

PERSONALITY CHARACTERISTICS AND STUDY SKILLS
OF POST-SECONDARY TECHNICAL INSTITUTE STUDENTS

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by

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ABSTRACT

This research examined the relationship between Jungian personality characteristics and the study habits of college students. Male and female applied science college students completed the Myers-Briggs Type Indicator (Myers, 1962) and the Survey of Study Habits and Attitudes (Brown and Holtzman, 1967). The dichotomous personality preferences which were examined included introversion and extroversion, sensing and intuition, thinking and feeling, and judgement and perception. The study habits examined included delay avoidance, work methods, teacher approval, education acceptance, and their composites. Post hoc analysis treated age along with the personality preferences as a predictor variable. Stepwise multiple regression analysis was applied to the data.

Results indicated that while delay avoidance for males can be explained on the basis of the judgement-perception dimension, none of the other habits and attitudes examined for either males or females could be explained on the basis of personality characteristics. When the male and female subgroups were combined the judgement-perception dimension contributed to the explanation of delay avoidance, as it had for the male subgroup, but none of the other dependent study skills variables for the total group were explained by personality characteristics. The inclusion of age in the prediction of study habits revealed an important relationship in delay avoidance; regardless of personality characteristics, older female students had more delay avoidance than

their younger counterparts had. Age did not have a significant effect on any of the study skills variables for male students.

In view of these findings, it was recommended that counsellors and educators treat students and their study problems with respect for the uniqueness of each situation. Possible reasons for these findings, implications for those involved with students and study skills instruction, and suggestions for further research were made.

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CHAPTER 1

INTRODUCTION

Considerable attention in educational research has centered around the effectiveness of study skills programs and the characteristics of college students who participate in these programs (Entwistle, 1960; Bednar & Weinberg, 1970; Mitchell & Piatowski, 1974; Kirschenbaum & Perri, 1982). However, those who voluntarily participate in these programs appear atypical of the general college population (Robyak, 1978). The present study specifically focuses on the interrelation of personality characteristics with study habits and attitudes of college students who have not been exposed to study skills courses. This area has attracted a great deal of speculation, but little research (Entwistle & Wilson, 1977; Kirschenbaum & Perri, 1982).

Students with different personality characteristics learn in different ways (Caldwell, 1965; McCaulley, 1978; McCaulley & Natter, 1974); accordingly, it can be expected that they will study in different ways (Entwistle & Wilson, 1977). Main (1980) highlights the importance of understanding the interrelation of personality characteristics and study habits in his discussion of study skills counselling. He suggests that good study methods are not the sole prerequisite for academic achievement, that suitable study skills are unique to each individual, and that individuality of the student ought to be appreciated in all discussions of studying and learning.

The role of personality characteristics and study habits in academic achievement should be a major concern of colleges, instructors,

and students. Cross (1976), in reviewing the vast literature on academic achievement, concludes that achievement, or lack thereof, is not a purely cognitive matter. Traditionally, research has examined the predictability of college achievement by studying cognitive criteria such as previous academic achievement and scholastic aptitude. However, more recent evidence questions the validity of such traditional measures for college students. For example, Lindquist (1975) found that the scores from scholastic aptitude tests had little, if any, practical application in predicting the achievement of community college vocational students. Similarly, Dalton (1976) concluded that the ability to predict college grades from the Scholastic Aptitude Test and high school grades seems to be decreasing.

This change in predictability of college grades parallels a major social change of the last two decades; non-traditional students are entering higher education at unprecedented rates. They differ academically and demographically from traditional college students (Cross, 1976); many have been away from high school for years, and most are not hindered, in the admission process, by their inability to compete scholastically with the bright, high achieving, direct entry high school graduate. The college students involved in the present study represent a broad cross-section of students; some registered immediately after completing high school, others have some University training and yet others are mature admissions students who had not completed high school requirements during adolescence.

Study methods (McAusland & Stewart, 1974; Sexton, 1965; Miller, 1970; Entwistle & Wilson, 1977; Entwistle & Brennan, 1971) and

personality characteristics (Entwistle & Brennan, 1971; Stricker, Schiffman & Ross, 1965; Robyak & Downey, 1978, 1979) are established as two variables which contribute to the academic achievement equation. How different students study needs to be examined, so that instructors and colleges can design instruction and study skills programs to serve as aids towards the academic achievement of individual students (Main, 1980).

Purpose of the Study

The purpose of the present study was to examine the relationship between the study habits of college students with different personality characteristics. The Jungian theory of personality, a typology based on four dimensions, served as the framework through which reported study habits and attitudes were examined.

Definition of Terms

Study Habits and Attitudes

The terms "study," "study habits and attitudes," "study methods," and "study approaches" are used interchangeably in the literature reviewed for the present study. The Survey of Study Habits and Attitudes (SSHA) is a one hundred item self-report inventory of various study habits and attitudes; by checking off one of five frequency categories ("rarely", "sometimes", "frequently", "generally", or "almost always") for each item, the respondent obtains scores in seven categories. As the inventory items on the SSHA touch on the many behaviors and attitudes dealt with in the literature review and the present study itself, the subscales of the SSHA served as operational

definitions. Those subscales are Delay Avoidance, Work Methods, Teacher Acceptance, and Education Approval; the first two subscales, in combination, comprise the Study Habits subscale, the next two comprise the Study Attitudes subscale, and all four additively comprise the Study Orientation scale.

Personality

The personality characteristics examined in the present study are those operationalized by the Myers-Briggs Type Indicator (MBTI). The MBTI (Form G) is a 126 item self-report, untimed inventory in which the respondent selects the one of two or three responses for each item which most aptly reflects their personal response to the stated situation. They include relative preferences on four continuous dimensions: extroversion-introversion, sensing-intuition, thinking-feeling, and judgement-perception. The MBTI is concerned with individual differences among people which result from their use of relative preferences on four dichotomous dimensions of personality characteristics. Each person's personality is defined, then, by a relative preference for the attitudes of extroversion or introversion, the perception methods of sensing or intuition, the judgement methods of thinking or feeling and also by the relative preference of judgement or perception in dealing with the outer world. The MBTI generates 16 personality types, each defined by a combination of four letters which stand for the preferred poles of each of the four dichotomies, Extroversion-Introversion (EI), Sensing-Intuition (SI), Thinking-Feeling (TF) and Judgement-Perception (JP). The present study is not concerned with the 16 types, as such, but with relative preferences on each of the

four dimensions.

Extroversion is defined as the attitude in which energy and interest are directed mainly to the world of actions, objects, and persons. Introversion is the attitude in which energy and interest are directed mainly to the world of concepts and ideas.

Sensing perception is defined as the tendency to observe that which is real, immediate, and practical in experience. Intuition is the interest in seeing possibilities, meanings, and relationships among events.

Thinking judgement is the rational process of reaching conclusions objectively, logically, and analytically. Feeling judgement is the rational process of weighing values to decide the importance of issues to oneself and others.

Judgement is defined by a desire to plan, organize, and control one's environment. Perception, on the other hand, is the desire to understand, experience, and adapt to the environment (Myers, 1962, 1977).

College Students

College students are defined as those individuals enrolled in post-secondary, non-university credit programs. Those college students involved in the present study are, specifically, students in applied science technology courses at Kelsey Institute in Saskatchewan. Kelsey Institute is a public post-secondary, non-university credit granting institution offering a variety of programs, including two year technology programs.

Sequential Students

Sequential students are those who have not been away from the regular school system for one year or more. Non-sequential students, on the other hand, have been away from the regular school system for at least one year.

Assumptions

As subjects from three similar, but characteristically separate, applied science programs are involved in the study, and as they are exposed to similar evaluation methods, it is assumed that during this particular academic year each course exposed its students to similar types of criterion tasks with similar frequency. For example, the preparation of weekly laboratory reports is a similarity among all three programs. Anderson and Armbruster (1980) suggest that the greater the appropriateness of the study technique to the criterion task, the more favorable the evaluation outcome. It may be assumed then, that the particular content of the assignment, for example a laboratory experiment, will not affect the variance of results to a significant extent, whereas different study techniques might affect the variance. For purposes of a laboratory experiment, for example, it would be expected that reading the lab manual would be more effective than making notes based on the theory text. As all students must perform the evaluation task, in this example laboratory experiments, with similar frequency and similar testing environments, they had similar degrees of exposure to these common types of evaluation tasks. Field assignments, written short answer and essay examination are the other types of

evaluation tasks common to all three programs.

A second major assumption is that learning style and study methods represent trait, rather than state, characteristics. The present study is grounded on the hypothesis that one set of trait characteristics, that of study habits and attitudes, can be explained by another set of traits, that of personality characteristics. Cross (1979) discusses Witkin and Berry's (1975) review of 179 cross-cultural reports on cognitive style. She suggests that people probably learn habitual ways of responding to their environment early in life. One's cognitive style is determined by these habits which are spontaneously applied to specific situations without conscious choice. Counsellors and instructors may suggest that people can be taught to make conscious choices about which cognitive processes to use in given situations, such deliberate choices being termed cognitive strategies. The present study assumes, then, that the learning or cognitive style is a trait characteristic and that specific study techniques, or cognitive strategies, although predictable on the basis of cognitive style, can be changed and adopted as the criterion task may demand.

Limitations of the Present Study

This research project involved first year students enrolled in three applied science technology courses at a technical institute. The generalization of this study's findings to other technical institute students may, therefore, be limited.

A second limitation concerns differences between the evaluation methods used by each of the three programs in which subjects were

enrolled. Curricula differed considerably among the three courses whose students were involved in the present study; accordingly, the content on which students are evaluated is different from program to program.

Nonetheless, one important similarity is that all three programs are applied sciences. A second similarity is that the types of criterion tasks, or evaluation methods, employed are common to all three programs. Specifically, students are evaluated on the basis of laboratory reports, field assignments, and a combination of short answer and essay written examinations taken at regular intervals throughout the year. Anderson and Armbruster (1980) contend that almost any study technique can be effective if it is used in a manner appropriate to the mode of evaluation; the particular curriculum content was not assumed to play a role in the results of the present study as all subjects were exposed to similar modes of evaluation, and as they are all enrolled in the broad discipline of applied sciences. It is also assumed that all students have equal opportunity to employ study techniques appropriate to the same variety of evaluation methods.

A third limitation arises from the self-report nature of both the Myers-Briggs Type Indicator and the Survey of Study Habits and Attitudes. The subjectivity of self-report measures may have produced somewhat different results than objective, observation methods might have generated.

CHAPTER II

REVIEW OF THE LITERATURE

The literature reviewed for this study was intended to provide a framework for the examination of the effects of personality on study habits and attitudes. First the particular personality theory on which the present study is based, Jungian theory, is described both in terms of its original development, and in terms of its later influence on Myers' and Briggs' development of the Myers-Briggs Type Indicator. The second focus of the literature review is on the study habits and attitudes of college students. In particular, Anderson and Armbruster's (1980) work in building a framework of the elements of study behavior is described. As well, the interrelation of learning style and personality type is discussed. Finally, several studies examining the question of the interrelation of study habits and personality type are reviewed. The literature reviewed is intended to demonstrate an interrelation between study habits and personality characteristics.

Personality Type

The Swiss physician-psychologist, C. G. Jung, developed one of the most comprehensive of current theories to explain human personality. This theory of personality type (Jung, 1923) postulates that much apparently random variation in human behavior is actually quite orderly and consistent; its framework is developed around the attitudes of extroversion and introversion and the four basic mental processes of

sensing, intuition, thinking, and feeling. Each of the three pairs, respectively, contain two dichotomous preferences used by everyone, but not equally preferred and developed. Every type uses all four processes, but persons of each type are distinguished by their relative preferences for each of the four, and by the introversion or extroversion attitude in which they are used.

The word "type," in Jung's theory of psychological types, refers to a particular class of persons in terms of the three mutually independent pairs of dichotomous variables. Individuals belong to given categories or types, and can always be typified by their combination of preferences. Although the word "type" usually connotes a static system, Jung's theory emphasizes that development and command of relative preferences is dynamic; it is developed and enhanced with life experience.

In normal development, persons of each type are motivated to use the processes and attitudes which they are predisposed to prefer; through practice, they develop expertise in the activities for which their preferences are particularly useful. Skills and refined interests grow from "specializing" in preferences, and lead to characteristics, habits, attitudes and traits associated with the type. In early life, development involves discovering natural predispositions and developing attitude and function preferences by meeting challenges with purposeful effort. Early life is a period of specialization, and failure to specialize was characterized by Jung as resulting in a primitive or undifferentiated personality. The theory allows for continued growth and development throughout life, as each type comes to increased

appreciation of and command over attitudes and functions which were of lesser interest and development early in life. In midlife, rare individuals may be developed to the point where they can transcend their preferred function and move from one to another as the situation demands.

In reviewing recent developments which seemed most promising for the future, Carlson (1975) identified a major turnaround in personality study; she cites widespread dissatisfaction with the former dominant modes of enquiry--simple, linear, quantitative, causal models for prediction of overt behaviors--as the reason for the recent fundamental reorientations in conceptualizations and enquiry. Specifically, she suggests that

the promise of a 'new' theoretical framework of complexity and power may be found in the accelerated rediscovery of Jungian thought... The bases for psychologists' earlier neglect of Jung's work now seem to commend (sic) it to our attention: the emphasis upon nativism, symbolism, the intrinsic duality in human nature, and upon the proactive quality of inner experiences...Jung's own writings, like those of his current interpreters, tend more toward metapsychological and therapeutic issues than toward providing an explicit framework for empirical enquiry. Thus considerable effort may be required in aligning Jungian theoretical insights with appropriate research procedures. However, this task seems both feasible and worthwhile, as several recent contributions demonstrate. (Carlson, 1975, 397).

Carlson (1975) further suggests that research on Jungian typology may be

greatly facilitated by the availability of the Myers-Briggs Type Indicator (Myers, 1962, 1977) which, she maintains, combines intuitive appeal to subjects with psychometric stability and an increasingly firm record for construct validity.

The Myers-Briggs Type Indicator (MBTI) is a psychological instrument concerned primarily with variations in normal attitudes and behavior, rather than with psychopathology. The purpose of the Indicator is to operationalize Jung's theory of type.

Early in this century Katherine C. Briggs became interested in personality differences and developed her own typology from biographies. When Jung's book Psychological Types ([1921] 1971) was published, Briggs realized that Jung's typology was congruent with her own effort but was much more complete. Briggs and her daughter, Isabel Briggs Myers, spent their lifetimes working to develop the MBTI, with the goal of implementing Jung's theory of personality type. In 1962 the Educational Testing Service published a research version of the MBTI, and by 1975 the instrument was made widely available for research and clinical application by the Consulting Psychologists Press; a supplementary manual was published in 1977 (Myers, 1977).

Myers' instrumentation of Jung's theory involves preferences and terminology central to the MBTI. Four dichotomous preferences are scored in the MBTI. Three of these variables--extroversion-introversion (EI), sensing-intuition (SN), and thinking-feeling (TF)--are explicit in Jung's theory. The judgement-perception (JP) dimension is implicit in his theory and was made explicit by Myers in order to identify the dominant function.

The Attitudes: Extroversion and Introversion

The major part of Jung's ([1921] 1971) Psychological Types is devoted to the history and description of extroversion and introversion, which are referred to as fundamental human attitudes. In the extroverted attitude, attention seems to flow out to the objects and people of the environment. There is a desire to act on the environment, to increase its effect. In the introverted attitude, energy seems to flow from the object back to the subject, who consolidates it within her own person. Although everyone uses extroversion and introversion processes daily, an individual habitually adopts the preferred attitude and develops typical characteristics. Extroverted types are characterized by sociability, outspokenness, ease of communication, reliance on the environment for stimulation and an action-oriented way of meeting life. Introverted types are typically characterized by thoughtfulness, contemplative detachment, interest in clarity of concepts and ideas, and reliance on enduring concepts rather than external events for decision-making.

The Four Functions

Jung postulated the existence of four basic functions, or mental processes which represent the individual's orientation to consciousness. The functions are sensation (S), intuition (N), thinking (T), and feeling (F). Jung defined a function as "a particular form of psychic activity that remains the same in principle under varying conditions" (Jung, [1921] 1971), 436). The functions are not related to one another.

Myers (1962, 1977) calls sensing ("sensation" in Jung's terminology) and intuition the two basic perceptual processes. She suggests that they are "irrational" in that they are beyond reason, or attuned to the flux of

events. Sensing refers to perception of the observable by way of the senses; it establishes what exists. Intuition refers to perception of possibilities, meanings, and relationships by way of insight. Jung characterized intuition as perception by way of the unconscious. Those whose primary perceptual orientation is sensing typically develop acute powers of observation, a memory for facts and detail, a capacity for realism, and an enjoyment of the pleasures of the immediate moment. Those who use primarily intuition are attuned to future possibilities, often creative ones, develop the ability to see patterns at theoretical and abstract levels, and use their imagination.

Thinking and feeling, in Jung's view, are the two basic modes of decision-making, or judgement. He called them both the "rational" functions, directed towards managing a harmonious life within the laws of reason. Thinking is the function that links ideas together by means of concepts, and the development of logical connections. Feeling is the function that arranges the contents of consciousness according to their value. Thinking types typically develop strong powers of analysis, objective evaluation, a logical, future-directed, and sequential time perspective, and a tough-minded scepticism. Those oriented to life through feeling develop sensitivity to others' values, a need for affiliation, a capacity for warmth, and a time orientation emphasizing values of the past.

Myers (1962) added the judging-perceiving (JP) index in order to measure an individual's preferred way of dealing with the outer world. Judging types are organized and systematic; they live in a planned, orderly manner and strive to regulate and control life. Extroverted

judging types consistently choose either of the thinking or feeling functions, over the less well developed sensing or intuition functions, to deal with the outer world; the inverse (sensing or intuition) is true for introverts, as they are predominantly involved with the inner world of thoughts and ideas. Perceptive types are more curious and open-minded; they go through life in a flexible, spontaneous way, aiming to understand and adapt to life. Extroverted perceptive types choose either of the thinking or feeling functions to deal with the outer world; inversely, introverts who are perceptive types will prefer either of the sensing or intuition function over their less well developed thinking or feeling function. Unlike the other dimensions measured by the Myers-Briggs Type Indicator, judgement and perception were never explicitly defined by Jung as independent functions, although the distinction between judging types and perceiving types is implied in Jung's theory.

As one of the four functions (S,N,T, or F) becomes dominant, an auxiliary function develops to complement the dominant function. If the dominant function is perception (P), the auxiliary will be judgement (J). Conversely, if the dominant function is a judging function then the auxiliary will provide perception. Depending on whether the individual is an introvert or extrovert either pair of sensing-intuition and thinking-feeling will contain the dominant function, with the other pair containing the auxiliary function.

The MBTI identifies sixteen personality types by using a four letter formula to describe the preferred attitude (E or I), the four functions (S or N, and T or F), and the preference for either the

perception functions SN (P), or the judging functions TF (J). For example, ENFJ would characterize a person who prefers the extroverted attitude, and shows this primarily through feeling judgements; less often shown, but available for balance, is perception by way of intuition. In addition to using the sixteen types, research studies have focused on various single and combined attitudes and functions.

Study Habits and Attitudes

Among the research reviewed for the present study, only one article specifically provides a definition of the term "study." Anderson and Armbruster (1980), in their review of study research and theory, offer this definition: "Studying is a special form of reading. The way that studying differs from 'ordinary reading' is that studying is associated with the requirement to perform identifiable cognitive and/or procedural tasks."

Empirical measures of study approaches are characterized by their lack of attention to a basic conceptual framework. The Survey of Study Habits and Attitudes (Holtzman & Brown, 1967) as an example, purports to serve as a "measure of study methods, motivation for studying, and certain attitudes towards scholastic activities which are important in the classroom" (p. 5). Particular behaviors and attitudes which serve as the one hundred items on the instrument are the only further explanation of exactly what is meant by the term "study."

Anderson and Armbruster (1980) used a two component framework to order the elements and portray the picture of what is known about how students study. The first component includes variables related to the

student and the material to be learned. Important student variables include knowledge of the criterion task, knowledge of the course material and motivation. Content variables include text materials covered, organization or structure, and other features affecting readability. The authors focus specifically on knowledge of the criterion task, as it is directly associated with studying as compared to other types of reading. They do not discuss personality characteristics, but allude to them in their reference to cognitive style. The second component includes processing variables, those factors involved in getting information from the written page into the student's mind. Processing variables include the initial focusing of attention, the subsequent encoding of the information attended to, and retrieval of information for the criterion task. Anderson and Armbruster conceptualize the outcome of studying as a function of the interaction of the two sets of variables. Finally, they examine research on common study techniques, including underlining, note-taking, summarizing, student questioning, outlining, and diagrammatic representation of text material.

Knowledge of the criterion task, suggest Anderson and Armbruster (1980), is directly related to the effectiveness of studying. The research reviewed examines three levels of student awareness: complete knowledge of the criterion test, some information but not the actual test items, and little knowledge. Fourteen studies of complete awareness, particularly those where students were given adjunct questions inserted in course materials, indicated a 10.8% higher test performance than when those adjunct questions were not repeated as test

items. The mid-range of awareness studies include research on the use of behavioral objectives and typographical cueing on text. Behavioral objectives research deals with the effect on learning of giving students a set of objectives which typically include information about the topic to be learned and how students can demonstrate mastery of the material. Typographical cueing investigates the effect on learning of underlining and other techniques of physically highlighting sections of the prose. It is presumed that these techniques cue information that is likely to be tested. Both techniques appear to facilitate learning, but to a lesser extent than the use of adjunct questions; Anderson and Armbruster conclude that this finding is consistent with the hypothesis that performance on the criterion task is a function of the knowledge of the task. In the third line of research, where students are given little knowledge of the criterion task, students are typically told only the type of items. The use of multiple choice and essay questions were compared; the reanalysis reveals that students instructed to study for an essay exam learned more ideas of high importance than did those instructed to study for multiple-choice tests. In addition, students preparing for multiple-choice tests learned more ideas of low importance than high importance. Again, the authors conclude that the more specific the knowledge of the criterion task, the greater the effectiveness of studying.

Knowledge of the criterion task must be accompanied by processing of the relevant information in order for studying to be effective. For information on the criterion task to cause students to change their study strategy, the students must believe that a more favorable outcome

can be expected on the criterion test if they study differently. The actual study behaviors, or what students do in response to their knowledge or beliefs about what the task demands, are referred to by Anderson and Armbruster (1980) as processing variables. The primary tasks which they identify are focusing attention and encoding; in other words, students must select important ideas and segments of the course materials and must ensure that this material is understood and likely to be retained. Reynolds (1979) studied effects of the attention monitoring and controlling techniques of college students who read timed course materials. Times were greater when students were dealing with more relevant text segments than with less important information. Both the amount of initial inspection time and the amount of time concentrating on relevant segments were directly related to improved performance on corresponding test items. A number of other studies where study or reading rate are manipulated are cited in the review, all supporting this model of attention focusing. Anderson and Armbruster appear confident in concluding that there is an important relationship between the amount of time spent focusing attention on task-relevant information and performance on related criterion test items.

The processing variables related to studying may be viewed from two theoretical frameworks. According to the principle of encoding specificity (Tulving & Thompson, 1973), the way in which information is encoded determines how it is stored, which in turn determines which retrieval cues will access it. Accordingly, the optimal form of processing is ultimately dependent on the nature of the retrieval task. Again, knowledge of the criterion task will dictate subsequent behavior.

If the student knows the exact questions to be asked, he should study the answers; if he only knows the general type of task, he should concentrate on the class of appropriate responses to tasks of that type.

The second framework is concerned with the qualitative nature of processing. The student must ensure that the requisite information is processed in such a way that it is stored and available when needed to perform the criterion task. This framework is known as "levels of processing" (Anderson, 1970, 1972; Craik & Lockhart, 1972). Stimuli are analyzed in a hierarchy of processing stages, from an analysis of physical or sensory features to extraction of meaning; greater depth implies a greater degree of semantic analysis. In other words, what is stored in memory is dependent on the kinds of operations performed on the input. The extent to which students attend to, interact with, and elaborate on the underlying meaning of course material will be directly related to performance on recall and comprehension tasks.

Anderson and Armbruster (1980) conclude: "Together then, the principles of encoding specificity and levels of processing suggest that studying will be effective if students process the 'right' information' in the 'right way'." They define 'right information' with respect to the criterion task and 'right way' in terms of a meaningful level of involvement with the text" (p.13). Anderson and Armbruster (1980) pursue this principle in their examination of research on specific study techniques. Included are studies on underlining, note-taking, summarizing, student questioning, outlining, and diagrammatic representation of the text. They suggest that almost any technique can be effective if its use is accompanied by focused attention and

encoding in a form and manner appropriate to the criterion task.

In drawing conclusions about the research on common studying techniques, Anderson and Armbruster suggest that almost any technique can be effective if used with focused attention and encoding in a form and manner appropriate to the criterion task. Some techniques have greater potential for criterion tasks requiring greater comprehension and/or recall. Outlining and the diagrammatic representation techniques all force students to identify or develop relationships which convey the meaning of the text; they require deeper processing, and may, therefore, have greater effectiveness. These techniques, however come at some cost; they must be taught to the student, and the student must invest considerable time and energy.

Two additional variables influencing study habits which are not directly addressed by Anderson and Armbruster (1980) are learning style and personality type. An individual's approach to global and specific learning demands may be determined by the learning style and personality type which influence the processing strategies around which Anderson and Armbruster have developed their framework.

Lawrence (1979) and Kiersey and Bates (1978) discuss learning style on the basis of Myers' model of psychological type. They maintain, on the basis of systematic observation, that each psychological type has a preferred learning style, and that determination of the type will lead to information about the way in which one learns.

Lawrence (1979) breaks down motivation for academic tasks into four parts, corresponding to the four dimensions of type identified by the Myers-Briggs Type Indicator. First, the broad areas of a student's

natural interest are ascertained by the extroversion-introversion (E1) preference. Second, the sensing-intuition (SN) preference reveals basic learning style differences. Then, the thinking-feeling (TF) dimension shows patterns of commitments and values. Finally, Lawrence suggests that the judging-perceiving (JP) dimension indicates work habits. McCaulley and Natter (1974) validated the preference of different types for both classroom learning style and preference for various media of instruction. The specific findings of the McCaulley & Natter study are dealt with in the research hypotheses. The present study examines the study habits and attitudes used by college students to process the material presented in the classroom; specifically, it examines the interrelation of personality type with study habits and attitudes.

Interrelation of Personality Type and Study Habits and Attitudes

Rutkowski and Domino (1975) concluded that there is "a definite and pronounced relationship between study skills variables and personality variables. They tested the hypotheses that study skills and personality factors are significantly interrelated by intercorrelating scores on the SSHA and the California Personality Inventory (Gough, 1969), by comparing subjects with low and high SSHA scores to their CPI profiles using t-tests, and by performing factor analysis on the scores of the two instruments' scales. In both the correlational analysis and the comparison of extreme groups the results clearly support the hypothesis. The proposition that the SSHA might be a personality inventory in

disguise is not supported by the factor analysis which indicates loadings on a factor separate from most CPI loadings.

The results of Rutkowski and Domino's study show definite personality characteristics concomitant with good study skills. The student who reports good study skills, which include both habits and attitudes, is one whose CPI profile is generally favorable, with particular strengths in those scales that measure socialization, maturity, and responsibility as well as those that measure achievement potential and intellectual efficiency. Specifically, the Responsibility, Self-Control, and Achievement via Conformance scales correlate significantly across the study skills dimensions. Specifically, the student who reports high delay avoidance (AV) is apt to be of active and participative temperament, is conscientious and responsible, shows self-control and tolerance, is diligent, well-organized and resourceful, but is rather cautious and methodical. In addition to being responsive to the motives and needs of others, those who report good work methods (WM) on the SSHA scored high on all of the CPI measures of poise, self-assurance, and interpersonal ascendancy, on four of the six CPI measures of personal maturity and socialization, and on three CPI measures of achievement potential and intellectual efficiency. The student showing a high teacher approval (TA) score is a responsible, socially forceful person whose maturity and achievement orientation are accompanied by personal initiative and conformity. Similarly, the student who readily accepts educational

goals (EA) and practices exhibits leadership, sociability, and acceptance of the work ethic to a significantly greater extent than one whose EA score is low.

Study skills are often assumed to be cognitive skills amenable to manipulation and improvement through cognitive training; Rutkowski and Domino have demonstrated the significant involvement of personality, rather than cognitive, variables in study habits and attitudes.

Rutkowski and Domino (1975) elaborated on earlier work by Stricker and Ross (1964) which correlated many subscales of the California Personality Inventory with the scales of the SSHA. Stricker and Ross found that the Thinking-Feeling (TF) and Judging-Perceiving (JP) scales correlated significantly ($p < .01$) with the SSHA Study Orientation (SO) scores ($r = -.20$ for the TF scale and $r = -.31$ for the JP scale). Additionally, Stricker and Ross computed product-moment correlations between the MBTI continuous scores and the CPI scales, obtaining many significant ($p < .05$) correlations. The EI scale's highest correlations, all negative, were with ascendance and self-assurance scales - Sy ($r = -.67$), Do ($r = -.53$), Sa ($r = -.53$), and Sp ($r = .47$). Somewhat lower negative correlations occurred with a social status scale - Cs ($r = -.35$), two achievement and intellectual potential scales -Ie ($r = -.21$) and Ac ($r = -.16$), and two of the three response bias scales - Wb ($r = -.23$) and Gi ($r = -.16$). The SN scale's highest correlations, all positive, were with a social status scale - Cs ($r = .29$), a flexibility scale - Fx ($r = .29$), two achievement and intellectual potential scales - Ai ($r = .27$) and Ie ($r = .24$), and a "psychological mindedness" scale - Py ($r = .25$). The TF scale's highest

correlation was one of .17 with a masculinity-femininity scale - Fe. The JP scale's highest positive correlations were with a flexibility scale - Fx ($r = .45$), and a social presence scale - Sp ($r = .22$). Its highest negative correlations were with an achievement potential scale - Ac ($r = -.37$), and maturity, socialization, and responsibility scales - Sc ($r = -.34$), So ($r = -.32$), and Re ($r = -.30$). It also correlated negatively with three response bias scales - Gi ($r = -.27$), Cm ($r = -.24$), and Wb ($r = -.17$). Given the many significant correlations between the MBTI and the CPI cited, and the evidence presented by Rutkowski and Domino, it appears that study skills and personality characteristics are significantly interrelated.

The research on study skills suggests that there may be differences in study behaviors between male and female students. In one study, McAusland and Stewart (1974) examined these differences and found that female subjects reported less delay avoidance in studying tasks than did males, and that they reported greater acceptance of broad, institutional educational goals and programs than did their male counterparts.

Research Hypotheses

Delay Avoidance

The extent to which a student is prompt in completing assignments and efficient in management of time is expected to be related to more generalized personality characteristics. The tendency towards introversion, or the inner world of ideas and concepts has previously been related to correspondingly high self-reports of delay avoidance by Cowell and Entwistle (1971), and was expected to occur in the present study. The sensing student, who deals with factual observations and knowledge, keeps track of details, enjoys precise work and established routines, and who works steadily towards goals, was expected to report greater delay avoidance behavior than the student who prefers intuition, variety, long-range vision, and demonstrates impatience (McCaulley & Natter, 1974). The thinking student was also expected to demonstrate greater levels of delay avoidance than the feeling student, as the former is characterized by interests in things, ideas, facts, and the solution of problems and the latter by external motivation and more interest in other people rather than things or ideas (Myers, 1962; Stricker & Ross, 1964; McCaulley & Natter, 1974). Although Robyak and Patton (1977) found no significant relationship between delay avoidance and the tendency towards judging or perception, two studies suggest that those subjects who preferred judging reported greater delay avoidance (Robyak & Downey, 1978; McCaulley & Natter, 1974). Perhaps because those who prefer judging demonstrate more positive attitudes towards work (Myers, 1962; Stricker & Ross, 1974), as well as endurance and strong

needs for order (McCaulley & Natter, 1974) their reported delay avoidance ought to be higher than perceivers; McCaulley and Natter (1974) and Myers (1962) found perceptive types more likely to procrastinate, to place a higher value on play than on work, and to be less competitive than judging types.

The research hypothesis regarding Delay Avoidance is that a significant amount of the variance in DA scores can be explained by MBTI subscores, either singly, or in combination.

Work Methods

The work methods included in the SSHA deal with organizing study time and tasks, note-taking, reading and writing skills, and concentration. As introverts prefer to work alone and are more self-sufficient than extroverts (Myers, 1962; Stricker & Ross, 1964), it was expected that a significant amount of the variance occurring in the work methods behaviors would be explained by students' tendencies towards introversion or extroversion. The evidence that intuitive types have a strong need for autonomy (Myers, 1962), prefer teachers who give open-ended instruction, and spend more time each week on non-required reading (McCaulley & Natter, 1974) would suggest that the sensing types are more likely to score higher on reports of behaviors prescribed by others as effective. It was expected, therefore, that a significant amount of the variance on the work methods subscale of the SSHA would be explained by the respondents' tendencies towards sensing or intuition. Thinking types were also expected to demonstrate better work methods than feeling types, on measures of study habits, as has been identified

previously by Myers (1962) and McCaulley & Natter, (1974). Although Robyak and Patton (1977) found no significant differences in work methods between judges and perceivers, Robyak and Downey (1978) found that judges reported better work methods. Their need for order (McCaulley & Natter, 1974) and their capacity for endurance (Stricker & Ross, 1964) led to the expectation that this personality characteristic would contribute significantly to the variance generated on the Work Methods subscale.

The research hypothesis regarding Work Methods was that a significant amount of the variance in WM scores can be explained by the MBTI subscores, either singly or in combination.

Study Habits

As the Study Habits (SH) subscale of the SSHA is a composite of the Delay Avoidance and Work Methods subscales, it was expected that a significant amount of the variance in SH would be explained by students' tendencies towards introversion or extroversion, sensing or intuition, thinking or feeling, and judging or perception as proposed by Myers' elaboration of Jungian theory.

The research hypothesis regarding Study Habits was that a significant amount of the variance in SH scores can be explained by the MBTI subscores, either singly or in combination.

Teacher Approval

The first of the two SSHA measures of study attitudes, Teacher Approval, examines the extent to which students feel positively about

their teachers, the teachers' motivations, and the teachers' teaching methods. As extroverts have higher affiliation needs (Myers, 1962; Stricker & Ross, 1962) and prefer to interact with others (Stricker & Ross, 1964), it could be expected that they would endeavor to develop positive relationships with teachers, and correspondingly to evaluate them more favorably than introverts might view their teachers.

Similarly, on the sensing-intuition dimension, sensing types place a high value on authority and are likely to be rated by faculty as cooperative (Ross, 1961); therefore, it was expected that this dimension would contribute to variance on the Teacher Approval subscale scores. On the thinking-feeling dimension, students who prefer feeling have demonstrated strong needs for nurturance and affiliation (Myers, 1962; Saunders, 1960) and were, therefore, expected to report greater teacher approval than those who prefer thinking. Although Robyak and Patton (1977) established no significant difference between judges and perceivers on the work methods subscale of the SSHA, Robyak and Downey (1977) did establish a significant difference.

The research hypothesis regarding Teacher Approval was that a significant amount of the variance in TA scores can be explained by the MBTI subscores, either singly or in combination.

Education Acceptance

The Education Acceptance (EA) subscale of the SSHA measures the extent to which the student agrees with educational objectives, requirements, and practices. It was expected that introverts would score higher than extroverts on the EA subscale, as found by Cowell and

Entwistle (1971); because their academic aptitude scores are higher than extroverts (Myers, 1962; Stricker & Ross, 1964) they are more likely to accept an academic learning environment. As intuitive types have a strong need for autonomy, whereas sensing types prefer affiliation with others, it was expected that this dimension would also explain some of the variance on the EA subscale. On the judgement-perception dimension, Robyak and Patton (1977) did not establish a significant contribution to variance on the EA subscale, but Robyak and Downey (1978) were successful in establishing evidence of a significant contribution. As judging types demonstrate positive attitudes to work (Myers, 1962) and a need for order (McCaulley and Natter (1974), it was expected that they would report more acceptance of education than perceiving types.

The research hypothesis regarding Education Acceptance was that a significant amount of the variance in EA scores would be explained by the MBTI subscores, either singly or in combination.

Study Attitudes

The Study Attitudes (SA) subscale is a composite of the Teacher Approval and Education Acceptance subscales of the SSHA. It measures the extent to which students' scholastic beliefs are favorable and in compliance with those of their teachers and governing institutions.

The research hypothesis regarding Study Attitudes was that a significant amount of the variance in SA scores would be explained by the MBTI subscores, either singly or in combination.

Study Orientation

The Study Orientation score (SO) of the SSHA is a composite of the Study Habits (SH) and Study Attitude (SA) scores. It serves as an overall measure of study habits and attitudes.

The research hypothesis regarding Study Orientation was that a significant amount of the variance occurring in SO would be explained by the MBTI subscores, either singly or in combination. Support for this research hypothesis is provided in studies by Entwistle and Entwistle (1970), Entwistle and Brennan (1971), Entwistle and Wilson (1977), Robyak and Downey (1979), and Stricker and Ross (1964).

Summary of Hypotheses

Hypothesis #1: The research hypothesis regarding Delay Avoidance (AV) is that a significant amount of the variance in AV scores can be explained by the Myers-Briggs Type Indicator (MBTI) subscores, either singly or in combination.

Hypothesis #2: The research hypothesis regarding Work Methods (WM) is that a significant amount of the variance in WM scores can be explained by the MBTI subscores, either singly or in combination.

Hypothesis #3: The research hypothesis regarding Study Habits (SH) is that a significant amount of the variance in SH scores can be explained by the MBTI subscores, either singly or in combination.

Hypothesis #4: The research hypothesis regarding Teacher Approval (TA) is that a significant amount of the variance in TA scores can be explained by the MBTI subscores, either singly or in combination.

Hypothesis #5: The research hypothesis regarding Education Acceptance (EA) is that a significant amount of the variance in EA scores can be explained by the MBTI subscores, either singly or in combination.

Hypothesis #6: The research hypothesis regarding Study Attitudes (SA) is that a significant amount of the variance in SA scores can be explained by the MBTI subscores, either singly or in combination.

Hypothesis #7: The research hypothesis regarding Study Orientation (SO) is that a significant amount of the variance in SO scores can be explained by the MBTI subscores, either singly or in combination.

CHAPTER III

METHOD

Design

The present study was designed to test the interrelation between the study habits and attitudes of college students and their personality preferences on each of four dimensions, including introversion-extroversion, sensing-intuition, thinking-feeling, and judgement-perception.

Male and female college students completed self-report inventories of study skills and personality characteristics and comparisons were made among the variables.

The dependent variables included the seven measures of the Survey of Study Habits and Attitudes (Holtzman & Brown, 1967); they are Delay Avoidance (AV), Work Methods (WM); Teacher Approval (TA), Education Acceptance (EA); Study Habits (SH); Study Attitudes (SA), and Study Orientation (SO).

The independent variables included the personality preferences measured by the Myers-Briggs Type Indicator (Myers, 1980). Continuous scores, representing relative preferences, rather than dichotomous types, served as variables for the introversion-extroversion (EI) dimension, the sensing-intuition (SN) dimension, the thinking-feeling (TF) dimension, and the judgement-perception (JP) dimension.

As it has been established that study skills and personality factors are significantly interrelated (Rutkowski & Domino, 1975) the

goal of the present study was to determine whether study habits can be predicted on the basis of personality characteristics, thereby applying Jungian theory to the actual study attitudes and behaviors reported by college students.

Subjects

One hundred and forty male and female college students were eligible to participate in the study; due to absences and the non-compulsory condition of participation 92 subjects completed the inventories. The subjects included first year students registered in the Biological Sciences Technology, Environmental and Water Sciences Technology, and Renewable Resources Technology programs during the winter semester of 1983. These courses are two year diploma programs offered in the Applied Sciences and Technologies Division of Kelsey Institute in Saskatoon, Saskatchewan. Kelsey Institute is one of three technical institutes in Saskatchewan. Saskatchewan technical institutes are non-university, credit granting, public post-secondary institutions which offer one and two year courses in health sciences, technologies, industrial fields, and community services. They provide services similar to those provided by Colleges of Applied Arts and Technologies (CAAT) in Ontario.

These students represented a variety of rural and urban backgrounds, socio-economic settings, and career interests. They were between the ages of 17 and 30 and had achieved high school science and mathematics standings in the above average to superior ranges.

Permission to involve all students in the first year of these

programs was granted by the Division Head and the three Program Heads; scheduled classroom time was used to conduct the research.

Measures

The Myers-Briggs Type Indicator (Myers, 1962, 1977) is a self-report inventory which was developed to measure the variables in Jung's theory of personality typology. Form G which is comprised of 126 items, was published in 1977 by Consulting Psychologist's Press. Isabel Myers developed the MBTI in order to assess preferences in the four dimensions of extroversion-introversion (EI), sensing-intuition (SN), thinking-feeling (TF) and judgement-perception (JP). The instrument was chosen because its explicit purpose is to operationalize the characteristic personality variables identified by Jung.

The Indicator yields two types of scores for each person. MBTI scores may be either dichotomous or continuous. Respondents may be dichotomously classified, for example, as either an introvert or an extrovert; alternatively, using continuous scores, the respondents' relative preference for either pole of each dichotomy is established. For purposes of the present study, continuous scores were used because the research hypotheses sought to establish the extent to which relative personality preferences explained the study habits and attitudes of college students.

Carlyn (1977) provided a comprehensive assessment of the MBTI, including extensive reviews of intercorrelation, reliability, and validity studies. Studies of intercorrelation of continuous scores on the four dimensions have produced consistent results, indicating

relative independence of the EI, SN, TF scales, with JP being related slightly to TF. Carlyn's summary of reliability findings indicates that continuous scores are generally internally consistent (reported coefficients ranging from .76 to .82 for EI, .75 to .87 for SN, .69 to .86 for TF, and .80 to .84 for JP) and stable over a period of time (reported percentages of subjects changing in one dimension after two years was 39%, in two dimensions after two years was 22%, in three dimensions was 7% and in all four was 0%). Carlyn concluded that the MBTI demonstrates content validity in terms of Jungian theory, moderate predictive validity in terms of success in college and choice of college major (based on regression equations using all four type categories and individual scales), and construct validity in terms of numerous other instruments measuring personality characteristics.

The Survey of Study Habits and Attitudes (SSHA) is an empirical self-report inventory comprised of one hundred items to which the student replies in one of five ways: "rarely", "sometimes", "frequently", "generally", or "almost always." Total frequencies are computed for items on each of the six subscales, Delay Avoidance (AV), Work Methods (WM), Study Habits (SH), Teacher Approval (TA), Education Acceptance (EA), and Study Attitudes (SA). Study Habits is a composite of AV and WM scores, Study Attitudes is a composite of TA and EA scores, and the overall Study Orientation score (SO) is a combination of SA and SH scores. The SSHA (Holtzman & Brown, 1967) was chosen for use in the present study because it identifies, through continuous scores, the extent to which respondents employ the habits and attitudes generally associated with academic progress. The inventory is based on the

assumption that certain habits and attitudes are more desirable than others. Although the instrument has had limited success in meeting one objective, prediction of academic achievement, it does appear useful as a counselling and research tool (Deese, 1972).

A serious difficulty with the SSHA is that respondents may be influenced by social desirability, thereby affecting the validity of the instrument. Otherwise, the SSHA appears to have adequate validity and reliability (Shay, 1972). One study (Khan & Roberts, 1975) suggests caution in use of the second-stage SH and SA scales. As well, while supporting the construct validity of the AV, WM and TA scales, Khan and Roberts suggest that the EA scale may measure academic diligence rather than acceptance of academic goals and programs. The SSHA was thought to be particularly useful in the present study, as the research hypotheses involve the prediction of the degree to which students employ good study habits and the extent to which they report favorable study attitudes.

Procedure

The SSHA and MBTI were administered to the three classes of subjects in group sessions during the second semester of the first year of studies. Standard introduction to the research and instructions on completing the inventories preceded their administration. Identifying data including name, program, sex, and age was requested. The inventories were untimed but took the expected average completion time of one hour. Administration was done by the author.

Subjects were advised to answer all questions on the basis of their actual personal behaviors, attitudes and preferences, rather than on

whatever attributes they might associate with an ideal student.

As the present study does not involve a study skills intervention, the author advised subjects that those desiring study skills counselling could make arrangements to have the inventories interpreted through the Counselling Service at Kelsey Institute.

Null Hypotheses

Each of the research hypothesis was tested with the null hypothesis that there is no significant relationship between SSHA subscores or combined scores and MBTI subscores, either singly or in combination.

Analysis of the Data

Multiple regression analysis was performed by using the continuous scores of the scales of the Survey of Study Habits and Attitudes, and the Myers-Briggs Type Indicator. In addition to analysis for the total group, prediction equations were derived separately for male and female subjects. Analysis included stepwise multiple regression with each regression run several times, varying the order in which variables were entered.

CHAPTER IV

RESULTS

Chapter 4 presents the findings of the tests of the seven research hypotheses and examines some serendipitous findings.

The purpose of the analysis was to apply aspects of Jungian personality theory to the study habits of college students; specifically, the analysis sought to determine whether study habits can be predicted on the basis of college students' personality characteristics.

According to the research findings presented in Chapter 2, a relationship between study habits and personality characteristics does exist. Much of the research has neglected the overall college population in favor of examining students enrolled in effective study courses, leaving the exact nature of this relationship to be determined.

The present study undertook to examine this relationship in college students who had not necessarily been exposed to effective study courses. In order to gain further insight into the relationship, and to build more predictability into the present study, stepwise multiple regression analysis was applied to the data. Stepwise multiple regression was performed in order to determine the "best" set of independent variables which contribute to the prediction of study habits. Appendix Table 1 lists all variables. Means, standard deviations, absolute frequencies, and minimum and maximum scores are reported in Appendix Tables 2 and 3. The variables entered into the prediction equation included the four personality dimensions operationalized by the Myers-Briggs Type Indicator. For each of the

dimensions Extroversion-Introversion (EI), Sensing-Intuition, (SN), Thinking-Feeling (TF), and Judgement-Perception (JP), one continuous score was entered; low subscores indicate preferences towards Extroversion, Sensing, Thinking, and Judgement, with higher scores reflecting relatively greater preferences towards the respective dichotomy. Separate analyses were performed for each sex and for the total group population. Appendix Table 4 presents the correlation coefficients for the dependent and independent variables; these variables were subsequently subjected to stepwise multiple regression analysis.

In summary, the stepwise multiple regression analysis sought to determine the effects of four personality dimensions on the study habits of male, female, and combined groups of college students.

The multiple regression analysis was performed using the "Regression" program of the Statistical Package for the Social Sciences (Hull, 1975). The analysis sought to determine which independent variables contributed significantly ($p < .05$) to the prediction equations, the order in which contribution was made, and the extent to which each contributing variable affected the outcome. As the research was concerned with both the predictability of criterion variables (study habits) and with the extent to which individual predictor variables contribute to successful prediction, both the regression coefficients (R^2) and the beta weights (Beta) are listed in the multiple regression tables (Tables 5, 6, 7). R^2 indicates the percentage of the variance in study habits which is predictable on the basis of personality characteristics, whereas Beta indicates, by its relative size, how

variables rank in contribution as predictors. All variables contributing to the equation are reported in the tables regardless of statistical significance, and those individual variables whose F of entry is statistically significant ($p < .05$) are noted accordingly.

Tests of the Hypotheses

The seven hypotheses tested deal with dependent variables operationalized by the seven subscales of the Survey of Study Habits and Attitudes (Holtzman and Brown, 1967). The four subscales which are independent of each other are Delay Avoidance (AV), Work Methods (WM), Teacher Approval (TA), and Education Acceptance (EA). A composite of AV and WM provides the Study Habits (SH) score, and the composite of TA and EA provides the Study Attitudes (SA) score. The overall score, Study Orientation (SO), is a composite of SH and SA.

After a review of other data collected, it was observed that the variable AG (age) was significantly correlated ($p < .05$) with AV and SO (see Table 4). After the inclusion of AG as a predictor variable, a number of additional null hypotheses were rejected. For males and females, the null hypotheses for AV were rejected. The effect of age on AV was sufficiently great to result in the rejection of the null hypotheses for SH and SO as well as for the total group.

Full presentation of both results of hypotheses tests and post hoc serendipitous findings follows. Tables 5, 6 and 7 in the Appendix present the results of the multiple regression analyses and Tables 8, 9, and 10 present the results of the post hoc analyses which included the variable age (AG).

Hypothesis 1

The first hypothesis is that a significant amount of the variance in Delay Avoidance can be explained by the Myers-Briggs Type Indicator subscores, either singly or in combination.

The null hypothesis was accepted for females indicating that the prediction of this group's Delay Avoidance could not be based on Jungian personality characteristics, $F(1, 40) = 2.172, p > .05$. However, for males and for the total group, the null hypotheses were rejected. The alternate hypothesis which is accepted for males is that a significant amount of the variance is explained on the basis of the variable JP, $F(1, 48) = 6.494, p < .05$. For males, JP explains 11.9% of the variance. The regression equation ($p < .05$) for AV in males is $AV = 29.1403 - 0.1113 JP$. For the total group, the alternate hypothesis which is accepted is that a significant amount of the variance in AV is explained on the basis of JP, $F(1, 90) = 6.455, p < .05$. Six point seven percent of the variance is explained by JP. The regression equation ($p < .05$) for the total group is $AV = 26.8276 - 0.8066 JP$.

Hypothesis 2

The second hypothesis is that a significant amount of the variance in Work Methods can be explained by the Myers-Briggs Type Indicator subscores, either singly or in combination.

The results of the stepwise multiple regression indicate that none of the four predictor variables significantly affect the criterion variable Work Methods (WM). F values reported are those of the overall F for the initial regression equation. None of the variables for

females, $F(1,40) = 1.9804$, for males, $F(1,48) = 1.5200$, or for the total group, $F(1,90) = 1.9701$ contributed significantly ($p > .05$).

Therefore, the null hypotheses are accepted and the alternate hypotheses are rejected. The results for each of the three subgroups (males, females, total) are presented in Tables 5, 6, and 7. Therefore, Work Methods in college students cannot be explained by the Jungian personality preferences identified by the Myers-Briggs Type Indicator.

Hypothesis 3

The third hypothesis is that a significant amount of the variance in Study Habits can be explained by the Myers-Briggs Type Indicator subscores, either singly or in combination.

The results of the stepwise multiple regression indicate that none of the four predictor variables significantly affect the criterion variable Study Habits (SH); none of the variables for females, $F(1,40) = 3.074$, for males, $F(1,48) = 3.1010$, or for the total group, $F(1,90) = 3.4646$, contributed significantly ($p > .05$). Therefore, the null hypotheses are accepted and the alternate hypotheses are rejected. The results for each of the three groups (males, females, and total) are presented in Tables 5, 6, and 7. Therefore, Study Habits in college students cannot be explained by the Jungian personality preferences identified by the Myers-Briggs Type Indicator.

Hypothesis 4

The fourth hypothesis is that a significant amount of the variance in Teacher Approval can be explained by the Myers-Briggs Type Indicator subscores, either singly or in combination.

The results of the stepwise regression indicate that none of the

four predictor variables significantly affect the criterion variable Teacher Approval (TA); none of the variables for females, $F(1,40) = 1.4952$, for males, $F(1,48) = 0.9906$, or for the total group, $F(1,90) = 1.5916$, contributed significantly ($p > .05$). Therefore, the null hypotheses are accepted and the alternate hypotheses are rejected. The results for each of the three groups (females, males, and total) are presented in Tables 5, 6, and 7. Therefore, Teacher Approval in college students cannot be explained by the Jungian personality preferences identified by the Myers-Briggs Type Indicator.

Hypothesis 5

The fifth hypothesis is that a significant amount of the variance in Education Acceptance can be explained by the Myers-Briggs Type Indicator subscores, either singly or in combination.

The results of the stepwise multiple regression indicate that none of the four predictor variables significantly affect the criterion variable Education Acceptance (EA); none of the variables for females, $F(1,40) = 0.8221$, for males, $F(1,48) = 1.1602$, or for the total group, $F(1,90) = 0.9211$, contributed significantly ($p > .05$). Therefore, the null hypotheses are accepted and the alternate hypotheses are rejected. The results for each of the three groups (females, males, and total) are presented in Tables 5, 6, and 7. Therefore, Education Acceptance in college students cannot be explained by the Jungian personality preferences identified by the Myers-Briggs Type Indicator.

Hypothesis 6

The sixth hypothesis is that a significant amount of the variance in Study Attitudes can be explained by the Myers-Briggs Type Indicator

subscores, either singly or in combination.

The results of the stepwise multiple regression indicate that none of the predictor variables significantly affect the variable Study Attitudes (SA); none of the variables for females, $F(1,40) = 1.4307$, for males, $F(1,48) = 0.7499$, or for the total group $F(1,90) = 1.1600$, contributed significantly ($p > .05$). Therefore, the null hypotheses are accepted and the alternate hypotheses are rejected. The results for each of the three groups (females, males and total) are presented in Tables 5, 6, and 7. Therefore, Study Attitudes in college students cannot be explained by the Jungian personality preferences identified by the Myers-Briggs Type Indicator.

Hypothesis 7

The seventh hypothesis is that a significant amount of the variance in Study Orientation can be explained by the Myers-Briggs Type Indicator subscores, either singly or in combination.

The results of the stepwise multiple regression indicate that none of the predictor variables significantly affect the variable Study Orientation (SO); none of the variables for females, $F(1,40) = 2.4591$, for males, $F(1,48) = 1.7632$, or for the total group, $F(1,90) = 2.3453$, contributed significantly ($p > .05$). Therefore, the null hypotheses are accepted and the alternate hypotheses are rejected. The results for each of the three groups (females, males , and total) are presented in Tables 5, 6, and 7). Therefore, Study Orientation in college students cannot be explained by the Jungian personality preferences identified by the Myers-Briggs Type Indicator.

Serendipitous Findings

In addition to data called for by the thesis hypotheses, the research project gathered data for three other factors. Subsequent to the tests of the original hypotheses, these three factors were examined for possible roles in the variance observed among the study skills variables.

After reviewing correlation coefficients among variables (Tables 11, 12, 13), the variable AG (age in years) was included in the stepwise multiple regression analysis. Correlation coefficients for CO (participation in previous study skills courses) and TY (sequential or non-sequential type) were very low, and these two variables were precluded from any further analysis. Consequently, the independent variables retained for post hoc regression analysis included AG (Age), EI (Extroversion-Introversion), SN (Sensing-Intuition), TF (Thinking-Feeling), and JP (Judgement-Perception). As with the tests of the original hypotheses, separate analyses were done for each sex as well as the total test population. Table 14 presents the correlation coefficients for the dependent variables and the independent variable AG.

Delay Avoidance (AV)

When AG is included with the independent variables EI, SN, TF, and JP the regression equations derived explain more variance for females and for the total groups than when the hypothesis was originally tested. The original equations explain a nonsignificant amount of the variance for females, 11.9% for males, and 6.7% for the total group ($p < .05$).

When AG is included as an independent variable, the amounts of variance explained by the equations are 13.7% for females, 11.9% for males, and 16.9% for the total group. When AG is considered, the prediction equations for AV are as follows:

$$\text{Females: } AV \text{ (}\underline{F}(1,40) = 6.3336) = -0.5269 + 0.9711 \text{ AG}$$

$$\text{Males: } AV \text{ (}\underline{F}(1,48) = 6.4944) = 29.1403 - 0.1113 \text{ JP}$$

$$\text{Total: } AV \text{ (}\underline{F}(2,89) = 9.0982) = 5.7472 + 1.0404 \text{ AG} - 0.8341 \text{ JP}$$

All three equations are statistically significant ($p < .05$). Equations for the female group and for the total group indicate that the older college students had higher AV scores than did their younger counterparts. For females, higher AV scores are significantly related to age. For the total group, higher AV scores were predicted by greater age and by a tendency towards Judgement rather than Perception.

Work Methods (WM), Teacher Approval (TA), and Education Acceptance (EA)

WM, TA, and EA are the remaining dependent variables which are mutually independent of the composite variables Study Habits (SH), Study Attitudes (SA), and Study Orientation (SO). When AG was included with the independent variables EI, SN, TF, and JP, none of the regression equations for WM, TA, and EA contain any predictor variables which contribute significantly. That is, none of the equations indicate that older college students had significantly different WM, TA, or EA scores than younger students had. Nor did they indicate that any particular personality preferences contributed significantly to the prediction of Work Methods once age was considered.

Study Habits (SH)

SH is the composite score of Delay Avoidance and Work Methods. When AG is included with the independent variables the regression equation for the total group indicates that the older college students had higher SH scores than the younger students had, $F(1,40) = 4.9358$, $p < .05$). $SH = 15.2740 + 1.3929 AG$. No significant predictor variables were identified for either separate group of males or females.

Study Attitudes (SA)

SA is the composite score of Teacher Approval and Education Acceptance. When AG is included with the independent variables none of the regression equations contain any predictor variables which contribute significantly. That is, none of the three equations indicate that older college students had significantly different SA scores than younger students had. Nor did they indicate that any particular personality preferences contributed significantly to the prediction of Study Attitudes once age was considered.

Study Orientation (SO)

SO is a composite score of Study Habits and Study Attitudes. When AG is included with the independent variables the regression equation for the total group indicates that the older college students who preferred extroversion had higher SO scores than had younger students who preferred introversion, $F(2,89) = 4.1406$, $p < .05$. The equation is $SO(\text{total}) = 56.3051 - .1986 EI + 2.9367 AG$. No significant predictor variables were identified for the separate male and female groups.

In summary, when age is included with the personality variables, age predicted Delay Avoidance for the female and total groups, and Study Habits and Study Orientation for the total group. Although age was significantly related to AV for males, when added to JP, it did not significantly increase the predictive power of the equation.

Summary of Findings

To summarize the results of the original hypotheses, the sole personality characteristic which predicted any of the study skills variables was the Judgement-Perception (JP) dimension. That is, for male college students higher levels of Delay Avoidance were explained by a tendency towards judgement rather than perception; while this phenomenon was also evident in the composite group (male and female subgroups combined) it was not evident in the female group alone. Neither JP nor any of the other personality variables tested (Extroversion-Introversion, Sensing-Intuition, and Thinking-Feeling) explained significant amounts of the variance among any of the remaining six dependent study skills variables. Post hoc analysis which added age (AG) to the independent personality variables revealed that while older female students tended to have higher levels of Delay Avoidance than did their younger counterparts, the personality characteristics tested did not affect this outcome.

CHAPTER V

CONCLUSIONS AND DISCUSSION

Summary

The present research examined the relationship between Jungian personality characteristics and study habits. Male and female college students completed the Myers-Briggs Type Indicator (Myers, 1962) and the Survey of Study Habits and Attitudes (Brown & Holtzman, 1967). The dichotomous personality preferences which were examined were introversion and extroversion, sensing and intuition, thinking and feeling, and judgement and perception. The study habits examined were delay avoidance, work methods, teacher approval, education acceptance, and their composites. Post hoc analysis included age along with the personality characteristics as a predictor variable. Stepwise multiple regression analysis was applied to the data.

Results indicated that, while some of the variance on delay avoidance for males can be explained on the basis of the Judgement-Perception (JP) dimension, none of the other habits and attitudes examined could be explained on the basis of personality characteristics. None of the personality characteristics contributed to the prediction of study habits for females. When the male and female subgroups were combined, the Judgement-Perception dimension contributed to the explanation of delay avoidance, as it had for the male subgroup, but none of the other dependent study skills variables were explained by personality characteristics. As the amount of explained variance in

Delay Avoidance was 11.9% for males, much remains to be learned about this study habit as well as about those which were not explained by personality characteristics. The inclusion of age in the prediction of study habits also revealed an important relationship in Delay Avoidance; regardless of personality characteristics, older female students had greater levels of Delay Avoidance than their younger counterparts had. Age did not have a significant effect on any of the study skills variables for male students.

Chapter 5 explores the findings in terms of observed differences between the sexes, expectations based on previous research, and the effect of age on study habits. Chapter 5 also presents several implications for counselling and learning assistance in the college setting. Finally, the chapter presents suggested areas for further research.

Conclusions

The theoretical foundation on which this research project was based was the Jungian theory of personality. The theory developed by C. G. Jung (Jung, 1923) postulates that much apparently random variation in human behavior is actually quite orderly and consistent. The word "type", in Jung's theory, refers to particular classes of individuals which are characterized in terms of the mutually independent pairs of dichotomous variables of extroversion and introversion, sensing and intuition, and thinking or feeling. The judgement-perception dimension

was included when the Myers-Briggs Type Indicator (Myers, 1962) was developed to operationalize the theory. The present research project found very little validity in predicting study habits on the basis of these dichotomies and dimensions in that the Delay Avoidance category was the only one of the four mutually independent study skills categories which showed an interrelationship with the Jungian personality characteristics.

Delay Avoidance is a measure of the extent to which a student reports himself to be prompt in completing assignments and in managing time. Earlier studies suggested that the preferences related to high delay avoidance include introversion (Cowell and Entwistle, 1971), sensing (McCaulley and Natter, (1974), and thinking (Myers, 1962; Stricker & Ross, 1964, McCaulley and Natter, 1974); some research suggested that judging was related to delay avoidance (Robyak & Downey, 1978; McCaulley & Natter, 1974), and other research suggested that neither judging nor perception were related (Robyak & Patton, 1977). The present research project found that a nonsignificant amount of the variance in AV for females and only 11.9% of the variance for males were determined by any personality characteristics, the predictor for males being the Judgement-Perception dimension. Findings of the present study are, therefore, only somewhat consistent with earlier research.

Work methods includes behaviors such as organizing time and tasks, note-taking, reading, writing, and concentration. Earlier research suggests that the preferences related to good work methods include introversion (Myers, 1962; Stricker & Ross, 1964), sensing (Myers, 1962, McCaulley & Natter, 1974), and thinking (Myers, 1962; McCaulley &

Natter, 1974). While most of the earlier research favors judgement as a predictor (Robyak & Downey, 1977; McCaulley & Natter, 1974; Stricker & Ross, 1962), one study found no significant differences between judgement and perception (Robyak & Patton, 1977). The results of the present research are inconsistent with previous research. The amounts of variance in WM explained in the present study were statistically nonsignificant, and there were no personality dimensions which significantly explained the Work Methods scores. Therefore, the present research project failed to establish that work methods of college students can be predicted on the basis of Jungian personality characteristics.

The third independent study habits variable is Teacher Approval (TA), which measures the extent to which students feel positively towards teachers and their methods. Earlier research suggests that the personality preferences related to high TA include extroversion (Myers, 1962; Stricker & Ross, 1962; Stricker & Ross, 1964), sensing (Ross, 1961), and feeling (Myers, 1962; Saunders, 1960); as well, while Robyak and Patton (1977) found no significant difference between the judgement and perception preferences, Robyak and Downey's (1977) study suggested that judgement is related to teacher approval. The present research results are inconsistent with those of the previous research. In the present research project, the amounts of variance explained by personality characteristics were statistically nonsignificant. That is, the present research project failed to establish that teacher approval of college students can be predicted on the basis of Jungian personality characteristics.

The fourth study skills variable, Education Acceptance, measures the extent to which students agree with educational objectives, requirements, and practices. Earlier research suggests that the personality preferences positively related to Education Acceptance (EA) include introversion (Cowell & Entwistle, 1971; Myers, 1962; Stricker & Ross, 1964) and judgement (Myers, 1962; McCaulley & Natter, 1974). The results of the present study are inconsistent with previous research. In the present research the amounts of variance explained by personality characteristics are statistically nonsignificant. That is, the present research failed to establish that education acceptance among college students can be predicted on the basis of Jungian personality characteristics.

Serendipitous Findings: The Effect of Age

After the effect of personality on study habits was examined, the variable age was added as a predictor variable. The addition of age to the four personality variables led to greater explanation of the study skills variance, particularly for Delay Avoidance in females; age explained 13.7% of the variance in AV for females. However, none of the other equations for the separate groups of males and females was statistically significant overall. While the older female college student was more likely to have greater delay avoidance than her younger counterpart, age did not act in concert with any of the personality characteristics to predict AV.

Discussion

The present research substantiates the existence of a relationship between the study variable Delay Avoidance and one Jungian personality characteristic of male college students; the personality dimension which predicted delay avoidance was the Judgement-Perception dimension for males and for the total group. A preference towards judgement for the males explained higher delay avoidance scores on the Survey of Study Habits and Attitudes. Further analysis revealed that age explained delay avoidance for females, in favor of the older student, but that age was not a predictor for male college students. Whether or not age was considered, none of the other three mutually independent study skills (work methods, education acceptance, and teacher approval) were interrelated with the Jungian personality dimensions. Although some findings did just meet the criteria for significance, the amounts of variance accounted for by the independent variables was such that neither theoretical nor practical insight into those relationships is considerably enhanced. Two additional outcomes that are noteworthy, for both practical and theoretical purposes, are the lack of clarification for both male and female students, and the apparent effect of age on delay avoidance in female college students. Before these outcomes are discussed, limitations of the present research will be explored in terms of possible effects on the results.

Previous research has provided little, and perhaps outdated, insight into the relationship between personality and study habits. Entwistle and Wilson (1977) and Kirschenbaum and Perri (1982) concluded

that while most related research in the last decade has dealt with voluntary participants in college study skills programs, little is known about the college population in general. As well, the recent changes in the demographic and motivational characteristics of college students (Cross, 1976) may now enter the study skills equation.

Secondly, the limitations of design and procedure may have had an effect on the outcomes. Selection of subjects necessitated some bias. First, of one hundred and forty potential subjects, only ninety-two participated. It is possible that the responses of those who were absent made a difference in the outcome. As well, all subjects were applied science students; perhaps participation by students in other disciplines would have led to other insights into the study skills equation. The research instruments themselves may have hampered the study; all measures were self-report. Respondents may have replied to questions in different ways than if objective observation had been employed, as self-report measures are prone to socially desirable response patterns. Another possible procedural influence was that the self-report instruments were administered consecutively. After completing the Myers-Briggs Type Indicator, subjects may have approached the Survey of Study Habits and Attitudes with a biased frame of reference, or with mental fatigue.

Finally, the study habits construct and its operationalization may have inadvertently affected the outcomes. The Survey of Study Habits and Attitudes is an empirically established self-report measure of behavior and attitudes; it has no theoretical framework to guide its operationalization. The instrument measures the frequency with which

the respondent acts and feels in prescribed manners. There are several concerns regarding the SSHA as it was applied in the present research. As the prescribed behaviors and attitudes are assumed to approximate those of an ideal student with good study habits and attitudes, the SSHA rests on a major assumption which may well be faulty. Whether students can, and ought to follow prescribed methods, and whether those habits and attitudes specified on the instrument are in fact valuable or ideal are questionable. Secondly, the value of the instrument itself has come under question by Shay (1972), who found that contrary to its main purpose, the SSHA has had limited success in prediction of academic achievement. As well, while supporting a priori classification of items for each of the Delay Avoidance, Work Methods, and Teacher Approval scales, Khan and Roberts (1975) suggest that the Educational Acceptance scale measures motivational characteristics that were judged to be more appropriately included in the AV and WM categories.

Another major weakness of the SSHA is that because it is a self-report inventory, rather than a test, scores can be manipulated at will by respondents. Although the instrument's reliance on the frankness and honesty of the respondents does not appear to effect test-retest reliability (the lowest 14 week test-retest coefficient reported in the manual (Holtzman & Brown, 1967) is .83), it does give rise to concerns regarding content validity. Whether students can and should follow prescribed methods may be clarified by further insight into learning styles. Lawrence (1979) and Witkin and Goodenough (1977) maintain that each personality type has a preferred learning style and that future investigation should focus on learning style. Further,

Anderson and Armbruster's (1980) major review of study habits concludes with the suggestion that both learning style and personality variables may offer further insight into the effectiveness of particular study habits. It is, therefore, plausible that an individual's approach to global and specific learning tasks may be determined by interactions of the learning style and the personality characteristics which direct the processing strategies presented by Anderson and Armbruster. In other words, the relationship between study habits and personality characteristics may be due to the SSHA's own failure to recognize individuality in studying and learning.

Up to this point, the discussion of results has focused on the limitations of the design, procedure, and operationalization of the two major constructs involved. Regardless of the limitations imposed by the study, two unanticipated outcomes deserve attention at this point. Those outcomes include the role of age in Delay Avoidance and the general lack of insight gained regarding both female and male students.

While all subjects were full-time first-year college students, their ages varied (see Table 2). Ages of female subjects varied from 18 to 29 and ages of males varied from 17 to 27. The mean age for both male and female group was 20.52. For all subjects, the zero-order correlations showed that age correlated significantly with delay avoidance but did not correlate significantly with the other three separate scales measuring study habits and attitudes (work methods, teacher approval, and educational acceptance). Likewise, among the zero-order correlation coefficients (Tables 11, 12, 13) of age with the personality variables, only one significant correlation was noted;

that was the correlation between age and the judgement-perception dimension for females. In keeping with the weak linkages established between age and study habits, and between age and personality characteristics, on the basis of zero-order correlations, no significant multiple regression equations were established by age in concert with personality characteristics for either separate group of males or females. Although greater age did predict higher levels of delay avoidance in females, it did so alone, rather than in concert with any of the personality characteristics. Because age had an important effect on one of four mutually independent study variables for females, and on none of the four for males, further research is needed to explore this relationship.

A second note regarding the role of age concerns the current trend towards non-sequential studies. Fifty-one of the 92 subjects were non-sequential; that is, they had one full year or more away from full-time studies since high school. Although the sequential or non-sequential status of students was not significantly correlated with personality characteristics or study habits, age was a consideration for females; the older the individual, the greater her delay avoidance. While numerous studies, including Henderson and Plummer (1978), Frankel (1978), Magarell (1980) and others discuss the trend towards non-sequential studies as an outstanding difference in today's student population, perhaps other factors would lead to greater insight in the study skills equation. Career values and stages of career decision are worthy of exploration. Facts of a changing work environment coupled with trends in social, cultural, political, and religious elements of

life are external factors which effect the personality characteristics, educational beliefs, and behavior of given individuals. New insight into learning styles (Witkin & Goodenough, 1981) and other intellectual factors may also prove fruitful in the path to a greater understanding of study habits. As well, previous post-secondary experience, particularly in the university sector, may have served as a confounding, but untested variable.

One specific question not examined in this study is that of the reading demands on the applied science student as compared to students in health sciences, service, or industrial courses. The emphasis in applied sciences courses is on laboratory and applied investigation; it is possible that this emphasis on independent, individual investigation does not call for the frequency of reading-related study tasks that are assumed by either the Survey of Study Habits and Attitudes, or by fields other than the applied sciences. Although it is known (Anderson & Armbruster, 1980) that the successful student is one who prepares for criterion tasks in a manner highly similar to the task itself, for example by the preparation and execution of a lab or practical project, we have yet to identify different clusters of study skills which may be more appropriately employed in applied science courses than those typically found useful in lecture format courses. Although applied science students are involved in lectures, note-taking, and reading assignments, their main academic objectives involve laboratory performance; there may be a set of study behaviors and attitudes, perhaps those of independent learning and scientific discovery, that have not been measured in the present study. For example, laboratory

assignments require the ability to execute a goal-directed experiment, to identify and report both qualitative and quantitative results, and to synthesize results for the purpose of drawing conclusions. Most previous study skills research has been premised on the lecture mode of educational programming. This disparity, coupled with the SSHA's orientation towards reading, and its neglect of investigative skills, may have set a misleading expectation in the present research.

One plausible confounding variable has to do with the relatively different backgrounds represented by the subjects studied. Some had work experience, in some cases related to their field of study. Some had previous university, community college, or technical institute experience. A few were mature entry students. Some were people with family responsibilities and others were single parents. Some lived at home and others independently. Perhaps these demographic and environmental variables played an untested role in the interrelationships examined.

The final point for discussion has to do with the only main anticipated result which was established by the present research. It was found that for the male group the Judgement-Perception dimension was related to Delay Avoidance. That the student who preferred judgement over perception would have greater delay avoidance, as anticipated on the basis of previous research (Robyak & Downey, 1978; McCaulley & Natter, 1974) was established in the present research. Those who prefer judging have more positive attitudes towards work (Myers, 1962; Stricker & Ross, 1974) and have more endurance and strong needs for order (McCaulley & Natter, 1974). Hence, it follows that

these individuals are those who have greater self-control, better time management and planning skills, and the corresponding ability to keep up with work and complete tasks on time, all of which are elements of high Delay Avoidance scores. That the present research did not identify a similar relationship for the female group, and that it provided little insight regarding male students (only 11.9% of the AV variance was accounted for by JP) suggests that this question remains, to a large extent, unanswered by the present research.

Implications

The present research results have failed to establish that a major explanation for students' study habits lies in their personality characteristics. While the results did establish that the Judgement-Perception dimension is a part of the explanation for delay avoidance in males, and that age alone partially explains delay avoidance in females, those working with college students are cautioned about assessing or remediating academic study difficulties on the basis of personality characteristics.

A number of studies, including those cited by Cross (1976), plead for greater attention to the needs of the mature student. In support of this plea, more needs to be understood about the learning styles of students of all ages (Anderson & Armbruster, 1980), including those of both non-sequential college students and those with previous post-secondary experience. In addition, counsellors and educators ought to remember that a direct relationship between favorable study habits and academic achievement has come under considerable question (Deese, 1972).

Counsellors and other educators should be cautious, therefore, in assuming that students using prescribed study habits will have few, if any, difficulties in achieving academically. Regarding age and previous academic experience, counsellors and educators should consider each student as an individual; standardized approaches to remediation and counselling may have limited success.

Secondly, there are practical implications regarding the sex of the student. Prediction of delay avoidance for females, based on personality characteristics, is even less certain than for males. Again, for practical purposes, those assisting female students, particularly applied science female students, must address questions and solutions to the uniqueness of each individual situation.

Further Research

On the basis of the results of this research project, it is suggested that further research be conducted in several areas.

The present research project sought to examine college students as a general population. Because previous research dealt primarily with a biased group, that is voluntary participants in college study skills courses, and because the present project dealt with a small segment of college students, that is ninety-two applied science students, more research on the original question would be helpful. Specifically, there would be great value in learning more about the demographic and motivational characteristics of students, in studying a broader range of Canadian students, and in applying other measures and variables to the equation of how different people study.

As the use of the Myers-Briggs Type Indicator to predict study habits, as measured by the Survey of Study Habits and Attitudes, is at a very preliminary stage, additional research could focus on the two instruments themselves. Other studies with identical hypotheses might provide valuable insight to the question.

Comparisons of students who have enrolled immediately after high school with older non-sequential students and comparisons of those who study in social science, industrial, and health science programs with applied science students would be helpful. As well, further research might consider other motivational and learning style factors which would act in concert with the predisposed preferences set out by Carl Jung's theory of personality.

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APPENDIX: TABLES

Table 1

List of Variables

AV	Delay Avoidance
WM	Work Methods
SH	Study Habits
TA	Teacher Approval
EA	Education Acceptance
SA	Study Attitudes
SO	Study Orientation
EI	Extroversion-Introversion
SN	Sensing-Intuition
TF	Thinking-Feeling
JP	Judgement-Perception
SE	Sex
AG	Age in Years
CO	Participation in any Previous Study Skills Course(s): Yes or No
TY	Type of Student: Sequential or Non-Sequential

Table 2

Descriptive Information for all Independent Variables

Variable	Mean	Standard deviation	Minimum	Maximum
EI				
Females	99.90	24.75	51.00	147.00
Males	102.28	25.43	61.00	155.00
Total	101.20	25.01	51.00	155.00
SN				
Females	93.95	20.58	47.00	139.00
Males	88.80	21.76	41.00	133.00
Total	91.15	21.24	41.00	139.00
TF				
Females	94.38	17.90	65.00	127.00
Males	85.64	23.92	41.00	133.00
Total	89.63	21.72	41.10	133.00
JP				
Females	101.24	23.43	49.00	135.00
Males	95.76	26.36	45.00	149.00
Total	98.26	25.08	45.00	149.00
AG				
Females	20.52	2.66	18	29
Males	20.52	2.21	17	27
Total	20.52	2.41	17	29

Note: N = 92; n(females) = 42; n(males) = 50.

(table continues)

Absolute Frequencies

Variable	Females	Males	Total
AG			
17	0	1	1
18	8	3	11
19	11	16	27
20	7	10	17
21	8	12	20
22	1	0	1
23	1	2	3
24	2	0	2
25	1	4	5
26	1	1	2
27	0	1	1
28	1	0	1
29	1	0	1
CO			
Yes	1	2	3
No	41	48	89
TY			
Sequential	23	18	41
Non-Sequential	19	32	51
SE	42	50	92

Note: $N = 92$; $n(\text{females}) = 42$; $n(\text{males}) = 50$

Table 3

Descriptive Information for All Dependent Variables

Variable	Mean	Standard deviation	Minimum	Maximum
AV				
Females	19.40	6.99	6.00	35.00
Males	18.48	8.50	5.00	42.00
Total	18.90	7.82	5.00	42.00
WM				
Females	25.21	7.84	10.00	41.00
Males	24.64	9.53	2.00	50.00
Total	24.92	8.76	2.00	50.00
SH				
Females	44.62	12.32	17.00	65.00
Males	43.22	16.58	8.00	93.00
Total	43.86	14.73	8.00	93.00
TA				
Females	27.29	8.23	11.00	44.00
Males	26.30	8.34	10.00	48.00
Total	26.75	8.26	10.00	48.00
EA				
Females	26.83	6.12	14.00	40.00
Males	25.20	8.77	8.00	50.00
Total	25.95	7.65	8.00	50.00
SA				
Females	54.12	13.07	28.00	83.00
Males	51.30	15.75	18.00	98.00
Total	52.87	14.58	18.00	98.00
S0				
Females	98.88	23.56	46.00	151.00
Males	94.46	29.83	25.00	190.00
Total	96.48	27.10	25.00	190.00

Note: N = 92; n(females) = 42; n(males) = 50.

Table 4

Correlation Coefficients for SSHA, MBTI, and AG Variables

	AV	ME	SH	TA	EA	SA	SO
EI							
Females	-0.17	-0.10	-0.16	-0.11	-0.03	-0.09	-0.13
Males	-0.52*	-0.17	-0.13	-0.14	-0.10	-0.12	-0.14
Total	-0.10	-0.15	-0.14	-0.13	-0.08	-0.11	-0.14
SN							
Females	-0.23	-0.22	-0.27	-0.19	-0.14	-0.18	-0.24
Males	-0.15	-0.02	-0.09	-0.13	-0.10	-0.06	-0.08
Total	-0.17	-0.09	-0.15	-0.08	-0.10	-0.09	-0.13
TF							
Females	0.11	-0.01	0.06	-0.10	-0.01	-0.06	0.00
Males	-0.15	0.17	-0.18	0.04	-0.05	-0.01	-0.10
Total	-0.05	-0.10	-0.09	-0.00	-0.01	-0.01	-0.05
JP							
Females	-0.14	-0.06	-0.12	-0.18	-0.04	-0.19	-0.14
Males	-0.35*	-0.11	-0.25	-0.01	-0.15	-0.09	-0.19
Total	-0.26*	-0.09	-0.19	-0.07	-0.10	-0.10	-0.16
AG							
Females	0.37*	0.09	0.27	0.13	0.27	0.21	0.25
Males	0.28*	0.12	0.21	0.18	0.16	0.20	0.22
Total	0.31*	0.10	0.23	0.15	0.20	0.20	0.23*

Note: See Table 1 for variables explanation. $N = 92$; n (females) = 42; n (males) = 50.

* $p < .05$.

Table 5

Multiple Regression Summary Tables for Female Subjects

<u>Dependent Variable - Delay Avoidance (AV)</u>				
Variable	Multiple R	R ²	R ² change	Beta
SN	0.22697	0.05151	0.05151	-0.20624
EI	0.26334	0.06935	0.01783	-0.11320
TF	0.28485	0.08114	0.01179	0.10307
JP	0.28704	0.08239	0.00125	-0.03828
Constant	26.5630			
<u>Dependent Variable - Work Methods (WM)</u>				
Variable	Multiple R	R ²	R ² change	Beta
SN	0.21720	0.04718	0.04718	-0.21039
EI	0.22773	0.05186	0.00469	-0.07309
JP	0.22830	0.05212	0.00026	0.01718
Constant	34.5077			
<u>Dependent Variable - Study Habits (SH)</u>				
Variable	Multiple R	R ²	R ² change	Beta
SN	0.26717	0.07138	0.07138	-0.25401
EI	0.29263	0.08563	0.01426	-0.11247
TF	0.29943	0.08966	0.00402	0.06409
Constant	60.3826			

(table continues)

Dependent Variable - Teacher Approval (TA)

Variable	Multiple R	R ²	R ² change	Beta
SN	0.18983	0.03603	0.03603	-0.13148
JP	0.23137	0.05353	0.01750	-0.14841
TF	0.26050	0.06786	0.01433	-0.12860
EI	0.26900	0.07236	0.00450	-0.06999
Constant	45.4245			

Dependent Variable - Education Acceptance (EA)

Variable	Multiple R	R ²	R ² change	Beta
SN	0.14191	0.02014	0.02014	-0.14311
TF	0.14304	0.02046	0.00032	0.01791
Constant	30.2637			

Dependent Variable - Study Attitudes (SA)

Variable	Multiple R	R ²	R ² change	Beta
SN	0.18583	0.03453	0.03453	-0.14978
JP	0.20341	0.04138	0.00684	-0.08982
TF	0.21407	0.04582	0.00445	-0.07254
EI	0.21924	0.04807	0.00224	-0.04941
Constant	75.7726			

(table continues)

Dependent Variable - Study Orientation (S0)

Variable	Multiple R	R ²	R ² change	Beta
SN	0.24066	0.05792	0.05792	-0.21167
EI	0.25791	0.06652	0.00860	-0.07983
JP	0.26469	0.07006	0.00354	-0.06333
Constant	135.7687			

* F of entry p<.05.

Table 6

Multiple Regression Summary Tables for Male Subjects

<u>Dependent Variable - Delay Avoidance (AV)</u>				
Variable	Multiple R	R ²	R ² change	Beta
JP*	0.34522	0.11918	0.11918	-0.33638
TF	0.37405	0.13991	0.02074	-0.14865
EI	0.38042	0.14472	0.00480	-0.07082
SN	0.38042	0.14502	0.00031	-0.01885
Constant	36.4668			
<u>Dependent Variable - Work Methods (ME)</u>				
Variable	Multiple R	R ²	R ² change	Beta
EI	0.17520	0.03069	0.03069	-0.19225
TF	0.25511	0.06508	0.03439	-0.18802
JP	0.27885	0.07776	0.01268	-0.12345
SN	0.28046	0.07866	0.00090	0.03228
Constant	41.4497			
<u>Dependent Variable - Study Habits (SH)</u>				
Variable	Multiple R	R ²	R ² change	Beta
JP	0.24634	0.06068	0.06068	-0.24370
TF	0.30035	0.09021	0.02952	-0.18647
EI	0.33452	0.11191	0.02170	-0.14803
Constant	78.8469			

(table continues)

Teacher Approval (TA)				
Variable	Multiple R	R ²	R ² change	Beta
EI	0.14220	0.02022	0.02022	-0.14158
SN	0.14433	0.02083	0.00061	-0.02831
TF	0.14697	0.02160	0.00077	0.02807
Constant	31.1737			
Dependent Variable - Education Acceptance (EA)				
Variable	Multiple R	R ²	R ² change	Beta
JP	0.15363	0.02360	0.02360	-0.13346
EI	0.18600	0.03460	0.01099	-0.11404
SN	0.19596	0.03840	0.00381	-0.05916
TF	0.20185	0.04074	0.00234	-0.04904
Constant	37.0865			
Dependent Variable - Study Attitudes (SA)				
Variable	Multiple R	R ²	R ² change	Beta
EI	0.12403	0.01538	0.01538	-0.12949
JP	0.15618	0.02439	0.00901	-0.08227
SN	0.16041	0.02573	0.00134	-0.03617
TF	0.16177	0.02617	0.00044	-0.02118
Constant	67.7255			

(table continues)

Dependent Variable - Study Orientation (SO)				
Variable	Multiple R	R ²	R ² change	Beta
JP	0.18824	0.03543	0.03543	-0.18704
EI	0.23482	0.05514	0.01971	-0.15184
TF	0.26169	0.06848	0.01335	-0.11612
Constant	145.3559			

* F of entry p<.05.

Table 7

Multiple Regression Summary Tables for All (Male and Female) Subjects

<u>Dependent Variable - Delay Avoidance (AV)</u>				
Variable	Multiple R	R ²	R ² change	Beta
JP*	0.25869	0.06692	0.06692	-0.22359
SN	0.27463	0.07542	0.00850	-0.09021
EI	0.28518	0.08133	0.00591	-0.08299
TF	0.28991	0.08405	0.00272	-0.05305
Constant	33.1173			
<u>Dependent Variable - Work Methods (ME)</u>				
Variable	Multiple R	R ²	R ² change	Beta
EI	0.14636	0.02142	0.02142	-0.15235
TF	0.18892	0.03569	0.01427	-0.11380
JP	0.20393	0.04159	0.00590	-0.05914
SN	0.21068	0.04439	0.00280	-0.05637
Constant	38.5659			

(table continues)

Dependent Variable - Study Habits (SH)

Variable	Multiple R	R ²	R ² change	Beta
JP	0.19253	0.03707	0.03707	-0.15587
EI	0.22807	0.05201	0.01494	-0.13478
TF	0.25292	0.06397	0.01196	-0.09854
SN	0.26473	0.07008	0.00611	-0.08329
Constant	72.1392			

Dependent Variable - Teacher Approval (TA)

Variable	Multiple R	R ²	R ² change	Beta
EI	0.13183	0.01738	0.01738	-0.12704
SN	0.15438	0.02383	0.00645	-0.06899
JP	0.15809	0.02499	0.00116	-0.03609
Constant	34.6076			

Dependent Variable - Education Acceptance (EA)

Variable	Multiple R	R ²	R ² change	Beta
SN	0.10065	0.01013	0.01013	-0.07783
EI	0.12862	0.01654	0.00641	-0.07386
JP	0.14370	0.02065	0.00411	-0.06787
Constant	32.8261			

(table continues)

Dependent Variable - Study Attitudes (SA)				
Variable	Multiple R	R ²	R ² change	Beta
EI	0.11280	0.01272	0.01272	-0.10702
SN	0.14598	0.02131	0.00858	-0.07092
JP	0.15727	0.02473	0.00342	-0.06296
TF	0.15794	0.02494	0.00021	-0.01476
Constant	67.8205			
Dependent Variable - Study Orientation (SO)				
Variable	Multiple R	R ²	R ² change	Beta
JP	0.15937	0.02540	0.02540	-0.12316
EI	0.20110	0.04044	0.01505	-0.13087
SN	0.21796	0.04751	0.00706	-0.07952
TF	0.22576	0.05097	0.00346	-0.05986
Constant	139.8446			

* F of entry p<.05.

Table 8

Serendipitous Findings: Addition of the Variable AG;
Multiple Regression Summary Tables for Female Subjects

<u>Dependent Variable - Delay Avoidance (AV)</u>				
Variable	Multiple R	R ²	R ² change	Beta
AG*	0.3697	0.1367	0.1367	0.4423
JP	0.4517	0.2040	0.0673	-0.1723
SN	0.47691	0.2274	0.0233	-0.1610
EI	0.49512	0.2451	0.0177	-0.1279
TF	0.50880	0.2588	0.0137	0.1206
Constant	5.0868			
<u>Dependent Variable - Work Methods (WM)</u>				
Variable	Multiple R	R ²	R ² change	Beta
SN	0.2172	0.0471	0.0471	-0.2030
AG	0.2335	0.0545	0.0073	0.0941
EI	0.2462	0.0606	0.0060	-0.0792
Constant	29.3270			
<u>Dependent Variable - Study Habits (SH)</u>				
Variable	Multiple R	R ²	R ² change	Beta
AG	0.2673	0.0714	0.0714	0.3136
SN	0.3742	0.1400	0.0685	-0.2195
EI	0.4022	0.1618	0.0217	-0.1209
JP	0.4161	0.1731	0.0113	-0.1051
TF	0.4224	0.1784	0.0052	0.0747
Constant	33.9686			

(table continues)

Dependent Variable - Teacher Approval (TA)				
Variable	Multiple R	R ²	R ² change	Beta
JP	0.2313	0.0535	0.0175	-0.2039
AG	0.2911	0.0847	0.0312	0.1831
TF	0.3119	0.0973	0.0125	-0.1213
SN	0.1898	0.0360	0.0360	-0.1127
EI	0.3203	0.1026	0.0053	-0.0761
Constant	34.9580			
Dependent Variable - Education Acceptance (EA)				
Variable	Multiple R	R ²	R ² change	Beta
AG	0.2723	0.0741	0.0741	0.2996
SN	0.3046	0.0927	0.0186	-0.1127
JP	0.3165	0.1002	0.0074	-0.0831
TF	0.3180	0.1011	0.0009	0.0298
EI	0.3187	0.1013	0.0004	-0.0214
Constant	17.6292			
Dependent Variable - Study Attitudes (SA)				
Variable	Multiple R	R ²	R ² change	Beta
AG	0.2098	0.0440	0.0440	0.2553
JP	0.2888	0.0834	0.0394	-0.1672
SN	0.3172	0.1006	0.0172	-0.1236
TF	0.3222	0.1038	0.0031	-0.0624
EI	0.3269	0.1068	0.0030	-0.0579
Constant	52.5872			

(table continues)

<u>Dependent Variable - Study Orientation (S0)</u>				
Variable	Multiple R	R ²	R ² change	Beta
AG	0.2526	0.0638	0.0638	0.3042
SN	0.3454	0.1193	0.0555	-0.1790
JP	0.3821	0.1460	0.0266	-0.1579
EI	0.3920	0.1537	0.0076	-0.0910
Constant	87.6569			

* F of entry $p < .05$.

Table 9

Serendipitous Findings: Addition of the Variable AG;Multiple Regression Summary Tables for Male SubjectsDependent Variable - Delay Avoidance (AV)

Variable	Multiple R	R ²	R ² change	Beta
AG	0.4043	0.1635	0.0443	0.2682
JP*	0.3452	0.1191	0.1191	-0.2516
EI	0.4397	0.1933	0.0147	-0.1409
TF	0.4225	0.1785	0.0150	-0.1171
SN	0.4496	0.2022	0.0088	-0.10691
Constant	17.1368			

Dependent Variable - Work Methods (WM)

Variable	Multiple R	R ²	R ² change	Beta
EI	0.1752	0.0306	0.0306	-0.2287
TF	0.2551	0.0650	0.0343	-0.1731
AG	0.2979	0.0887	0.0236	0.1410
JP	0.3089	0.0954	0.0066	-0.0836
Constant	29.6922			

Dependent Variable - Study Habits (SH)

Variable	Multiple R	R ²	R ² change	Beta
JP	0.2463	0.0606	0.0606	-0.1761
TF	0.3003	0.0902	0.0295	-0.1613
EI	0.3345	0.1119	0.0217	-0.2052
AG	0.3835	0.1471	0.0351	0.2202
SN	0.3879	0.1504	0.0033	-0.0661
Constant	47.6126			

(table continues)

Teacher Approval (TA)

Variable	Multiple R	R ²	R ² change	Beta
AG	0.1766	0.0312	0.0312	0.2787
EI	0.2613	0.0682	0.0371	-0.2145
SN	0.2713	0.0736	0.0053	-0.1212
JP	0.2824	0.0798	0.0061	-0.0923
TF	0.2887	0.0833	0.0035	-0.0609
Constant	11.3930			

Dependent Variable - Education Acceptance (EA)

Variable	Multiple R	R ²	R ² change	Beta
AG	0.1639	0.0268	0.0268	0.2143
EI	0.2218	0.0492	0.0223	-0.1701
SN	0.2709	0.0734	0.0242	-0.1295
JP	0.2769	0.0767	0.0032	-0.0657
TF	0.2779	0.0772	0.0005	-0.0238
Constant	21.2111			

Dependent Variable - Study Attitudes (SA)

Variable	Multiple R	R ²	R ² change	Beta
AG	0.1992	0.0397	0.0397	0.2726
EI	0.2683	0.0720	0.0322	-0.2017
SN	0.2938	0.0863	0.0143	-0.1230
Constant	32.0424			

(table continues)

Dependent Variable - Study Orientation (S0)				
Variable	Multiple R	R ²	R ² change	Beta
AG	0.2211	0.0488	0.0488	0.2658
EI	0.2986	0.0892	0.0403	-0.2221
SN	0.3335	0.1112	0.0220	-0.0999
JP	0.3437	0.1181	0.0069	-0.0987
TF	0.3532	0.1248	0.0066	-0.0833
Constant	79.1313			

* F of entry $p < .05$.

Table 10

Serendipitous Findings: Addition of the Variable AG;Multiple Regression Summary Tables for All Subjects

<u>Dependent Variable - Delay Avoidance (AV)</u>				
Variable	Multiple R	R ²	R ² change	Beta
AG*	0.3134	0.0982	0.0982	0.35264
JP*	0.4120	0.1697	0.0715	-0.2154
EI	0.4329	0.1874	0.0177	-0.1409
SN	0.4497	0.2023	0.0148	-0.12582
TF	0.4501	0.2026	0.0003	-0.01920
Constant	11.3312			
<u>Dependent Variable - Work Methods (WM)</u>				
Variable	Multiple R	R ²	R ² change	Beta
EI	0.1463	0.0214	0.0214	-0.1740
AG	0.1971	0.0388	0.0174	0.1320
TF	0.2251	0.0507	0.0118	-0.1011
SN	0.2413	0.0582	0.0075	-0.0697
JP	0.2470	0.0610	0.0027	-0.0560
Constant	29.4262			

(table continues)

 Dependent Variable - Study Habits (SH)

Variable	Multiple R	R ²	R ² change	Beta
AG*	0.2280	0.0519	0.0519	0.2652
JP	0.3025	0.0915	0.0395	-0.1497
EI	0.3446	0.1188	0.0272	-0.1783
SN	0.3633	0.1320	0.0132	-0.1100
TF	0.3703	0.1371	0.0051	-0.0730
Constant	41.2792			

 Dependent Variable - Teacher Approval (TA)

Variable	Multiple R	R ²	R ² change	Beta
AG	0.1528	0.0233	0.0233	0.1889
EI	0.2220	0.0493	0.0259	-0.1600
SN	0.2416	0.0584	0.0091	-0.0853
JP	0.2436	0.0593	0.0009	-0.0329
Constant	22.9053			

 Dependent Variable - Education Acceptance (EA)

Variable	Multiple R	R ²	R ² change	Beta
AG	0.2004	0.0401	0.0401	0.2316
EI	0.2329	0.0542	0.0141	-0.1129
SN	0.2609	0.0680	0.0138	-0.0998
JP	0.2678	0.0717	0.0036	-0.0631
TF	0.2681	0.0718	0.0001	0.0130
Constant	19.1109			

(table continues)

 Dependent Variable - Study Attitudes (SA)

Variable	Multiple R	R ²	R ² change	Beta
AG	0.1997	0.0399	0.0399	0.2348
EI	0.2498	0.0624	0.0225	-0.1464
SN	0.2735	0.0748	0.0124	-0.0934
JP	0.2789	0.0778	0.0030	-0.0580
Constant	41.2516			

 Dependent Variable - Study Orientation (SO)

Variable	Multiple R	R ²	R ² change	Beta
AG*	0.2292	0.0525	0.0525	0.2686
EI*	0.2917	0.0851	0.0325	-0.1750
JP	0.3278	0.1074	0.0223	-0.1169
SN	0.3445	0.1186	0.0112	-0.1066
TF	0.3461	0.1197	0.0011	-0.0340
Constant	82.3360			

* F of entry p<.05.

Table 11

Correlation Coefficients for All Variables for All Subjects

	AV	ME	SH	TA	EA	SA	SO
AV	1.00						
ME	0.57*	1.00					
SH	0.87*	0.90*	1.00				
TA	0.42*	0.55*	0.55*	1.00			
EA	0.64*	0.63*	0.72*	0.68*	1.00		
SA	0.58*	0.64*	0.69*	0.92*	0.90*	1.00	
SO	0.79*	0.84*	0.92*	0.80*	0.88*	0.92*	1.00
EI	-0.10	-0.15	-0.14	-0.13	-0.08	-0.11	-0.14
SN	-0.17	-0.09	-0.15	-0.08	-0.10	-0.09	-0.13
TF	-0.05	-0.10	-0.09	-0.00	-0.01	-0.01	-0.05
JP	-0.26*	-0.09	-0.19	-0.07	-0.10	-0.10	-0.16
AG	0.31*	0.10	0.23*	0.15	0.20	0.20	0.23*
CO	0.06	-0.10	0.02	0.08	0.00	0.05	0.03
TY	0.05	-0.03	0.01	0.01	0.03	0.03	0.02
SE	-0.06	-0.03	-0.05	-0.06	-0.11	-0.10	-0.08

(table continues)

	EI	SN	TF	JP	AG	CO	TY	SE
AV								
ME								
SH								
TA								
EA								
SA								
SO								
EI	1.00							
SN	0.02	1.00						
TF	-0.11	0.13	1.00					
JP	0.10	0.32*	-0.03	1.00				
AG	0.17	0.08	-0.10	0.03	1.00			
CO	0.16	-0.07	0.14	0.13	0.06	1.00		
TY	0.17	0.10	0.01	0.15	0.55*	0.04	1.00	
SE	0.05	-0.12	-0.20	-0.11	-0.00	0.04	0.19	1.00

Note: $n = 92$. Some of the SSHA intercorrelations are seriously inflated because one score is part of another score with which it is correlated. Specifically, $SH = AV + ME$, $SA = TA + EA$, and $SO = SH + SA$.

* $p < .05$.

Table 12

Correlation Coefficients for All Variables for Females

	AV	ME	SH	TA	EA	SA	SO
AV	1.00						
ME	0.38*	1.00					
SH	0.81*	0.85*	1.00				
TA	0.49*	0.50*	0.60*	1.00			
EA	0.59*	0.48*	0.64*	0.65*	1.00		
SA	0.58*	0.54*	0.68*	0.93*	0.88*	1.00	
SO	0.75*	0.77*	0.91*	0.84*	0.84*	0.92*	1.00
EI	-0.17	-0.10	-0.16	-0.11	-0.03	-0.09	-0.13
SN	-0.23	-0.22	-0.27	-0.19	-0.14	-0.18	-0.24
TF	0.11	-0.01	0.06	-0.10	-0.01	-0.06	0.00
JP	-0.14	-0.06	-0.12	-0.18	-0.04	-0.19	-0.14
AG	0.37*	0.09	0.27	0.13	0.27	0.21	0.25

(table continues)

	EI	SN	TF	JP	AG
AV					
ME					
SH					
TA					
EA					
SA					
SO					
EI	1.00				
SN	0.15	1.00			
TF	-0.12	0.07	1.00		
JP	0.26	0.26	-0.18	1.00	
AG	0.10	-0.02	-0.10	0.29*	1.00

Note: $n = 42$. Some of the SSHA intercorrelations are seriously inflated because one score is part of another score with which it is correlated. Specifically, $SH = AV + ME$, $SA = TA + EA$, and $SO = SH + SA$.

* $p < .05$.

Table 13

Correlation Coefficients for All Variables for Males

	AV	ME	SH	TA	EA	SA	SO
AV	1.00						
ME	0.69*	1.00					
SH	0.91*	0.93*	1.00				
TA	0.38*	0.59*	0.53*	1.00			
EA	0.67*	0.71*	0.75*	0.70*	1.00		
SA	0.58*	0.70*	0.70*	0.93*	0.91*	1.00	
SO	0.81*	0.88*	0.92*	0.78*	0.90*	0.92*	1.00
EI	-0.05	-0.17	-0.13	-0.14	-0.10	-0.12	-0.14
SN	-0.15	-0.02	-0.09	-0.01	-0.10	-0.06	-0.08
TF	-0.15	-0.17	-0.18	0.04	-0.05	-0.01	-0.10
JP	-0.35*	-0.11	-0.25	-0.01	-0.15	-0.09	-0.19
AG	0.28*	0.12	0.21	0.18	0.16	0.20	0.22

(table continues)

	EI	SN	TF	JP	AG
AV					
ME					
SH					
TA					
EA					
SA					
SO					
EI	1.00				
SN	-0.07	1.00			
TF	-0.10	0.13	1.00		
JP	-0.01	0.34*	0.02	1.00	
AG	0.25	0.18	-0.10	-0.21	1.00

Note: $n = 50$. Some of the SSHA intercorrelations are seriously inflated because one score is part of another score with which it is correlated. Specifically, $SH = AV + ME$, $SA = TA + EA$, and $SO = SH + SA$.

* $p < .05$.

Table 14

Correlation Coefficients for SSHA and AG Variables

	AV	ME	SH	TA	EA	SA	SO
AG							
Females	0.37*	0.09	0.27	0.13	0.27	0.21	0.25
Males	0.28*	0.12	0.21	0.18	0.16	0.20	0.22
Total	0.31*	0.10	0.23	0.15	0.20	0.20	0.23*

Note: See Table 1 for variables explanation. $N = 92$; n (females) = 42;
 n (males) = 50.

* $p < .05$.

Table 15

Correlation Coefficients of the Scores on the SSHA - Form C:
Coefficients for SSHA Norming Population (1)a and Present Test
Population (2)b

	<u>AV</u>		<u>WM</u>		<u>SH</u>	
	<u>(1)</u>	<u>(2)</u>	<u>(1)</u>	<u>(2)</u>	<u>(1)</u>	<u>(2)</u>
AV			<u>.70</u>	<u>.58</u>	.92	.87
WM					.89	.90
SH						
TA						
EA						
SA						
SO						
Mean	25.0	18.9	25.1	24.9	50.1	43.8
SD	10.0	7.8	9.2	8.8	17.5	14.7

(table continues)

	TA (1)(2)		EA (1)(2)		SA (1)(2)		SO (1)(2)	
AV	<u>.49</u>	<u>.42</u>	<u>.65</u>	<u>.64</u>	<u>.64</u>	<u>.58</u>	.86	.79
WM	<u>.53</u>	<u>.55</u>	<u>.62</u>	<u>.63</u>	<u>.61</u>	<u>.64</u>	.84	.84
SH	<u>.55</u>	<u>.55</u>	<u>.71</u>	<u>.72</u>	<u>.69</u>	<u>.69</u>	.93	.92
TA			<u>.69</u>	<u>.68</u>	.91	.69	.78	.80
EA					.92	.90	.88	.88
SA							.91	.92
SO								
Mean	32.7	26.8	31.4	25.9	64.1	52.9	114.2	96.5
SD	8.0	8.3	8.3	7.7	14.8	14.6	29.7	27.1

Note: Some of the correlations are seriously inflated because one score is part of another score with which it is correlated. The independent correlations are underlined.

^a Norming population. N=3054. Data taken from SSHA Manual (1967), Table 8, p.22. ^b Population sampled for present study, Kelsey Institute, 1983. N=92.