies

Table D-1

Frequencies and Percentages of the 16 Types:
Goshen College Freshmen '73 and '74 (N = 433)

	SENSING TYPES		INTUITIVES		
	WITH THINKING	WITH FEELING	WITH FEELING	WITH THINKING	
INTROVERTS JUDGING	ISTJ 13 3%	ISFJ 67 15.5%	INFJ 27 6.2%	INTJ 14 3.2%	INTROVERTS JUDGING
INTROVERTS PERCEPTIVE	ISTP 7 1.6%	ISFP 34 7.9%	INFP 67 15.5%	INTP 12 2.8%	INTROVERTS PERCEPTIVE
EXTRAVERTS PERCEPTIVE	ESTP 8 1.8%	ESFP 30 6.9%	ENFP 57 13.2%	ENTP 7 1.6%	EXTRAVERTS PERCEPTIVE
EXTRAVERTS JUDGING	ESTJ 14 3.2%	ESFJ 47 10.9%	ENFJ 21 4.8%	ENTJ 8 1.8%	EXTRAVERTS JUDGING

Table D-2

N = 433 Goshen College Histogram of Male-Female Frequencies of Each Type

	5 10 15 20 25 30 35 40 45 50 55 60 65 70	Males	Females
ISTJ	mmmmmmfffffff	6	7
ISFJ	mmmmmmmmmmmmmmmmmmmmmmmmfffffffffffffffffffffffffffffffffffffffffff	24	43
INFJ	mmmmmmmmfffffffffffffffffff	8	19
INTJ	mmmmmmmmffffff	8	6
ISTP	mmmmfff	4	3
ISFP	mmmmmmmmmfffffffffffffffffffffffff	9	25
INFP	mmmmmmmmmmmmmmmmmmmmmffffffffffffffffffffffffffffffffffffffffffffff	21	46
INTP	mmmmmmmfffff	7	5
ESTP	mmmmffff	4	4
ESFP	mmmmmmmmmmmmmmmfffffffffffffff	15	15
ENFP	mmmmmmmmmmmmmmmmfffffffffffffffffffffffffffffffffffffffff	16	41
ENTP	mmfffff	2	5
ESTJ	mmmmffffffffff	4	10
ESFJ	mmmmmmmmmmmffffffffffffffffffffffffffffffffffff	11	36
ENFJ	mmmmmmmmfffffffffffff	8	13
ENTJ	mmmmffff	4	4

Males = m
Females = f

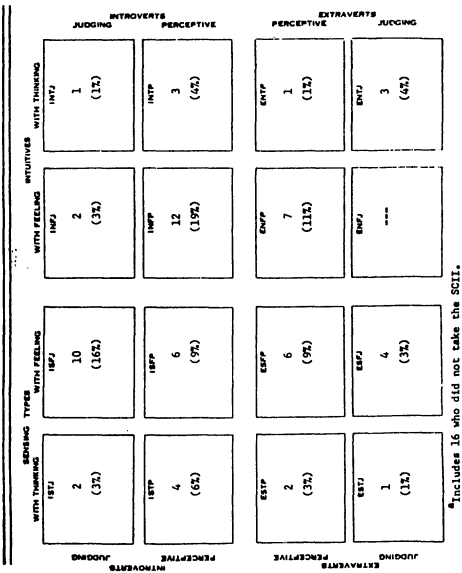
Table D-3

N = 448 Frequency of Individual MBTI Characteristics of GC Students in the Study Areas

	I	E	N	S	T	F	J	P	Graduates	Dropouts	Continuing Students	Total
1. Investigative	41	26	44	23	23	44	32	35	10	19	41	70
2. Artistic	38	33	42	29	10	61	31	40	7	31	35	73
3. Social	60	41	54	47	15	86	50	51	18	33	57	108
4. Enterprising	20	21	10	31	8	33	23	18	4	7	33	44
5. Nursing	31	45	26	50	9	67	50	26	19	26	34	79
6. Interdisciplinary	46	27	33	40	18	55	26	47	--	60	14	74
Totals	236	193	209	220	83	346	212	217	58	176	214	448

Table D-4

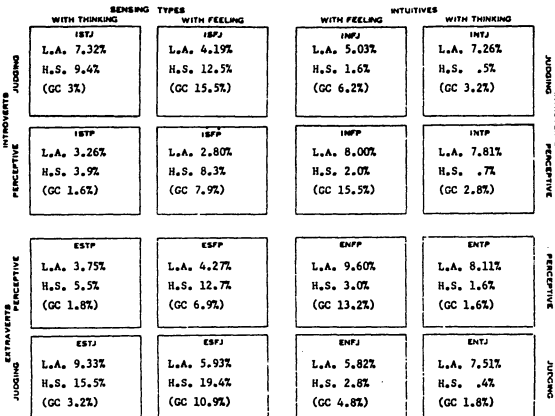
N = 63 Drop-Outs Distribution at GC[a]



[a]Includes 16 who did not take the SCII.

Table D-5

Frequencies: Liberal Arts (N = 3676), High School Non-College Prep (N = 433)



Goshen College N = 433

Table D-6

Percentage Frequencies of the 16 Types in Selected Educational Levels and Fields of Study

MALES

Penna. H.S. Students (Coll.Prep Group) (N = 3503)

ISTJ	ISFJ	INFJ	INTJ
8.08	3.97	2.11	4.68
ISTP	ISFP	INFP	INTP
5.14	4.37	4.17	5.97
ESTP	ESFP	ENFP	ENTP
7.74	6.42	7.14	7.88
ESTJ	ESFJ	ENFJ	ENTJ
15.67	6.48	3.54	6.65

National Merit Finalists (N = 671)

ISTJ	ISFJ	INFJ	INTJ
5.37	1.04	4.62	16.39
ISTP	ISFP	INFP	INTP
3.13	0.89	12.07	15.95
ESTP	ESFP	ENFP	ENTP
1.04	1.49	9.4	11.62
ESTJ	ESFJ	ENFJ	ENTJ
3.43	0.89	4.17	8.64

Engineering Students (N = 2188)

ISTJ	ISFJ	INFJ	INTJ
10.15	4.20	5.26	13.76
ISTP	ISFP	INFP	INTP
2.24	1.92	5.03	8.73
ESTP	ESFP	ENFP	ENTP
3.06	1.33	5.67	7.27
ESTJ	ESFJ	ENFJ	ENTJ
9.00	3.29	6.12	12.98

Liberal Arts College Students (N = 3676)

ISTJ	ISFJ	INFJ	INTJ
7.32	4.19	5.03	7.26
ISTP	ISFP	INFP	INTP
3.26	2.80	8.00	7.81
ESTP	ESFP	ENFP	ENTP
3.75	4.27	9.60	8.11
ESTJ	ESFJ	ENFJ	ENTJ
9.33	5.93	5.82	7.51

Business Students (Wharton) (N = 488)

ISTJ	ISFJ	INFJ	INTJ
9.02	3.89	.20	2.66
ISTP	ISFP	INFP	INTP
7.17	1.43	2.25	3.07
ESTP	ESFP	ENFP	ENTP
12.91	6.97	6.15	7.17
ESTJ	ESFJ	ENFJ	ENTJ
21.72	8.81	1.64	4.92

Science Students (Caltech) (N = 705)

ISTJ	ISFJ	INFJ	INTJ
5.53	1.70	6.24	18.16
ISTP	ISFP	INFP	INTP
2.55	2.13	8.23	17.45
ESTP	ESFP	ENFP	ENTP
1.70	0.14	7.80	11.21
ESTJ	ESFJ	ENFJ	ENTJ
1.84	1.13	3.82	10.35

FEMALES

Mass. H.S. (Non-Prep Group)* (N = 433)

ISTJ	ISFJ	INFJ	INTJ
9.4	12.5	1.6	.5
ISTP	ISFP	INFP	INTP
3.9	8.3	2.0	.7
ESTP	ESFP	ENFP	ENTP
5.5	12.7	3.0	1.6
ESTJ	ESFJ	ENFJ	ENTJ
15.5	19.4	2.8	.4

Mass. H.S. (College Prep Group)* (N = 168)

ISTJ	ISFJ	INFJ	INTJ
3.4	7.5	1.4	2.0
ISTP	ISFP	INFP	INTP
2.7	4.7	5.5	4.8
ESTP	ESFP	ENFP	ENTP
3.4	18.3	10.2	.7
ESTJ	ESFJ	ENFJ	ENTJ
11.5	16.9	4.1	2.7

*Data taken from the Myers-Briggs Manual, 1962.

Table D-7

CHARACTERISTICS OF THE TYPES IN HIGH SCHOOL

		SENSING TYPES	
		WITH THINKING	WITH FEELING
INTROVERTS PERCEPTIVE	JUDGING	**ISTJ** Serious, quiet, earns his success by earnest concentration and unhurried thoroughness. Logical and orderly in his work and dependable in all he does. Sees to it that everything he touches is well organized. Takes responsibility of his own accord. Makes up his own mind as to what should be accomplished and works toward it steadily, regardless of protests or distractions.	**ISFJ** Quiet, friendly, responsible and conscientious. Works devotedly to meet his obligations and serve his friends and school. Thorough and painstaking, accurate with figures, but needs time to master technical subjects, as reasoning is not his strong point. Patient with detail and routine. Loyal, considerate, concerned with how other people feel even when they are in the wrong.
	PERCEPTIVE	**ISTP** Quiet, reserved, a sort of cool onlooker at life, observing and analyzing it with detached curiosity and unexpected flashes of original humor. Interested mainly in mechanics, in cars, in sports and in business. Exerts himself only as much as he considers actually necessary, even if he happens to be a star athlete.	**ISFP** Retiring, quietly friendly, sensitive, hates argument of any kind, is always too modest about his abilities. Has no wish to be a leader, but is a loyal, willing follower. Puts things off to the last minute and beyond. Never really drives himself about anything, because he enjoys the present moment and does not want it spoiled.
EXTRAVERTS PERCEPTIVE	PERCEPTIVE	**ESTP** Matter-of-fact, doesn't worry or hurry, always has a good time. Likes mechanical things, cars and sports, with friends on the side. A little blunt and insensitive. Can take school or leave it. Won't bother to follow a wordy explanation, but comes alive when there is something real to be worked, handled or taken apart. Can do math and technical stuff when he sees he will need it.	**ESFP** Outgoing, easy-going, uncritical, friendly, very fond of a good time. Enjoys sports and making things, restless if he has to sit still. Knows what's happening and joins in helpfully. Literal-minded, tries to remember rather than to reason, is easily confused by theory. Has good common sense and practical ability, but is not at all interested in study for its own sake.
	JUDGING	**ESTJ** Practical, realistic, matter-of-fact, with a natural head for business. Likes the mechanics of things. Not interested in subjects that he sees no actual use for, but can apply himself when necessary. Is good at organizing and running school activities, but sometimes rubs people the wrong way by ignoring their feelings and viewpoints.	**ESFJ** Warm-hearted, talkative, popular, conscientious, interested in everyone, a born cooperator and active committee member. Has no capacity for analysis or abstract thinking, and so has trouble with technical subjects, but works hard to master the facts in a lesson and win approval. Works best with plenty of praise and encouragement. Always doing something nice for someone in a practical way.

Table D-7 Continued

CHARACTERISTICS OF THE TYPES IN HIGH SCHOOL

INTUITIVES

WITH FEELING	WITH THINKING
INFJ Gifted and original student who succeeds through combination of intelligence, perseverance, and desire to please. Puts his best efforts into his work because he wouldn't think of doing less than his best. Quiet, conscientious, considerate of others, widely respected if not popular, but suffers socially from unwillingness to compromise where a principle or conviction is involved.	**INTJ** Has a very original mind and a great amount of drive which he uses only when it pleases him. In fields which appeal to his imagination he has a fine power to organize a job or piece of work and carry it through with or without the help of others. He is always sceptical, critical and independent, generally determined, and often stubborn. Can never be driven, seldom led.
INFP Particularly enthusiastic about books, reads or tells the parts he likes best to his friends. Interested and responsive in class, always attentive and quick to see what the teacher is leading up to. Has a warm, friendly personality but is not sociable just for the sake of sociability and seldom puts his mind on his possessions or physical surroundings.	**INTP** Quiet, reserved, brilliant in exams, especially in theoretical or scientific subjects. Logical to the point of hair-splitting. Has no capacity for small talk and is uncomfortable at parties. Primarily interested in his studies and wouldn't care to be president of his class. Liked by his teachers for his scholarship and by the few fellow-students who get to know him for himself.
ENFP Warmly enthusiastic, high-spirited, ingenious, imaginative, can do almost anything that interests him. Quick with a solution for any difficulty and very ready to help people with a problem on their hands. Often relies on his spur-of-the-moment ability to improvise instead of preparing his work in advance. Can usually talk his way out of any jam with charm and ease.	**ENTP** Quick, ingenious, gifted in many lines, lively and stimulating company, alert and outspoken, argues for fun on either side of any question. Resourceful in solving new and challenging problems, but tends to neglect routine assignments as a boring waste of time. Turns to one new interest after another. Can always find excellent reasons for whatever he wants.
ENFJ Responsive and responsible. Feels a real concern for what others think and want, and tries always to handle things with due regard for the other fellow's feelings and desires. Can lead a group discussion or present a proposal with ease and tact. Sociable, popular, active in school affairs, but puts time enough on his lessons to do good work.	**ENTJ** Hearty, frank, able in studies and a leader in activities. Particularly good in anything requiring reasoning and intelligent talk, like debating or public speaking. Well-informed and keeps adding to his fund of knowledge. May be a bit too positive in matters where his experience has not yet caught up with his self-confidence.

JUDGING — INTROVERTS — PERCEPTIVE

PERCEPTIVE — EXTRAVERTS — JUDGING

Note. Data taken from the Myers-Briggs Manual, 1962.

Table D-8

CONTRIBUTION MADE BY EACH PREFERENCE TO EACH TYPE

SENSING TYPES

	WITH THINKING	WITH FEELING
INTROVERTS JUDGING	**ISTJ** I Depth and concentration S Thoroughness and respect for detail T Realism, analysis, logic, critical faculty J Organization	**ISFJ** I Depth and concentration S Thoroughness and respect for detail F Sympathetic handling of people J Organization
INTROVERTS PERCEPTIVE	**ISTP** I Depth and concentration S Realism and observation T Capacity for analysis and logic P Adaptability	**ISFP** I Depth and concentration S Observation and attention to detail F Capacity for devotion and sympathy P Adaptability
EXTRAVERTS PERCEPTIVE	**ESTP** E Ease with environment S Observation, realism, enjoyment, reliance on experience T Impersonality, with structural, mechanical and some analytical ability P Adaptability	**ESFP** E Ease with environment S Observation, realism, enjoyment, reliance on experience F Sociability, no analytical powers P Adaptability
EXTRAVERTS JUDGING	**ESTJ** E Ease with environment S Practicality, observation, reliance on experience T Logical, executive, decisive, critical, demands efficiency J Organization	**ESFJ** E Ease with environment S Reliance on experience, observation, no analysis F Sympathetic awareness of people, grasp of group feeling J Organization

Table D-8, Continued

CONTRIBUTION MADE BY EACH PREFERENCE TO EACH TYPE

INTUITIVES

WITH FEELING		WITH THINKING		
INFJ		**INTJ**		JUDGING
I	Depth and concentration	I	Depth and concentration	INTROVERTS
N	Insight and penetration, originality, grasp of the complicated	N	Insight and penetration, originality, grasp of the complicated	
F	Sympathetic understanding and handling of people	T	Analysis, logic, impersonal critical faculty	
J	Organization	J	Organization	
INFP		**INTP**		PERCEPTIVE
I	Depth and concentration	I	Depth and concentration	
N	Insight, ingenuity, grasp of the complicated	N	Insight, ingenuity, grasp of the complicated	
F	Capacity for devotion and sympathy	T	Capacity for analysis and logic	
P	Adaptability	P	Adaptability	
ENFP		**ENTP**		PERCEPTIVE
E	Ease with environment	E	Ease with environment	EXTRAVERTS
N	Drive for projects, initiative, versatility, ingenuity, invention	N	Drive for projects, initiative, versatility, ingenuity, invention	
F	Enthusiasm, insight into people, persuasiveness, charm	T	Objectivity, analysis, some executive ability	
P	Adaptability	P	Adaptability	
ENFJ		**ENTJ**		JUDGING
E	Ease with environment	E	Ease with environment	
N	Interest in possibilities, facility with language, insight	N	Awareness of possibilities, insight, ingenuity, bent for experiment	
F	Sympathetic awareness of people, grasp of group feeling	T	Logical, executive, decisive, critical, demands efficiency	
J	Organization	J	Organization	

Note. Data taken from the Myers-Briggs Manual, 1962.

Table D- 9

EFFECTS OF EACH PREFERENCE IN WORK SITUATIONS

INTUITIVES	SENSING TYPES
Like solving new problems	Dislike new problems unless there are standard ways to solve them.
Dislike doing the same thing over and over again.	Like an established routine.
Enjoy learning a new skill more than using it.	Enjoy using skills already learned more than learning new ones.
Work in bursts of energy powered by enthusiasm, with slack periods in between.	Work more steadily, with realistic idea of how long it will take.
Frequently jump to conclusions.	Must usually work all the way through to reach a conclusion.
Are patient with complicated situations.	Are impatient when the details get complicated.
Are impatient with routine details.	Are patient with routine details.
Follow their inspirations, good or bad.	Rarely trust inspirations, and don't usually get inspired.
Often tend to make errors of fact.	Seldom make errors of fact.
Dislike taking time for precision.	Tend to be good at precise work.

PERCEPTIVES	JUDGING TYPES
Tend to be good at adapting to changing situations.	Best when they can plan their work and follow the plan.
Don't mind leaving things open for alterations.	Like to get things settled and wrapped up.
May have trouble making decisions.	May decide things too quickly.
May start too many projects and have difficulty in finishing them.	May dislike to interrupt the project they are on for a more urgent one.
May postpone unpleasant jobs.	May not notice new things that need to be done.
Want to know all about a new job.	Want only the essentials needed to get on with it.
Tend to be curious and welcome new light on a thing, situation or person.	Tend to be satisfied once they reach a judgment on a thing, situation or person.

Table D-9, Continued

EFFECTS OF EACH PREFERENCE IN WORK SITUATIONS

INTROVERTS	EXTRAVERTS
Like quiet for concentration.	Like variety and action.
Tend to be careful with details, dislike sweeping statements.	Tend to be faster, dislike complicated procedures.
Have trouble remembering names and faces.	Are often good at greeting people.
Tend not to mind working on one project for a long time uninterruptedly.	Are often impatient with long slow jobs.
Are interested in the idea behind their job.	Are interested in the results of their job, in getting it done and in how other people do it.
Dislike telephone intrusions and interruptions.	Often don't mind the interruption of answering the telephone.
Like to think a lot before they act, sometimes without acting	Often act quickly, sometimes without thinking.
Work contentedly alone.	Like to have people around.
Have some problems communicating.	Usually communicate well.

FEELING TYPES	THINKING TYPES
Tend to be very aware of other people and their feelings.	Are relatively unemotional and uninterested in people's feelings.
Enjoy pleasing people, even in unimportant things.	May hurt people's feelings without knowing it.
Like harmony. Efficiency may be badly disturbed by office feuds.	Like analysis and putting things into logical order. Can get along without harmony.
Often let decisions be influenced by their own or other people's personal likes and wishes.	Tend to decide impersonally, sometimes ignoring people's wishes.
Need occasional praise.	Need to be treated fairly.
Dislike telling people unpleasant things.	Are able to reprimand people or fire them when necessary.
Relate well to most people.	Tend to relate well only to other thinking types.
Tend to be sympathetic.	May seem hard-hearted.

Note. Data taken from the Myers-Briggs Manual, 1962.

Table D-10

MUTUAL USEFULNESS OF THE OPPOSITES

INTUITIVE NEEDS A SENSING TYPE:	SENSING TYPE NEEDS AN INTUITIVE:
To bring up pertinent facts	To see the possibilities
To remember things that weren't relevant at the time they happened	To supply ingenuity on problems
To read over a contract	To deal with a complexity having too many imponderables
To check records, read proof, score tests	To explain what another intuitive is talking about
To notice what ought to be attended to	To look far ahead
To inspect	To furnish new ideas
To keep track of detail	To "spark" things that seem impossible
To have patience	

THINKER NEEDS A FEELING TYPE:	FEELING TYPE NEEDS A THINKER:
To persuade	To analyze
To conciliate	To organize
To forecast how others will feel	To find the flaws in advance
To arouse enthusiasm	To reform what needs reforming
To teach	To weigh "the law and the evidence"
To sell	To hold consistently to a policy
To advertise	To stand firm against opposition
To appreciate the thinker himself	

Note. Data taken from the Myers-Briggs Manual, 1962.

Table D-11

MYERS-BRIGGS TYPE INDICATOR

UNDERSTANDING THE TYPE TABLE

FOUR PREFERENCES ARE SCORED TO ARRIVE AT A PERSON'S TYPE

DOES THE PERSON'S INTEREST FLOW MAINLY TO

- **E** — THE OUTER WORLD OF ACTIONS, OBJECTS AND PERSONS? — EXTRAVERSION
- **I** — THE INNER WORLD OF CONCEPTS AND IDEAS? — INTROVERSION

DOES THE PERSON PREFER TO PERCEIVE

- **S** — THE IMMEDIATE, REAL, PRACTICAL FACTS OF EXPERIENCE AND LIFE? — SENSING
- **N** — THE POSSIBILITIES, RELATIONSHIPS AND MEANINGS OF EXPERIENCES? — INTUITION

DOES THE PERSON PREFER TO MAKE JUDGMENTS OR DECISIONS

- **T** — OBJECTIVELY, IMPERSONALLY, CONSIDERING CAUSES OF EVENTS & WHERE DECISIONS MAY LEAD? — THINKING
- **F** — SUBJECTIVELY AND PERSONALLY, WEIGHING VALUES OF CHOICES & HOW THEY MATTER TO OTHERS? — FEELING

DOES THE PERSON PREFER MOSTLY TO LIVE

- **J** — IN A DECISIVE, PLANNED AND ORDERLY WAY, AIMING TO REGULATE & CONTROL EVENTS? — JUDGMENT
- **P** — IN A SPONTANEOUS, FLEXIBLE WAY, AIMING TO UNDERSTAND LIFE AND ADAPT TO IT? — PERCEPTION

THE LOCATION OF THE 16 PREFERENCE TYPES ON THE TYPE TABLE

ISTJ	ISFJ	INFJ	INTJ
ISTP	ISFP	INFP	INTP
ESTP	ESFP	ENFP	ENTP
ESTJ	ESFJ	ENFJ	ENTJ

EXTRAVERSION-INTROVERSION

I
E

SENSING-INTUITION

S	N

THINKING-FEELING

T	F	T

JUDGMENT-PERCEPTION

J
P
J

Table D-11, Continued

THE THEORY: DOMINANT AND AUXILIARY FUNCTIONS FOR EACH TYPE

According to Jung's *theory of psychological types*, everyone uses all four *functions* (S, N, T, F), and adopts all four *attitudes* (E, I, J, P). The types are called *preference types* because people in each type *prefer* one of the two *perceptive functions* (S or N), and one of the two *judgment functions* (T or F). These preferences appear in the 2 middle letters of the type formula. Types also differ in the functions they prefer to use when in the introverted or extraverted attitudes.

The most preferred, or favorite, or *dominant function*, is extraverted in E types and introverted in I types. The second favorite or *auxiliary function* is introverted in E types and extraverted in I types. The type table below shows these relationships for each of the 16 MBTI types.

ISTJ INTROVERTED SENSING with Thinking Sensing is dominant and introverted Thinking is auxiliary and extraverted	**ISFJ** INTROVERTED SENSING with Feeling Sensing is dominant and introverted Feeling is auxiliary and extraverted	**INFJ** INTROVERTED INTUITION with Feeling Intuition is dominant and introverted Feeling is auxiliary and extraverted	**INTJ** INTROVERTED INTUITION with Thinking Intuition is dominant and introverted Thinking is auxiliary and extraverted
ISTP INTROVERTED THINKING with Sensing Thinking is dominant and introverted Sensing is auxiliary and extraverted	**ISFP** INTROVERTED FEELING with Sensing Feeling is dominant and introverted Sensing is auxiliary and extraverted	**INFP** INTROVERTED FEELING with Intuition Feeling is dominant and introverted Intuition is auxiliary and extraverted	**INTP** INTROVERTED THINKING with Intuition Thinking is dominant and introverted Intuition is auxiliary and extraverted
ESTP EXTRAVERTED SENSING with Thinking Sensing is dominant and extraverted Thinking is auxiliary and introverted	**ESFP** EXTRAVERTED SENSING with Feeling Sensing is dominant and extraverted Feeling is auxiliary and introverted	**ENFP** EXTRAVERTED INTUITION with Feeling Intuition is dominant and extraverted Feeling is auxiliary and introverted	**ENTP** EXTRAVERTED INTUITION with Thinking Intuition is dominant and extraverted Thinking is auxiliary and introverted
ESTJ EXTRAVERTED THINKING with Sensing Thinking is dominant and extraverted Sensing is auxiliary and introverted	**ESFJ** EXTRAVERTED FEELING with Sensing Feeling is dominant and extraverted Sensing is auxiliary and introverted	**ENFJ** EXTRAVERTED FEELING with Intuition Feeling is dominant and extraverted Intuition is auxiliary and introverted	**ENTJ** EXTRAVERTED THINKING with Intuition Thinking is dominant and extraverted Intuition is auxiliary and introverted

THE 4 COLUMNS: COMBINATIONS OF PERCEPTION AND JUDGMENT

SENSING PLUS THINKING	SENSING PLUS FEELING	INTUITION PLUS FEELING	INTUITION PLUS THINKING
ST	**SF**	**NF**	**NT**
PRACTICAL AND MATTER-OF-FACT	SYMPATHETIC AND FRIENDLY	ENTHUSIASTIC AND INSIGHTFUL	LOGICAL AND INGENIOUS
Like using abilities in	Like using abilities in	Like using abilities in	Like using abilities in
TECHNICAL SKILLS WITH FACTS AND OBJECTS	PRACTICAL HELP AND SERVICES FOR PEOPLE	UNDERSTANDING & COMMUNICATING WITH PEOPLE	THEORETICAL AND TECHNICAL DEVELOPMENTS
for example in	for example in	for example in	for example in
Applied science Business Production Construction and many more	Patient care Community service Sales Teaching and many more	Behavioral science Research Literature & art Teaching and many more	Physical Science Research Management Forecasts & Analysis and many more

THE 4 QUADRANTS: COMBINATIONS OF ATTITUDE AND PERCEPTION

INTROVERSION AND SENSING	INTROVERSION AND INTUITION
IS	**IN**
KNOWLEDGE IS IMPORTANT TO ESTABLISH TRUTH	KNOWLEDGE IS IMPORTANT FOR ITS OWN SAKE
"THOUGHTFUL REALISTS"	"THOUGHTFUL INNOVATORS"
EXTRAVERSION AND SENSING	**EXTRAVERSION AND INTUITION**
ES	**EN**
KNOWLEDGE IS IMPORTANT FOR PRACTICAL USE	KNOWLEDGE IS IMPORTANT FOR CREATING CHANGE
"ACTION-ORIENTED REALISTS"	"ACTION-ORIENTED INNOVATORS"

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APPENDIX E: SCII Groupings and Frequencies

Table E-1

SCII GENERAL THEME GROUPINGS, GOSHEN COLLEGE CURRICULUM MAJORS, TYPOLOGIES

GROUP 1[1]	GROUP 2	GROUP 3	GROUP 4
SCII Realistic: (Agriculture, nature, adventure, military, mechanical)	SCII Investigative: (Science, math, medical service, medical science)	SCII Artistic: (Drama, music, art, writing)	SCII Social: (Teaching, Social Service, athletics, domestic arts, religious)
GC Majors offered: Tropical Agriculture	GC Majors offered: Biology Chemistry Math Natural Science Physics	GC Majors offered: Art Communications Music Languages: (English, French, German, Spanish)	GC Majors offered: Bible-Religion Social Work Elementary Education Secondary Education: (History, Physical Education, Sociology) Comajors: Peace, World Service
Typologies: ESTJ	Typologies: INTP, INTJ, ENTP	Typologies: INFJ, ENFP	Typologies INFP, ENFJ, ISFJ, ESFP, ISFP

GROUP 5	GROUP 6[2]	GROUP 7 (added)	GROUP 8 (added)	GROUP 9 (added)
SCII Enterprising: (Public speaking, law/politics, merchandising, sales, business, management	SCII Conventional: (Office practices)	GC Major: Psychology*	GC Major: Nursing**	GC Major: Interdisciplinary***
GC Majors offered: Business Economics Politics and Society Home Ec Teacher	GC Majors offered: none			
Typologies: ESTP, ESFJ, ENTJ	Typologies: ISTJ, ISTP			

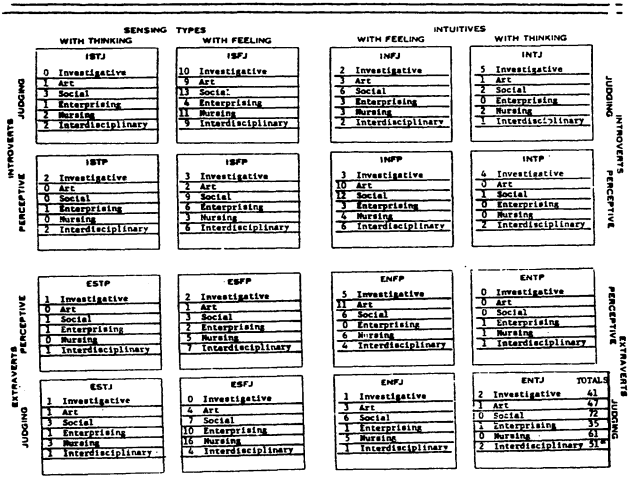
TOTALS: 25 SCII Basic Interests in 6 General Themes or Groupings. One Group has no corresponding GC Major.
27 defined Majors in 8 groupings.

*Psychology is placed in Group 2, Investigative, for statistical computations.
**Nursing is included in Group 4, Social, for statistical computations.
***Interdisciplinary is inherently a many-Group or cross-Group discipline and is not included under a specific group.

[1] Combined with Group 2 for tabulations
[2] Combined with Group 5 for tabulations

Composite Table E-2

N = 307 Goshen College Student MBTI and Majors Matrix



	SENSING TYPES WITH THINKING	SENSING TYPES WITH FEELING	INTUITIVES WITH FEELING	INTUITIVES WITH THINKING	
INTROVERTS JUDGING	ISTJ 0 Investigative 1 Art 3 Social 1 Enterprising 2 Nursing 2 Interdisciplinary	ISFJ 10 Investigative 9 Art 13 Social 4 Enterprising 11 Nursing 9 Interdisciplinary	INFJ 2 Investigative 3 Art 6 Social 3 Enterprising 3 Nursing 2 Interdisciplinary	INTJ 5 Investigative 1 Art 2 Social 0 Enterprising 2 Nursing 1 Interdisciplinary	JUDGING INTROVERTS
INTROVERTS PERCEPTIVE	ISTP 2 Investigative 0 Art 0 Social 1 Enterprising 0 Nursing 2 Interdisciplinary	ISFP 3 Investigative 2 Art 9 Social 6 Enterprising 3 Nursing 6 Interdisciplinary	INFP 3 Investigative 10 Art 12 Social 3 Enterprising 4 Nursing 6 Interdisciplinary	INTP 4 Investigative 0 Art 1 Social 0 Enterprising 0 Nursing 2 Interdisciplinary	PERCEPTIVE INTROVERTS
EXTRAVERTS PERCEPTIVE	ESTP 1 Investigative 0 Art 1 Social 1 Enterprising 0 Nursing 1 Interdisciplinary	ESFP 2 Investigative 1 Art 3 Social 2 Enterprising 5 Nursing 7 Interdisciplinary	ENFP 5 Investigative 11 Art 6 Social 0 Enterprising 6 Nursing 4 Interdisciplinary	ENTP 0 Investigative 0 Art 0 Social 1 Enterprising 1 Nursing 1 Interdisciplinary	PERCEPTIVE EXTRAVERTS
JUDGING EXTRAVERTS	ESTJ 1 Investigative 1 Art 3 Social 1 Enterprising 3 Nursing 1 Interdisciplinary	ESFJ 0 Investigative 4 Art 7 Social 10 Enterprising 16 Nursing 4 Interdisciplinary	ENFJ 1 Investigative 3 Art 6 Social 1 Enterprising 5 Nursing 1 Interdisciplinary	ENTJ TOTALS 2 Investigative 41 1 Art 47 0 Social 72 1 Enterprising 35 0 Nursing 61 2 Interdisciplinary 51*	JUDGING EXTRAVERTS

*Nine continuing students.

Table E-3

N = 41 Frequency Distribution (and percent) of GC Investigative Students

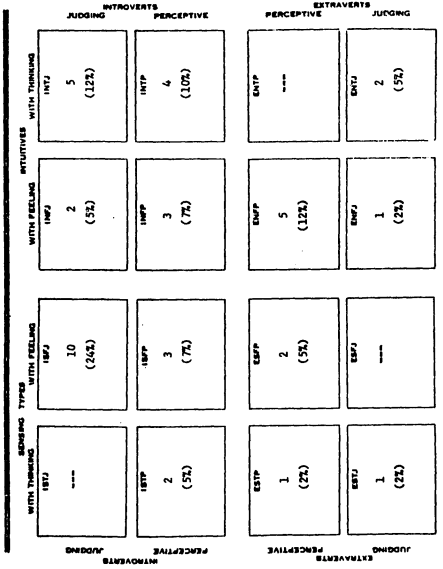


Table E-4

N = 47 Frequency Distribution (and percent) of GC Art Students

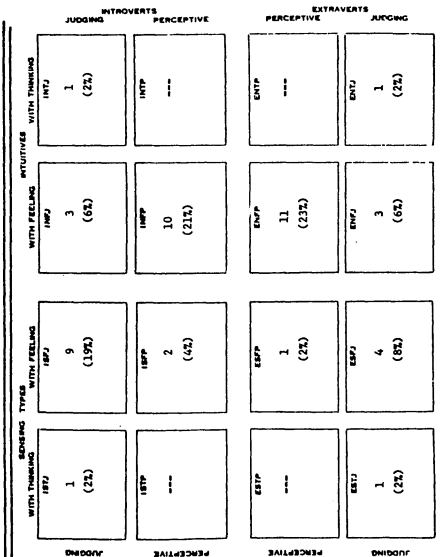


Table E-5

N = 72 Frequency Distribution (and percent) of OC Social Students

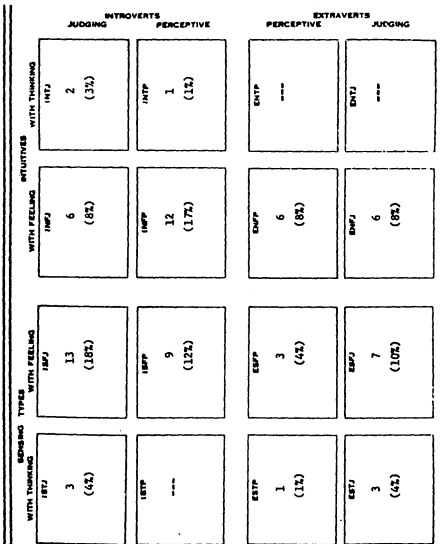


Table E-6

N = 35 Frequency Distribution (and percent) of GC Enterprising Students

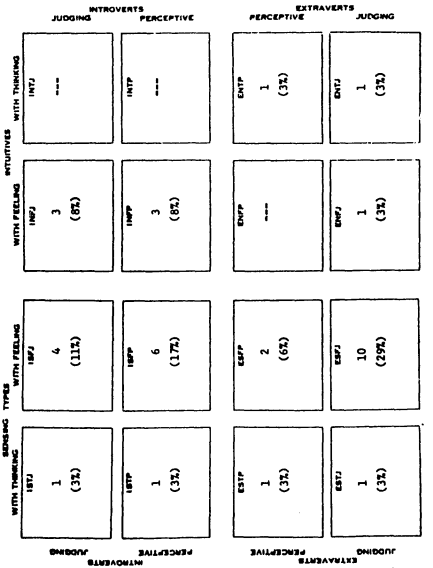


Table E-7

N = 61 Frequency Distribution (and percent) of GC Nursing Students

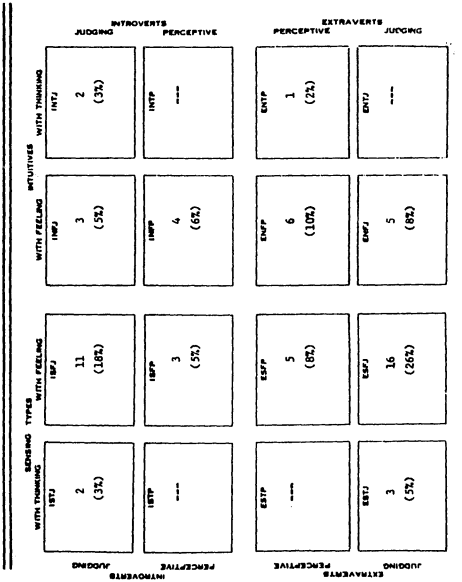


Table E-8

N = 51 Frequency Distribution (and percent) of GC Interdisciplinary Students

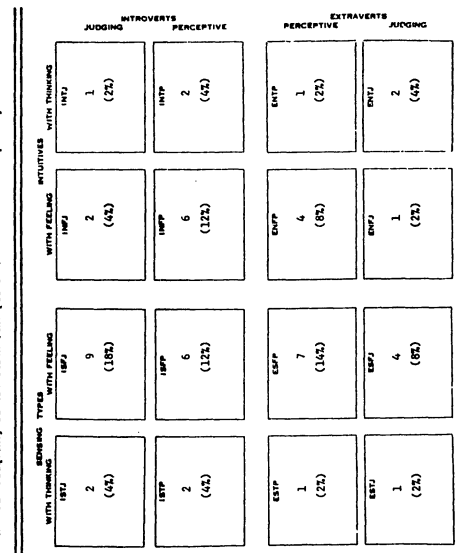


Table E-9

N = 262 Comparison of GC Student Study Areas and SCII Interest Areas[a]

	Area of Study Frequency	Interests				% Chosen	% Actual	Difference
		1st	2nd	3rd	Average			
1. Realistic	0	34	29	30	31	12%	0%	-12%
2. Investigative	48	55	45	44	48	18%	18%	same
3. Artistic	47	33	45	41	40	15%	18%	+3%
4. Social	132	109	113	107	110	42%	50%	+8%
5. Enterprising	35	19	19	26	21	8%	13%	+5%
6. Conventional	0	12	11	14	12	5%	0%	-5%
Totals	262					100%	99%	

[a]Undesignated majors are not included.

Table E-10

N = 286 Comparison of GC Student Initial Interest and SCII Interests[a]

	Initial Interest Frequency	Interests 1st	2nd	3rd	Average	% Chosen	% Actual	Difference
1. Realistic	1	39	26	35	33	11%	0%	-11%
2. Investigative	70	59	48	51	53	18%	25%	+7%
3. Artistic	48	42	51	49	47	17%	17%	same
4. Social	144	113	129	110	117	41%	50%	+9%
5. Enterprising	23	21	20	25	22	8%	8%	same
6. Conventional	0	12	12	16	13	5%	0%	-5%
Totals	286					100%	100%	

[a]Undesignated Initial Interest is not included.

Table E-11

N = 287 Initial Interests and Personality Type Distribution of GC Students[a]

	ISTJ	ISFJ	INFJ	INTJ	ISTP	ISFP	INFP	INTP	ESTP	ESFP	ENFP	ENTP	ESTJ	ESFJ	ENFJ	ENTJ
1. Realistic	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0
2. Investigative	3	13	2	4	2	7	8	6	2	5	7	0	1	5	2	3
3. Artistic	0	8	3	3	0	1	11	0	0	2	10	1	2	3	3	1
4. Social	4	30	10	4	0	11	18	0	1	9	14	2	6	24	10	2
5. Enterprising	1	3	1	0	0	5	1	1	1	2	1	0	0	5	1	1
Total Frequencies	8	54	16	11	2	24	39	7	4	18	32	3	9	37	16	7

[a]Undesignated Initial Interest are not included.