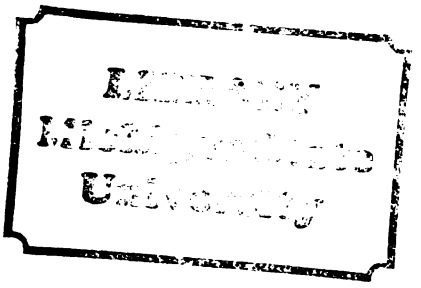

This is to certify that the

thesis entitled

THE RELATIONSHIP BETWEEN MOTIVATIONAL STRUCTURE AND ACADEMIC ACHIEVEMENT OF FRESHMEN AT A SMALL FOUR-YEAR STATE COLLEGE

presented by

Steven H. Childs

has been accepted towards fulfillment of the requirements for

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Walter F. Johnson

Major professor

Date August 13, 1982

THE RELATIONSHIP BETWEEN MOTIVATIONAL STRUCTURE AND ACADEMIC ACHIEVEMENT OF FRESHMEN AT A SMALL FOUR-YEAR STATE COLLEGE

by

Steven H. Childs

A DISSERTATION

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ABSTRACT

THE RELATIONSHIP BETWEEN MOTIVATIONAL STRUCTURE AND ACADEMIC ACHIEVEMENT OF FRESHMEN AT A SMALL FOUR-YEAR STATE COLLEGE

by

Steven H. Childs

The purpose of the study was two-fold. First, to determine if a relationship exists between motivational structure and academic achievement; secondly, to determine if certain motivational traits could be used to differentiate between high achieving and less successful students.

After completing an exhaustive review and analysis of several statistical models, it was determined that Partial Correlation Analysis would be the most appropriate model for the sample under investigation.

Major Findings

1. For the group as a whole, there was a positive correlation found between academic achievement and the following traits: Achievement, Cognitive Structure, Endurance, Order, and Succorance. In contrast, there was a negative correlation found between academic achievement and the following: Aggression, Autonomy, Impulsivity, and Play.

2. For Low Ability Females, there was no correlation found between academic achievement and motivational structure.

3. For Low Ability Males, Order was found to be positively correlated with GPA, whereas Aggression was negatively correlated.

4. For Average Ability Females, Defendence was found to be negatively correlated with GPA.

5. For Average Ability Males, Achievement and Endurance were positively correlated with GPA; whereas Aggression was negatively correlated.

6. Defendence, Order, Succorance, and Understanding were all positively related to GPA for High Ability Females.

7. For High Ability Males, Abasement was positively correlated with GPA while Aggression was found to be negatively correlated.

DEDICATION

This dissertation is dedicated to my grandmother, Gertrude Flagg, from whom I learned the importance of commitment, perserverance, and determination. She was without question the driving force in our family. My only regret is that she passed away before I could complete my degree.

ACKNOWLEDGMENTS

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CHAPTER I

RATIONALE FOR THE STUDY

It has been confirmed by numerous researchers that a significant number of students making the transition from high school to college will experience problems academically, especially during the first term of enrollment. In light of this fact, the primary concern of the current study will be to ascertain why students, of relatively equal ability, exhibit varying levels of academic performance. More specifically, the purpose of the study will be to determine if there is a relationship between academic achievement and motivational structure. A second objective will be to determine if certain traits can be used to differentiate between high achieving and less successful students. High achievement in this instance, is defined by a grade point average of 3.00 or greater.

This study is important for three reasons. First, if educators are to work effectively with students in a holistic fashion, they must have access to a student profile which is comprehensive in nature. Such a profile is essential when one is striving to meet the needs of students through such traditional programs as orientation, counseling, academic advisement, student activities, and other innovative developmental programs. Second, if educators are to substantially reduce the effects of academic transition on students, they must

provide a mechanism through which students might gain a better understanding of their needs, goals, and objectives. Concommitantly, it is essential that students thoroughly understand how such variables interface with their educational environment. Finally, declining enrollments and soaring recruitment costs will necessitate the creation of an educational environment designed to effectively reduce student attrition.

The individuals involved in the study are a representative cross-section of freshmen, both commuters and dormitory residents, from a broad range of academic disciplines, who are attending a small four-year public institution with an enrollment of 4,000 students. Hence, the findings of the study should have precedential value for institutions of comparable size and composition.

The impetus for conducting the study evolved from the desire to accomplish two primary objectives, which are stated in the form of research questions. These questions are as follows:

1. Is there a relationship between motivational structure and academic achievement?

2. Can certain traits be used to differentiate between high achieving and less successful students?

For the purpose of conducting the research study, these questions can be restated in terms of research hypotheses:

1. There is a relationship between motivational structure and academic achievement.

2. Freshmen possessing dominant achievement oriented traits will earn higher grade point averages than freshmen possessing latent achievement oriented traits.

3. Freshmen possessing dominant socially related traits, will earn lower grade point averages than freshmen possessing latent socially related traits.

Definition of Terms

For the sake of clarity, several terms used in the study have been defined. These definitions are as follows:

Achievement Oriented Motivational Structure: Students possessing such a structure will tend to exhibit above average needs for the following traits: achievement, autonomy, cognitive structure, endurance, order, and understanding; while at the same time exhibiting average or below average needs for: affiliation, change, impulsivity, play, and succorance, as determined by the Personality Research Form.

Dominant Trait Group: A specific subgroup of traits manifesting above average strength, as determined by the Personality Research Form (PRF) scale scores of traits within its group (M = 50, S.D. = +10).

Motivational Structure (Synonymous with Need Structure): A complex intra-structure within one's personality structure; characterized by the existence of an intricate network of traits common to all mankind, which due to their varying levels of strength, ultimately influence an individual's pattern of behavior.

Latent Trait Group: A specific subgroup of traits manifesting average or below average strength, as determined by the PRF scale scores of traits within its group (M = 50, S.D. = -10).

Need: As defined by Murray (1938: 124) is "a force (the physio-chemical nature of which is unknown) in the brain region, a force which organizes perception, apperception, intellection, conation, and action in such a way as to transform in a certain direction an existing, unsatisfying situation." Moreover, such needs are functional in nature and possess verying levels of strength.

Personality: The dynamic organization, within the individual, of those psychophysical systems that determine his unique adjustment to his environment (Allport, 1937: 48).

Socially Oriented Motivational Structure: A student possessing such a structure will tend to exhibit above average needs for the following traits: affiliation, change, impulsivity, play, succorance; and average or below average needs for: achievement, autonomy, cognitive structure, endurance, order, and understanding, as determined by the PRF.

Trait: As defined by Allport (1937: 295), is "a generalized and focalized neuropsychic system (peculiar to the individual), with the capacity to render many stimuli functionally equivalent, and to initiate and guide consistent (equivalent) forms of adaptive and expressive behavior."

Trait Group: A specific subgroup of consistently manifested characteristics or behavioral acts.

Type: A type is a specimen, or example, which reproduces in a characteristic way the character of a species or general class.

Statement of Theory

The theoretical framework of this study is housed in the body of knowledge known as Motivation Theory. One of the most prominent theorists in this field was Kurt Lewin (1951) who developed what is known as Value/Expectancy Theory. Lewin viewed behavior as being a series of steps in a path to a goal. His theory was later modified by Vroom (1964), who utilized the theory to assess employee motivation. Value/Expectancy theory is based on two premises. The first premise being that people usually assess the outcome of various courses of action, and subjectively assign values to those expected outcomes. As a result, a hierarchy of preferences is established. The second premise is that any explanation of motivated behavior must be prefaced by a consideration of what an individual expects to accomplish and the extent to which he/she believes his/her own actions will influence the desired outcome.

From these premises, Vroom (1964: 18) sets forth the following theoretical proposition:

> The force on a person to perform an act is a monotonically increasing function of the algebraic sum of the products of the valences of all outcomes and the strength of his expectancies that the act will be followed by the attainment of these outcomes.

According to the first premise, people usually weigh both the negative and positive aspects of various courses of action and make decisions about how they will perform, based in part on the average value of all perceived outcomes associated with successful performance. For example, an individual may view the expenditure of effort as a means of achieving successful performance, i.e., higher

grades. Accordingly, successful performance may serve as a vehicle for achieving other goals such as acquiring power, prestige, influence, job security, salary increases and/or promotions. Vroom, however, indicates that wage increases or promotions may have no value by themselves, in that they might only become valuable in terms of their instrumental role in securing second level outcomes such as food, clothing, entertainment, status, and shelter, which are not obtained as the direct result of a particular action.

Vroom further states that motivation to perform also depends on one's expectation that he/she can successfully carry out a particular task, in addition to the expectation that such performance will help one accomplish his/her objectives. Accordingly, Vroom believes that if people give preference to wage increases as a desirable outcome of their job performance, their level of motivation will be dependent upon the degree to which they believe they can perform successfully, and the degree to which they believe high productivity is likely to help them achieve their financial goals.

Moreover, Vroom states that people may place great value on effectuating a certain outcome, but if they perceive a total lack of control over that outcome, they will not be inclined to expend any energy toward its fulfillment. Accordingly, an individual's level of motivation will be a function of the value he assignes to a particular end result and the degree to which he believes that the outcome depends upon his actions.

Although Vroom's theory was originally designed for use in business and industry, several authors have demonstrated that his

theory, with a few minor modifications, can easily be adapted for use in educational settings (Todd, Terrell, and Frank, 1962: 183-190; Mitchell and Nebeker, 1973: 61-67).

Prior to 1950, little or no distinction was made between intrinsic and extrinsic rewards emanating directly from effort and successful performance; however, several authors have pointed out that successful performance in and of itself is satisfying to some people under some conditions. A case in point has been presented by McClelland (1961), who has demonstrated that when an individual is provided with an opportunity to evaluate his performance as being a success or failure, the degree of satisfaction that can be derived from task performance is a function of both the probability of success and the strength of the individual's need for achievement. When such conditions exist, the individuals most likely to experience satisfaction with accomplishment are those who possess high needs for achievement.

Porter and Lawler (1968: 15-40) have expanded upon Vroom's theory by suggesting that even though individuals might be highly motivated to perform a certain act, their performance may still be poor if the requisite abilities are lacking or the individual's perception of what is required for successful performance is not accurate. Thus, Porter and Lawler suggest that adequate ability and accurate role perceptions are necessary, but not sufficient, for successful performance.

At this juncture it is important to discuss another topic, namely motivational structure. As defined earlier, motivational

structure is a complex intra-structure within one's personality structure, characterized by the existence of an intricate network of traits common to all mankind, which due to their varying levels of strength, ultimately influence an individual's pattern of behavior (see Figures 1 and 2).

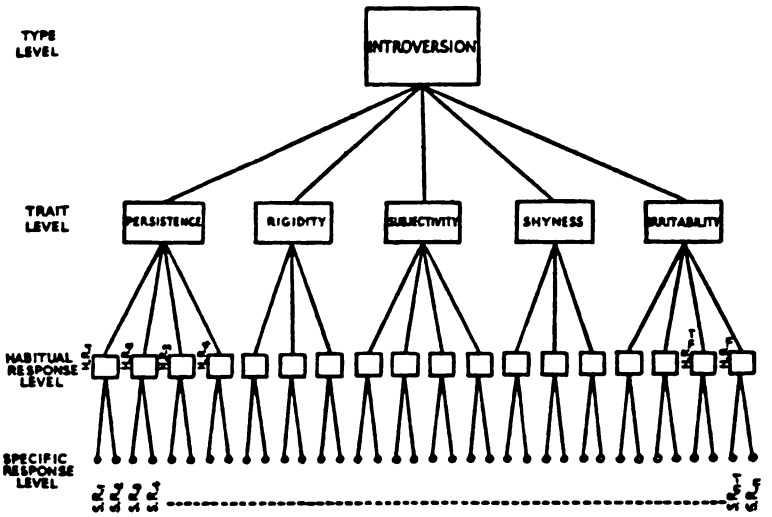

Figure 1.--Hierarchical Organization of Personality (Eyesenck, 1960: 13).

As can be seen from these two illustrations, an individual's personality hierarchy (Eysenck, 1960: 13) is comprised of four distinct levels of behavioral organization: specific response level, habitual response level, trait level, and at level four, the personality "type." As shown in Figure 2, an individual's motivational structure, operating from level three (trait level) serves as an

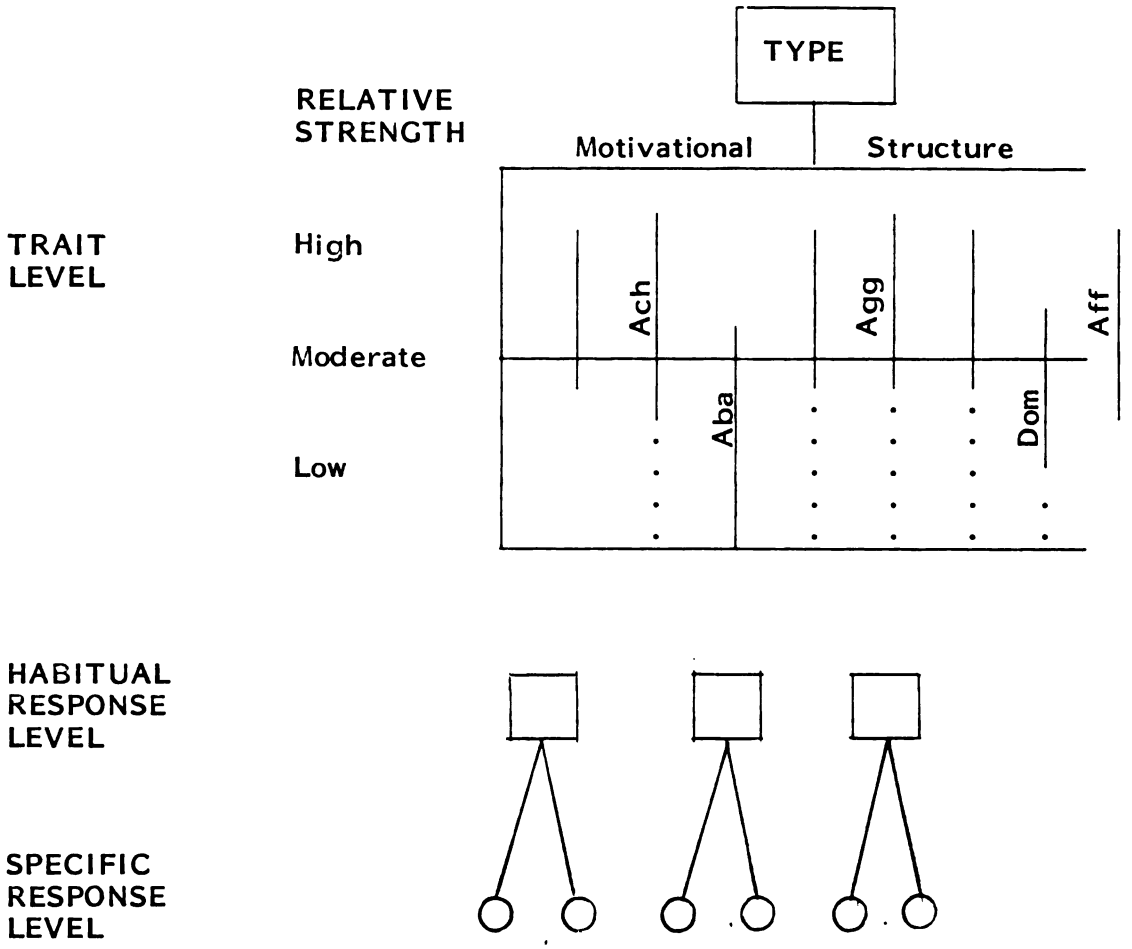

Figure 2.--Diagrammatic Representation of Motivational Structure.

umbrella for all lower order behavioral responses. According to Murray (1938: 712-713) this level of behavioral functioning is controlled by a complex network of "needs" which in Murray's view is synonymous with Allport's concept of "trait" or as Murray called them, "motivational traits." These motivational traits represent

only one of several classes of traits, such as individual traits, which but a few people possess; common traits, which are shared to some extent by almost everyone; and instrumental traits, which are "primarily expressive in significance, and seem predominantly motor in organization . . . ." Thus, instrumental traits merely represent styles of behaving (Allport, 1937: 323). Hence, from this theoretical frame evolved "need structure" or "motivational structure." As shown in Figure 1, the specific responses, SR_1, SR_2, SR_3 ... SR_n are first level responses which according to Eysenck (1960: 13) "are acts such as responses to an experimental test or to experiences of everyday life, which are perhaps observed once, and may or may not be characteristic of the individual."

The second level responses or habitual responses. HR_1, HR_2, HR_3 ... HR_n, are specific responses which tend to recur under similar circumstances; i.e., "if the test is repeated, a similar response is given or if the life situation recurs, the individual reacts in a similar fashion" (Eysenck, 1960: 13).

Level three is comprised of the various traits T_1, T_2, T_3, ... T_n. These traits--persistence, shyness, subjectivity--are "theoretical constructs, based on observed inter-correlations of a number of different habitual responses" (Eysenck, 1960: 14).

These traits, according to Allport (1937: 314)

> . . . are discovered not by deductive reasoning, not by fiat, not by naming, and are themselves never directly observed. They are discovered in the individual life . . . only through an inference (or interpretation) made necessary by the demonstrable consistency of the separate observable acts of behavior.

Thus, these traits may be described as being both functional and dynamic in nature; with the level of strength for each trait ranging from high to low (see Figure 2), but never equaling zero. Hence, all mankind possess such traits, but the relative strength of each trait will determine whether a trait becomes manifest or remains latent within the individual.

Finally, it is most important for traits to be viewed in their proper perspective, for no single trait--nor all traits together--determine behavior all by themselves, for according to Allport:

> Any specific action is a product of innumerable determinants, not only traits but of momentary pressures and specialized influences. But it is the repeated occurrence of actions having the same significance (equivalence of response) following upon a definable range of stimuli having the same personal significance (equivalence of stimuli) that makes necessary the postulation of traits as states of being. Traits are not at all times active, but they are persistent even when latent, and are distinguished by low thresholds of arousal (1937: 349).

At the fourth and uppermost level of the personality hierarchy lies what is known as the personality "type." Carl Jung was one of the chief exponents of the "type" concept and it was his belief that every individual possessed both the mechanism of introversion and that of extraversion; however, he was of the opinion that it was only the relative strength of the one as compared to the other which created the type. Moreover, he believed that external circumstances and inner dispositions frequently favor one mechanism and impede or restrict the other, which results in one being dominant.

Thus, it was the notion that chronic or habitual dominance lead to what is known as "type" (Jung, 1923: 412-517).

Value/Expectancy theory, one of several theories of motivation, was selected for the present research project because of its applicability to educational settings, particularly those of a post-secondary nature. The premises upon which the selection was based are as follows:

1. People who choose to attend college are a self-selected group of individuals who receive tangible incentives and rewards, as a result of their pursuit of identifiable goals and objectives.

2. Moreover, such individuals tend to be success-oriented, goal-directed, and are driven by numerous motivating factors.

Furthermore, the terminology and concepts involved in Value/Expectancy theory seem to be directly applicable to the study of the various complexities of human behavior and motivation . In fact, the Value/Expectancy model has been used by researchers in several other studies (Todd, Terrell, and Frank, 1962; Arvey and Dunnette, 1970; Mitchell and Knudson, 1971; and Mitchell and Nebeker, 1973).

Overview of the Dissertation

There have been numerous research studies conducted to determine the relationship between academic achievement and various correlates of personality; accordingly, those studies will be reviewed in Chapter II. To facilitate the discussion, the pertinent literature will be divided into three areas, culminated with an overall summary as follows: (a) Academic Achievement, (b) Motivational Structure, (c) Commuters vs. Resident Students, and (d) Summary.

In Chapter III there will be a thorough elucidation of the design and methodology employed in the investigation; followed by Chapter IV, which will be utilized to provide a delineation of the findings derived from the study. Chapter V, the final chapter, will be divided into five sections as follows: (a) The Problem, (b) Findings, (c) Conclusions, (d) Implications, and (e) Recommendations for Future Research.

CHAPTER II

REVIEW OF LITERATURE

Academic Achievement

According to Cope (1978), the projected attrition rate for colleges and universities during the 1980s will be approximately 40 percent. If this in fact becomes a reality, along with the predicted decline in enrollment, administrators will be under tremendous pressure to find answers to the attrition problem--especially if operational costs continue to spiral at their present rate.

Poor academic performance is one of the primary reasons why our current attrition rate is hovering at 40 percent, and although a great deal of time, effort, and resources have been devoted to studying academic performance, a central question remains essentially unanswered. (Namely, why is the academic performance of students often not commensurate with their ability?)

Henry Morgan has presented a good example of this perplexing question:

> A group of male sophomore students of high scholastic aptitude was selected from the College of Science, Literature, and Arts (SLA) of the University of Minnesota on the basis of their scores on the 1947 American Council on Education Psychological Examination (ACE) taken prior to their enrollment as freshmen in college. These students had obtained, on the ACE, a raw score of 136 or more which placed them at or above tne 90th percentile on Thurstone's 1947 norm group of 34,658 males who were freshmen in four year colleges. A total of 132 men were thus selected and a distribution of the freshman year grade point averages was computed. This

distribution revealed the following: Thirty-three percent (33%) of these students earned a "B" or better; 37% earned a "C" average; and 30% earned a "D" or less (1952: 292-298).

Considering the fact that these were high caliber students, this distribution of grades is not only alarming but it suggests that some factor other than ability is having a great impact on academic performance.

During the Fall of 1955 a similar study was conducted at the University of Utah, utilizing a group of 300 freshmen classified as low achievers, based on a predicted grade point average of 1.50 (D+) or below. Their predicted GPA was derived from high school grades and achievement test scores. From this group of low achievers, two distinct subgroups were identified in the following manner: Over Achieving Group (N = 49): A student with a predicted GPA of 1.50 or below, who, after one quarter had attained a GPA of 2.00 or above; Achieving as Expected Group (N = 52): A student with a predicted GPA of 1.50 or below, who, after one quarter had earned a GPA of 1.00 or below.

The mean predicted GPA for the over-achieving group was 1.22, S.D. = .23, while the mean predicted GPA for the group achieving as expected was 1.14, with a standard deviation of .19. At the end of the first quarter an analysis of the data revealed the following: the mean GPA earned by the over-achieving group was 2.36, S.D. = .33, and the mean GPA earned by the group achieving as expected was .65 with a standard deviation of .88 (Merrill and Murphy, 1959: 207-210).

Assuming that the prediction model employed was not faulty, this study provides evidence of the divergence between the predicted and the actual level of performance of college freshmen.

Krug (1959: 133-136) who in 1958 studied a sample of freshmen engineers at Carnegie Institute of Technology, also found that over-achievers and under-achievers quite often do not perform according to their predicted level of achievement. More specifically, he found that after one semester a group of over-achievers whose mean predicted GPA was 2.56 actually earned a mean GPA of 3.50. He also found, in the same study, that a group of under-achievers whose mean predicted GPA was 2.46 actually earned a mean GPA of 1.49 after completing one semester of coursework.

Motivational Structure

The aforementioned research projects are just a few of numerous studies which clearly indicate that academic performance is often affected by non-intellectual factors. One such factor is motivational structure. As defined in Chapter I, motivational structure is a complex intra-structure within one's personality structure, characterized by the existence of an intricate network of traits common to all mankind, which due to their varying levels of strength, ultimately influence an individual's pattern of behavior.

Many researchers have investigated the relationship between various personality traits such as the Need (N) Achievement, N Autonomy, N Affiliation, N Order, and their relationship to academic achievement. As might be expected, the literature on this particular

subject reveals a great deal of inconsistency with respect to the relationship between academic achievement and the various correlates of personality. One of the primary reasons for such inconsistency is that projective and self-report (objective) instruments do not measure the same traits with an equal degree of accuracy.

Secondly, some researchers have used only those subjects whose motivational scores fall in the extreme quartiles of a distribution, while others will use all subjects sampled for their particular study. Furthermore, according to Clarke (1973), additional discrepancies emerge as a direct result of the fact that many instruments are contaminated by social desirability and response variables. Moreover, there is a great deal of variability among instruments currently available, with respect to reliability and validity--a fact which makes comparisons between findings extremely difficult.

Overall, according to Clarke, the reliability estimates of internal consistency and stability for projective instruments, such as McClelland's Thematic Apperception Test (TAT) and French's Test of Insight (TOI) are very low. The Sentence Completion Test (SCT), in contrast, has a relatively high internal stability coefficient of .75 over a three-month period (Clarke, 1973).

As far as achievement motivation is concerned, Weinstein (1969) found very low reliability coefficients for the TAT, TOI, the Edwards Personal Preference Schedule (EPPS), and the California Psychological Inventory (CPI). In fact, the highest coefficient for either internal consistency or stability was .48.

Edwards (1959) reports relatively high stability coefficients of .74 for Achievement and .70 for Affiliation, but only over a seven-day interval. When the test was administered seven weeks apart, the coefficients were significantly lower and scores on the Achievement scale were considerably higher.

In terms of predicting academic achievement, Bendig (1959), Goodstein and Heilbrun (1962), Izard (1962), and Reiter found that instruments such as the EPPS tend to yield low but significant correlations. In their studies they found that most of the variance was accounted for by high school GPA. In a related study, Bachman (1964) found that the prediction model for GPAs was not significantly improved by adding N Achievement scores to SAT scores.

On the whole, according to Clarke (1973), the self-report measures tend to be more reliable than projective methods in terms of predicting academic performance. None of the instruments, however, appear to be sufficiently valid to be used for individual prediction of any behavior.

Nevertheless, according to several prominent researchers, among the self-report measures, the Personality Research Form is the most reliable instrument currently available for measuring achievement and affiliation motivation. Anastasi (1972) for example, states, "Technically the PRF appears to be exemplary," and Kelley (1972), refers to the PRF as an:

> "extremely promising" device which is "A welcomed contribution to the field of personality assessment" . . . . "The resulting scales have high content validity and homogeneity, making possible the measurement of personality traits with levels of precision and validity formerly associated only with intellectual abilities and scholastic achievement."

Another major source of the confusion surrounding the subject of motivational structure and its relationship to academic achievement, emanates from weaknesses in the design of various studies. Such weaknesses can usually be divided into three basic categories: failure to account for differences based on sex; inadequate stratification by age and/or level of academic progress; and inadequate stratification by ability level. For example, Osborne conducted a study at the University of Georgia in 1948, employing the Harrower Multiple Choice Rorschach. The Rorschach was administered to 504 freshmen, in an attempt to determine its usefulness in predicting the scholastic performance of college freshmen. Accordingly, at the end of the fall and winter terms, grades were obtained and ranked on a nine-point scale. After recording all pertinent data, biserial correlation coefficients were computed between each of the 300 Rorschach responses and the fall quarter GPAs. After the data were thoroughly analyzed, Osborne (1950) found that "several types of weighted Rorschach responses which, when combined with scholastic aptitude test scores, yield appreciably better predictions of college grades than those based solely on scholastic aptitude tests."

Osborne's study yielded a wealth of information; however, he apparently failed to consider the effects of a very important variable, namely the sex of the respondents. As a result, the conclusions drawn from the data are extremely clouded.

Level of Academic Progress and Age

When conducting research involving personality variables, it is important to consider the level of academic progress of the respondent in conjunction with the individual's age. For, as Izard (1962), Rothman (1973a), and Rothman (1973b), have pointed out, one's motivational structure has a tendency to change in accordance with the changing priorities of the individual student, which is often a function of age and/or maturity in addition to the varying demands of one's academic program.

The importance of controlling such factors was clearly demonstrated by Izard in a study conducted at Vanderbilt University. In 1957, during orientation week, the Edwards Personal Preference Schedule was administered to 627 entering freshmen. Four years later a follow-up study was carried out to assess any changes that might have occurred between the freshman and senior year. Follow-up test data were obtained for 19 nursing students, 63 engineering students, 24 arts and sciences (A&S) women and 28 A&S men. Subsequently, after completing an analysis of the data, Izard found the following:

> The nursing students showed significant mean decreases on Deference, Abasement, Order, Affiliation, and Endurance; with significant mean increases on Autonomy, Heterosexuality, and Aggression. The means for engineers decreased on Deference, Abasement, Succorance, and Endurance, and increased on Dominance, Heterosexuality, Autonomy and Aggression. The means for A&S women decreased on Deference, Dominance, Abasement, and Endurance while increasing on Heterosexuality and Autonomy. In contrast, the means for A&S men decreased on Abasement and Nuturance while increasing on Achievement, Aggression, and Heterosexuality (1962: 482).

Additional evidence concerning the importance of controlling for age has been presented by Serine (1976) in a study conducted at Mansfield State College. The purpose of Serine's study was to compare the needs of adults in a Continuing Education Program with those of traditional four year college freshmen. Serine's two samples consisted of 98 adults and 91 freshmen who were enrolled during the spring term of 1975.

The adults were enrolled as part-time students in the Continuing Education Program and the freshmen were full-time students enrolled in regular undergraduate programs. Each participant was administered the Edwards Personal Preference Schedule (EPPS) and a supplementary data questionnaire.

After completing an analysis of his data, Serine found a distinct difference in the need systems of freshmen and adults. More specifically he found that: adults exhibited a higher need for exhibition, affiliation, succorance, and nurturance, than freshmen in his sample. When the study samples were compared by sex, he found a greater difference in need strengths between the freshman males and females as compared to the difference between the adult males and females.

To his credit, Serine accounted for the differences in sex, but he failed to adequately stratify his sample by age groups. As a consequence, his sample of "traditional freshmen" (18-22 years of age) includes a large number of students who have been out of high school for several years. This fact alone presents a problem with respect to the wide variability in maturity levels, a problem Izard

(1962) and Rothman (1973) alluded to in earlier studies. Furthermore, Serine's rather imprecise definition of the "adult student" as "a person who would not say 'student' when asked his occupation, a person who spends most of his time in pursuits not considered educational . . . ," led to the mixing of seventeen "traditional freshmen" with those of the adult group. Consequently, his findiings are at best questionable.

In a similar study conducted at Ohio State University, Carder (1977), sought to investigate the relationship among four variables: age, need for achievement, need for affiliation, and career salience (general attitude toward work) in female college students. Her subjects were divided into two groups: those under 22 years of age (40 students) and those 28 years of age and older (39 students). The younger students were enrolled in introductory psychology classes and/or were members of the university residence halls. The older female students were recruited from various academic classes, interest groups, and through an advertisement in the campus newspaper. The research instruments employed included the Achievement via Independence and Achievement via Conformance Scales of the California Psychological Inventory, the Adjective Check List, and a 27-item measure of career salience.

After completing an analysis of her data, she found that:

1. College women over 28 score higher on a measure of Need Achievement than college women under 22;

2. There are no differences on a measure of N Affiliation between college women over 28 and college women under 22;

3. College women over 28 exhibit higher levels of career salience than college women under 22;

4. High career salient college women, regardless of age, score higher on a measure of N Achievment than low career salient women.

Unfortunately, Carder made the same error as Serine in that her stratification by age group was inadequate; a fact that becomes particularly pronounced when one considers the fact that the traditional four-year college student has usually completed college by age twenty-two.

Restricted Samples

Sample composition is another factor which should be considered when studying motivational structure; for this will determine the scope of any generalizations that might be drawn from the data. A case in point has been presented by Uhlinger and Stephens (1960: 259-266) who studied the academic performance of 72 freshmen at a midwestern state university, the majority of whom were male engineering majors. Each of the students in their study had received a special merit scholarship, scored high on the Scholarship Qualifying Test (SQT) one year before entering college; ranked in the top 10 percent of his/her high school graduating class, were single and were between the ages of 17 and 19. Each of these students also completed the Edward Personal Preference Schedule (EPPS), the Goal Preference Inventory (GPI), and the Incomplete Sentences Blank (ISB). All of the students were tested near the end of the fall semester, under normal testing conditions, and all tests were administered in the same sequence.

The mean GPA for the scholarship group was 4.97 on a six-point grading scale (A=6, B=5, C=4, D=3), whereas the mean for the entire freshman class was 4.11. Of the 72 students tested, 17 earned GPAs of 5.54 or above; these students were classified as high achievers. There were also 17 students in the low achieving group (GPAs of 4.5 or lower). Upon completion of their analysis, Uhlinger and Stephens found the following:

> The hypothesis that high achievers evidence greater need for achievement than do low achievers was supported by only one of four measures; high achievers show greater need for social love and affection that do low achievers; and generally, high achievers had a greater expectancy for academic success and higher minimal grade goals than did low achievers.

Nevertheless, due to the pronounced homogeneity of the sample, any generalizations that might be drawn from the data must be restricted primarily to high ability male engineering freshmen. In fact, the lack of an acute differentiation between high and low achievers may have been a result of sample homogeneity.

Another example of a restricted sample has been presented by Rothman (1973b: 180-182) in a study conducted at the University of Toronto. During the fall of 1967, all members of the entering medical class at the University of Toronto were administered a battery of psychological tests. The testing battery consisted of the Advanced Progressive Matrices, a non-verbal test of intellectual ability, and the Personality Research Form.

After establishing a criterion for persistent high and low achievement, the progress of each student was monitored over a four-year period. At the end of the four-year period, there were 160

students who could be classified as persistent high and low achievers. Subsequently, various comparisons were made between the two groups.

Upon completion of his analysis, Rothman found that in the first year the traits associated with conventional learning, such as Need Achievement, Need Endurance, and Need of Introversion, were the most effective differentiators between high and low achievers. In contrast, during the last two years, he found that differentiation between high and low achievers was exclusively in terms of power and status-associated traits, i.e., Need for Dominance, Need for Social Recognition, and Exhibition.

Again, the results of the study are enlightening, but due to the fact that the sample was comprised of a highly select group of students, any generalizations must be restricted chiefly to pre-medical students.

Stratification by Ability Level

One of the most common errors of researchers investigating the relationship between non-intellectual factors and academic achievement, involves a lack of stratification according to ability level. Recognizing this as a potential problem, Gebhart and Hoyt (1958: 125-128) exercised great care in designing their study, which was carried out at Kansas State University. Their sample included 240 freshmen male students enrolled in the School of Engineering and Architecture, and the School of Arts and Sciences. Each school group was subdivided into three ability levels, and further divided into under and over-achievers for the purpose of investigating some of the

personality correlates of over- and under-achievement. Within the limits of the sample employed, the following conclusions were reached:

1. Over-achievers scored significantly higher than under-achievers on the Achievement, Order, Intraspection, and Consistency Scales, and significantly lower on the Nurturance, Affiliation, and Change Scales.

2. High ability students scored significantly higher than those of low ability on the Achievement, Exhibition, Autonomy, Dominance, and Consistency Scales, and significantly lower on the Deference, Order, Abasement, and Nurturance Scales.

3. Engineering students scored significantly higher than arts and sciences students on the Endurance Scale and significantly lower on the Dominance Scale.

A similar study was carried out at Iowa State University by Goodstein and Hielbrun (1962), employing many of the same precautions as Gebhart and Hoyt. Their study involved 321 undergraduate students, 206 males and 115 females, enrolled in two large introductory psychology courses. The group was predominantly comprised of sophomores, with some juniors and a few seniors. Each of these students completed the Edwards Personal Preference Schedule (EPPS) early in the semester, under standard testing conditions. Additionally, the score on a 20 minute, 60-item vocabulary test was used to assess their scholastic aptitude. At the conclusion of the semester, the GPAs for each student was secured and the product-moment correlations between the semester GPAs , the vocabulary test scores, and the scores on the EPPS were computed separately by sex for the entire group. The results were as follows:

> The obtained correlation between vocabulary test scores and GPA was .46 for the males and .42 for the females (both p's < .01). The correlation between the vocabulary test scores and the EPPS scale scores ranged from -.23 to .37. Approximately 20% of the correlations between the vocabulary test scores and EPPS scale scores were statistically significant (p < .05).

After analyzing these essentially negative results, from a group of students possessing a wide range of intellectual ability, Goodstein and Heilbrun hypothesized that personality correlates of college achievement may be specifically tied to ability levels, and that these relationships are obscured in the type of analysis which fails to consider varying levels of ability. To investigate this hypothesis, they subdivided each of the two sex groups into three equal sized subgroups, using scores on the vocabulary tests to define Low, Middle, and High intellectual ability. The product-moment correlations between GPA, vocabulary test scores, and the 15 EPPS scale scores were then computed for each of the six subgroups. An analysis of these subgroups revealed the following:

> For the males, the obtained correlation between the vocabulary test scores and GPA was .28 for the Low ability group, .11 for the Middle ability group, and .33 for the High ability group. In contrast, the correlations for females were .32, -.05, and .40, respectively. The correlations between the vocabulary test scores and the EPPS scale scores ranged from -.32 to .43 with approximately 25% of the correlations statistically significant (p < .05). . . . A further analysis revealed that for Low ability males, Autonomy and Nurturance are negatively correlated with GPA; for the Middle ability males, Achievement and Endurance are positively correlated with GPA, while Affiliation, Intraception, Nurturance, and Change are negatively correlated with GPA; and for the High ability males, Aggression is negatively correlated with GPA. In contrast, for the Low ability females, Abasement and Nurturance are negatively correlated with GPA, for the High ability females, Intraception is positively correlated with GPA, but none of the partial correlations for the Middle ability female group is statistically reliable.

Goodstein and Heilbrun made a significant contribution to Motivation Theory as a result of conducting this study; however, their results are extremely clouded because of their failure to control for varying levels of academic progress; i.e., they mixed sophomores, juniors, and seniors without differentiation.

After reviewing numerous studies on academic achievement and the various personality correlates associated with the same, it became apparent that the motivational structures of high achieving and less successful college students are quite distinctive. The pattern that most often emerges for the high achieving student is one dominated by high needs for the following traits: Achievement, Autonomy, Cognitive Structure, Endurance, Order, and Understanding. In contrast, the less successful student has a tendency to exhibit high needs for: Affiliation, Change, Impulsivity, Play, and Succorance. Substantial support for the components of these two patterns can be found in the following studies: Gebhart and Hoyt (1958); Merrill and Murphy (1959); Krug (1959); Izard (1962); Goodstein and Heilbrun (1962); Rothman (1973a); Rothman (1973b); Parlow and Rothman (1974); Loucks, Kobos, Stanton, Burstein, and Lawlis (1979); Maudal, Butcher, and Mauger (1974); and Capoor (1974).

Commuters vs Residents

The literature on the commuting student, as scarce as it may be, tends to depict the "commuter" as the "deprived" student; however, it remains to be seen as to whether this is an accurate characterization. Nevertheless, the research to date indicates the following:

Kyser (1964), based on his observations, thought that many students selected non-residential colleges because of emotional problems. He also suggested that a higher potential for mental disorder, dropout, and/or failure existed at urban commuter institutions than at residential schools.

Schuchman (1966) reported that conflicting political and social attitudes were the greatest single producers of stress and unhappiness in the commuter's life. Commuters, he found, were forced to suppress their thinking at home or defend their "radical" views. Harrington (1972) revealed that commuters had fewer collegiate friends and acquaintances and identified more with people they had known in high school.

Graff and Cooley (1970), in comparing commuters to resident students, found that: the commuter had poorer mental health, had more problems with curricular adjustment, and demonstrated less maturity in goals and aspirations. They concluded that commuters were less satisfied with their chosen curriculums, perceived less relevance in their coursework, and showed less responsibility in satisfying academic requirements. Their study also indicated that commuters manifested a lack of self-confidence, nurtured feelings of failure and insecurity, and displayed excessive anxiety when confronted with petty annoyances, in comparison to resident students. With respect to study skills, organization, and interpersonal relations with peers, no differences were found between commuters and resident students.

Bishop and Snyder (1975), in a study conducted at an eastern university, found that commuters relied on themselves as sources of help more often than they did on friends, while the pattern for resident students was just the opposite. Such findings tend to indicate that commuters may be more self-reliant and autonomous than students who live on campus. While it is not known whether such contrast is due to choice or circumstances, it should be noted that George (1971) found similar differences in a study of the personality structures of commuter and resident students.

As a result of their studies of college attendance, Chickering and Kuper (1971) made several generalizations about differences in the development of residential and commuting students. They suggested that the main impact of college on commuters occurred during the last two years of college, whereas, change occurred during the first two years for resident students. The commuter's slower transition was thought to be a result of internal conflicts, parental pressure, and peer relationships formed before college. Chickering and Kuper concluded that the college experiences of commuters and residents were similar with regard to intellectual development; however, they found that substantial differences existed and persisted in the out-of-class experiences and interpersonal relationships, to the extent that non-intellectual changes occurred at a slower pace for the commuter. Their study also revealed that upon entrance to college, dormitory students exhibit a greater range of competencies than commuters. These competencies tend to expand during the freshman

year for resident students but contract for commuters, creating an even wider gap between the two groups.

Summary

The literature reveals a plethora of studies investigating the relationship between academic achievement and numerous variables of prsonality, but the findings emanating from these studies are often beset with conflicts. Aside from the conflicting results that can be attributed to highly unusual populations such as those based on high ability, pre-medical, or engineering students, there are numerous studies which are weak in design. These weaknesses usually fall into three basic categories: (1) some researchers have failed to consider differences in response based on sex; (2) others, despite strong evidence to the contrary, have failed to consider age differentials and levels of academic progress, i.e., mixing upperclassmen with freshmen; and (3) the most common error is the failure to consider the effects of varying ability levels.

In spite of these shortcomings, a relatively clear pattern has emerged from these studies, revealing that high achieving students have a tendency to exhibit high needs for: Achievement, Autonomy, Cognitive Structure, Endurance, Order, and Understanding; and that less successful students tend to exhibit high needs for: Affiliation, Change, Impulsivity, Play, and Succorance. Substantial support for the components of these two patterns can be found in the following studies: Gebhart and Hoyt (1958); Merrill and Murphy (1959); Krug (1959); Izard (1962); Goodstein and Heilbrun (1962);

Rothman (1973a); Rothman (1973b); Parlow and Rothman (1974); Loucks, Kobos, Stanton, Burstein, and Lawlis (1979); Maudal, Butcher, and Mauger (1974); and Capoor (1974).

With respect to differences and/or similarities between commuters and dormitory residents, Graff and Cooley (1970) found that commuters tend to be more disenchanted with their curriculums, perceived less relevance in their coursework, and were not as conscientious in satisfying their graduation requirements. In addition, Graff and Cooley found that commuters tend to be less self-confident when compared to resident students. In contrast, Bishop and Snyder (1975) found dormitory residents to be less self-reliant and autonomous than commuters.

Chickering and Kuper (1971) in their study of the impact of college on students, found that significant changes occurred in resident students during the first two years of college; whereas, for commuters such changes did not occur until the last two years of college. They also concluded that the college experiences of commuters and residents were quite similar with regard to intellectual development. This fact is further confirmed by Call (1974), Pugh and Chamberlain (1976); and Selby and Weston (1978), all of whom report no significant differences in achievement between the two groups. In light of these findings, no attempt was made to differentiate between these two groups in the current study.

In view of these findings, those motivational traits which appear to be fairly reliable academic predictors will be separated into two groups as indicated in Table 2.1. Trait Group I is

TABLE 2.1.--Motivational Traits: Academic Predictors.

TRAIT GROUP I Traits of High Achievers	TRAIT GROUP II Traits of Less Successful Students
a. Achievement	a. Affiliation
b. Autonomy	b. Change
c. Cognitive Structure	c. Impulsivity
d. Endurance	d. Play
e. Order	e. Succorance
f. Understanding	

comprised of traits associated with the high achieving student and Trait Group II the traits of the less successful student.

The primary focus of the investigation will be centered around the aforementioned traits; however, the results from the entire battery of scales from the Personality Research Form will be analyzed to determine if any additional relationships exist among other traits with respect to academic achievement. A description of these traits is provided in Table 2.2 (Jackson, 1974: 6-7).

TABLE 2.2.--Personality Research Form Scales.

SCALE	DESCRIPTION OF HIGH SCORER	DEFINING TRAIT ADJECTIVES
ABASEMENT	Shows a high degree of humility; accepts blame and criticism even when not deserved; exposes himself to situations where he is in an inferior positon; tends to be self-effacing.	meek, self-accusing, self-blaming, obsequious, self-belittling, surrendering, resigned, self-critical, humble, apologizing, subservient, obedient, yielding, deferential, self-subordinating
ACHIEVEMENT	Aspires to accomplish difficult tasks; maintains high standards and is willing to work toward distant goals; responds positively to competition; willing to put forth effort to attain excellence.	striving, accomplishing, capable, purposeful, attaining, industrious, achieving, aspiring, enterprising, self-improving, productive, driving, ambitious, resourceful, competitive.
AFFILIATION	Enjoys being with friends and people in general; accepts people readily; makes efforts to win friendships and maintain associations with people.	neighborly, loyal, warm, amicable, good-natured, friendly, companionable, genial, affable, cooperative, gregarious, hospitable, sociable, affiliative, good-willed.
AGGRESSION	Enjoys combat and argument; easily annoyed; sometimes willing to hurt people to get his way; may seek to "get even" with people whom he perceives as having harmed him.	aggressive, quarrelsome, irritable, argumentative, threatening, attacking, antagonistic, pushy, hot-tempered, easily-angered, hostile, revengeful, belligerent, blunt, retaliative.
AUTONOMY	Tries to break away from restraints, confinement, or restrictions of any kind; enjoys being unattached, free, not tied to people, places, or obligations; may be rebellious when faced with restraints.	unmanageable, free, self-reliant, independent, autonomous, rebellious, unconstrained, individualistic, ungovernable, self-determined, non-conforming, uncompliant, undominated, resistant, lone-wolf.
CHANGE	Likes new and different experiences; dislikes routine and avoids it; may readily change opinions or values in different circumstances; adapts readily to changes in environment.	inconsistent, fickle, flexible, unpredictable, wavering, mutable, adaptable, changeable, irregular, variable, capricious, innovative, flighty, vacillating, inconstant.
COGNITIVE STRUCTURE	Does not like ambiguity or uncertainty in information; wants all questions answered completely; desires to make decisions based upon definite knowledge, rather than upon guesses or probabilities.	precise, exacting, definite, seeks certainty, meticulous, perfectionistic, clarifying, explicit, accurate, rigorous, literal, avoids ambiguity, defining, rigid, needs structure
DEFENDENCE	Readily suspects that people mean him harm or are against him; ready to defend himself at all times; takes offense easily; does not accept criticism readily.	self-protective, justifying, denying, defensive, self-condoning, suspicious, secretive, has a "chip on the shoulder," resists inquiries, protesting, wary, self-excusing, rationalizing, guarded, touchy.

TABLE 2.2.--Continued.

SCALE	DESCRIPTION OF HIGH SCORER	DEFINING TRAIT ADJECTIVES
DOMINANCE	Attempts to control his environment, and to influence or direct other people; expresses opinions forcefully; enjoys the role of leader and may assume it spontaneously.	governing, controlling, commanding, domineering, influential, persuasive, forceful, ascendant, leading, directing, dominant, assertive, authoritative, powerful, supervising
ENDURANCE	Willing to work long hours; doesn't give up quickly on a problem; persevering, even in the face of great difficulty; patient and unrelenting in his work habits.	persistent, determined, steadfast, enduring, unfaltering, persevering, unremitting, relentless, tireless, dogged, energetic, has stamina, sturdy, zealous, durable.
EXHIBITION	Wants to be the center of attention; enjoys having an audience; engages in behavior which wins the notice of others; may enjoy being dramatic or witty.	colorful, entertaining, unusual, spellbinding, exhibitionistic, conspicuous, noticeable, expressive, ostentatious, immodest, demonstrative, flashy, dramatic, pretentious, showy.
HARMAVOIDANCE	Does not enjoy exciting activities, especially if danger is involved; avoids risk of bodily harm; seeks to maximize personal safety.	fearful, withdraws from danger, self-protecting, pain-avoidant, careful, cautious, seeks safety, timorous, apprehensive, precautionary, unadventurous, avoids risks, attentive to danger, stays out of harm's way, vigilant.
IMPULSIVITY	Tends to act on the "spur of the moment" and without deliberation; gives vent readily to feelings and wishes; speaks freely; may be volatile in emotional expression.	hasty, rash, uninhibited, spontaneous, reckless, irrepressible, quick-thinking, mercurial, impatient, incautious, hurried, impulsive, foolhardy, excitable, impetuous.
NURTURANCE	Gives sympathy and comfort; assists others whenever possible, interested in caring for children, the disabled, or the infirm; offers a "helping hand" to those in need; readily performs favors for others.	sympathetic, paternal, helpful, benevolent, encouraging, caring, protective, comforting, maternal, supporting, aiding, ministering, consoling, charitable, assisting.
ORDER	Concerned with keeping personal effects and surroundings neat and organized; dislikes clutter, confusion, lack of organization; interested in developing methods for keeping materials methodically organized.	neat, organized, tidy, systematic, well-ordered, disciplined, prompt, consistent, orderly, clean, methodical, scheduled, planful, unvarying, deliberate.
PLAY	Does many things "just for fun;" spends a good deal of time participating in games, sports, social activities, and other amusements; enjoys jokes and funny stories; maintains a light-hearted, easy-going attitude toward life.	playful, jovial, jolly, pleasure-seeking, merry, laughter-loving, joking, frivolous, prankish, sportive, mirthful, fun-loving, gleeful, carefree, blithe

TABLE 2.2.--Continued.

SCALE	DESCRIPTION OF HIGH SCORER	DEFINING TRAIT ADJECTIVES
SENTIENCE	Notices smells, sounds, sights, tastes, and the way things feel; remembers these sensations and believes that they are important part of life; is sensitive to many forms of experience; may maintain an essentially hedonistic or aesthetic view of life.	aesthetic, enjoys physical sensations, observant, earthy, aware, notices environment, feeling, sensitive, sensuous, open to experience, perceptive, responsive, noticing, discriminating, alive to impressions.
SOCIAL RECOGNITION	Desires to be held in high esteem by acquaintances; concerned about reputation and what other people think of him; works for the approval and recognition of others.	approval seeking, proper, well-behaved, seeks recognition, courteous, makes good impression, seeks respectability, accommodating, socially proper, seeks admiration, obliging, agreeable, socially sensitive, desirous of credit, behaves appropriately.
SUCCORANCE	Frequently seeks the sympathy, protection, love, advice, and reassurance of other people; may feel insecure or helpless without such support; confides difficulties readily to a receptive person.	trusting, ingratiating, dependent, entreating, appealing for help, seeks support, wants advice, helpless, confiding, needs protection, requesting, craves affection, pleading, help-seeking, defenseless
UNDERSTANDING	Wants to understand many areas of knowledge; values synthesis of ideas, verifiable generalization, logical thought, particularly when directed at satisfying intellectual curiosity.	inquiring, curious, analytical, exploring, intellectual, reflective, incisive, investigative, probing, logical, scrutinizing, theoretical, astute, rational, inquisitive.
DESIRABILITY	Describes self in terms judged as desirable; consciously or unconsciously, accurately or inaccurately, presents favorable picture of self in responses to personality statements.	
INFREQUENCY	Responds in implausible of pseudo-random manner, possibly due to carelessness, poor comprehension, passive non-compliance, confusion, or gross deviation.	

CHAPTER III

RESEARCH DESIGN

This chapter consists of a definition of the population and sample, a description of the instruments employed, a restatement of the hypotheses, in addition to an explanation of the techniques used during the analysis.

Definition of the Population and Sample

The study was conducted at a small four-year, public institution, located in a highly industrialized area in Lower Michigan.

During the fall semester of 1980, the total enrollment at this institution was 4,331, and 3,735 of these students were pursuing undergraduate programs. Approximately 11 percent of the student body lived in on-campus housing and 47 percent of all the students were under the age of 22; 53 percent of the student body was female.

The freshmen class of 1980 included 554 traditional students (17-19 years of age) and 140 non-traditional students (ages 20 and older). The mean high school grade point average for the traditional freshmen was 2.90; however, the mean high school GPA for the entire freshman class was not available.

A total of 316 freshmen participated in the study, each of whom was administered Form E of the Personality Research Form (PRF).

Eighty of these students were tested a few days before the fall semester began during a special orientation program for new dormitory residents. The remaining 236 students were tested while attending their regular English classes during the first week of the fall semester. Due to the fact that freshman English classes are restricted in size, it was necessary to administer the PRF during 16 separate class periods. The remaining demographic data, such as age, major, course load, ACT, and STEP scores, and other pertinent data were obtained from student and institutional records.

Although 316 students participated in the study, 85 students were exlcuded for the following reasons: 55 students failed to complete the Personality Research Form; 25 students were beyond the age of the traditional student; and five students were lacking both ACT and STEP (Sequential Tests of Educational Progress) scores, which were used as measures of ability. After these individuals were excluded, the sample size was reduced to 231 students, which represents 42 percent of the "traditional" freshman class.

First semester grade point averages were obtained for all students in the restricted sample (traditional Freshmen), at the end of the fall term. The scores of students on the various evaluative instruments, grade point averages, and all other pertinent data were recorded on IBM cards, using a separate card for each student.

With respect to gender, the final sample was comprised of 141 females (61 percent) and 90 males (39 percent). In terms of age distribution, 14 percent of the students were 17 years of age, 79

percent were 18 years old, and seven percent were 19 years of age. The mean age for the sample was 17.9 years.

The mean ACT composite score for the final sample was 17.9 in contrast to a composite of 17.7 for the entire freshman class, and a National Composite of 18.9. For the Sequential Tests of Educational Progress (STEP), the sample means for Reading and Mathematics were 465.16 and 465.28, respectively. Mean scores for the freshman class as a whole were not available for comparison.

With respect to academic programs, the sample included students from a wide cross-section of academic disciplines; as evidenced by the fact that 33 different majors from all five schools (Arts and Behavioral Sciences; Science, Engineering and Technology; Education; Business and Management; Nursing and Allied Health Sciences) were represented in the group under study.

Instrument Selection

The primary objective of the investigation was to determine the relationship between motivational structure and academic achievement. To accomplish such an objective, it was necessary to assess as accurately as possible the motivational structure of all subjects involved in the study. Cognizance of this fact led to a review of several different types of instruments designed for such a purpose. After completing an extensive examination of various instruments, it became apparent that Clarke's (1973) assessment of various projective, and objective instruments was quite accurate. Clarke was of the opinion that the projective instruments such as the Minnesota

Multiphasic Personality Inventory (MMPI); Thematic Apperception Test (TAT); Test of Insight (TOI), require considerably more time to administer and are not as reliable as the objective or self-report instruments in terms of predicting academic performance. Consequently, after reviewing several self-report instruments such as the Edwards' Personal Preference Schedule (EPPS); California Psychological Inventory (CPI); Sentence Completion Test (SCT); Adjective Check List (ACL), a decision was made to utilize the Personality Research Form (PRF). The PRF was developed by Douglas N. Jackson in 1967. After several years of research, Jackson modified his instrument in 1974.

The PRF is a comparatively new instrument which measures 20 variables of personality, stemming from Murray's (1938) system of needs, as well as two control variables--infrequent responding and social desirability. Murray's traits or needs, such as Abasement, Affiliation, Achievement, were further refined by Jackson in the following manner: over 100 face-valid items were written for each trait definition. The items were given to over 1000 college students, and 20 items (10 true, 10 false) for each of the final scales were selected according to three criteria--endorsement frequency between 5 and 95 percent; high correlations with the provisional key for each scale; and low correlations with a social desirability scale and acquiescence scale (Jackson, 1974).

The development of Form E of the PRF, the form that will be used in the investigation, represents an extension of the thinking and rationale used in the construction of the original forms (A, B,

AA, BB). Form E was designed for use with a wide array of diverse populations, including junior and senior high school students, psychiatric populations, the aged, and college students.

The reviews on the PRF by professionals in the field have been quite impressive: Anastasi (1972), for example, states "Technically the PRF appears to be exemplary;" and Kelly (1972) calls the inventory an "extremely promising" device which is "a welcome contribution to the field of personality assessment . . . . The resulting scales have a high content validity and homogeneity making possible the measurement of personality traits with levels of precision and validity formerly associated only with intellectual abilities and scholastic achievement."

In order to achieve the purposes of the investigation it was necessary to obtain measurements of motivational structure and academic ability for all students involved in the study.

Pursuant to this objective, the following instruments were utilized to measure the aforementioned characteristics:

1. Academic Ability
    a. Sequential Tests of Educational Progress (Educational Testing Service)
    b. ACT Assessment (American College Testing Program)
2. Motivational Structure
    a. Personality Research Form (Research Psychologists Press, Inc.)

Each of these instruments is discussed in detail; with special attention given to the origin and purpose of the instrument,

Sequential Tests of Educational Progress

The Sequential Tests of Educational Progress (STEP) Series II is a battery of achievement tests designed to measure student progress in several broadly defined academic areas. This battery of tests is designed to assess student performance in the following subject areas: Reading, English Expression, Science, Mathematics Basic Concepts, and Social Studies. Tests are also available in two additional areas: Mathematics Computation, and Mechanics of Writing, for grades four through twelve.

The college at which the present study was conducted, makes use of two of these subtests; namely, Reading and Mathematics Computation. The Mathematics Computation tests are designed to measure a wide variety of computational skills including basic operations with integers, fractions, decimals, and percent; estimation; evaluation of formulas; solution of simple inequalities; and manipulations with exponents. Each of these tests are comprised of 60 items and require 40 minutes to complete (Educational Testing Service, 1971).

Estimates of the reliability of the Mathematics Computation test are reported in the test manual. These coefficients, derived through the use of the Kuder-Richardson formula 20, range from .85 to .95, which is indicative of good internal consistency. The correlations of parallel-forms are also given, and most of these range from .85 to .95 with a few exceptions.

The manual also provides information regarding construct and empirical validity. Overall, according to Pikaart and Morton (1976),

these validity estimates, ranging between .60 and .80, appear very reasonable.

The Reading tests (STEP-R) are designed to measure the ability to read and understand a variety of materials including stories and poems as well as selections from the humanities, sciences, and social studies. All forms of the tests have two separately timed parts and yield a single score. Part I contains 30 sentence comprehension items of two basic types: straightforward comprehension and inference. The section on comprehension provides several option words from which a student is instructed to select the word closest in meaning to a word which has been underlined in a given sentence. The inference type items enable one to evaluate a student's ability to choose the option word that best describes the object, situation, or mood presented by the sentence.

Part II is also comprised of 30 items. Included within this section are six passages of varying length and each passage has a series of questions. The skills required for this section include translation and inference, comprehension, and analysis (Educational Testing Service, 1971).

Correlations of STEP-R scores with those from the verbal subtest of the School and College Ability Tests are provided in the manual. These correlations range from .75 to .83 with a median of .78. In contrast, the correlations between alternate forms of the STEP-R are slightly higher, ranging from .76 to .93 (Wardrop, 1978).

Unfortunately, the authors do not provide any data with respect to the validity of this particular subtest.

ACT Assessment

The ACT Assessment Program introduced by the American College Testing program in 1959, is a comprehensive set of instruments and services designed for students and educational institutions. Currently, it includes the following: the Academic Tests, a set of four cognitive tests given to students at their expense at test centers across the nation, providing four separate scores and a composite; the ACT Interest Inventory, which measures six interest areas; and the ACT Student Profile section, which provides information about many aspects of a student's background.

The academic tests were utilized in the study as the primary measure of academic ability. They consist of the following: the English Usage Test, Mathematics Usage Test, Social Studies Reading Test, and the Natural Science Reading Test, each with an individual score, in addition to a single composite score for the four subtests.

The English Usage Test is a 75-item, 40-minute test which measures the student's understanding of the conventions of standard written English and use of the basic elements of effective expository writing: punctuation, grammar, sentence structure, diction, style, logic, and organization, (John R. Hills, 1978: 622-623).

The Mathematics Usage Test is a 40-item, 50-minute examination that measures a student's reasoning ability in mathematics.

The Social Studies Reading Test is a 52-item test that enables one to assess a student's comprehension, analytical and evaluative reasoning, and problem-solving skills in social studies.

The Natural Science Reading Test is also a 52-item assessment tool which enables one to measure a student's interpretation, analyzation, evaluation, critical reasoning, and problem-solving skills in the area of natural science.

The estimated reliability of the ACT composite score based on all four sub-scores is approximately .90. With respect to validity, Hills states that "the content validity of the ACT appears to be quite reasonable."

The Personality Research Form

The Personality Research Form-E (PRF-E) is one of the several alternate forms of the PRF, consisting of 352 items, comprising twenty-two 16-item scales as follows:

1. Abasement
2. Achievement
3. Affiliation
4. Aggression
5. Autonomy
6. Change
7. Cognitive Structure
8. Defendence
9. Dominance
10. Endurance
11. Exhibition
12. Harmavoidance
13. Impulsivity
14. Nurturance
15. Order
16. Play
17. Sentience
18. Social Recognition
19. Succorance
20. Understanding
21. Infrequency
22. Desirability

The last two scales, Infrequency and Desirability are validity scales designed to assess response styles. A description of each of these scales can be found in Table 2.2.

The PRF is designed to yield a set of scores for personality traits broadly relevant to the functioning of individuals in a wide variety of situations. It is thus primarily focused upon areas of normal functioning rather than upon psychopathology (Jackson, 1974).

The estimated reliability coefficients for the individual scales of the PRF-E range from .50 to .91. In contrast, the validity coefficients range from .24 to .80.

Hypotheses

1. There is a relationship between motivational structure and academic achievement.
2. Freshmen possessing dominant achievement oriented traits will earn higher grade point averages than freshmen possessing latent achievement oriented traits.
3. Freshmen possessing dominant socially related traits will earn lower grade point averages than freshmen possessing latent socially related traits.

The Statistical Model

After completing a review of several statistical models, it was determined that Partial Correlations Analysis (a subsidiary of Multiple Regression Analysis) would be the most appropriate model for the sample under investigation. Multiple regression is a general statistical technique which enables a researcher to analyze the relationship between a dependent variable and a set of independent variables. Used in this manner, multiple regression helps a researcher explain the variance of a dependent variable.

Multiple regression can be utilized either as a descriptive tool by which the linear dependence of one variable on others is assessed, or as an inferential tool by which the relationships in the population are evaluated from the examination of sample data. When

employed as a descriptive tool, the technique can be used to (1) develop the best linear prediction equation for a specific set of variables; (2) to control for other variables which are known to be confounding in nature, so as to more accurately assess the contribution of a specific variable or set of variables; and (3) to identify and explain various structural relationships which exist among variables (Kim and Kohout, 1975).

When employed as an inferential tool, multiple regression can be utilized either to estimate population parameters from sample data, or to evaluate various hypotheses about the population.

Moreover, multiple regression enables a researcher to determine the nature of the relationship among variables, the direction of that relationship, positive or negative, and the magnitude of the relationship, expressed as regression coefficients.

Partial correlation enables one to describe the relationship between two variables while controlling for the effects of one or more additional variables. The control, however, is statistical rather than physical; therefore, the technique allows one to remove the effect of the controlled variable(s) from the relationship between the independent and dependent variables without physically manipulating the raw data.

In partial correlation the effect of the control variable is assumed to be linear, therefore, once the linear relationship among the dependent, independent, and control variables is known, the partial correlation coefficient can be ascertained by developing

(statistically) new dependent and independent variables which have had the effect of the controlled variable(s) removed. The new variable is constructed by taking the differences between the actual value of the original variable (for each observation) and its value as predicted by the controlled variable. After completing this process for both the independent and dependent variable(s), one in essence has created a new set of variables that are uncorrelated with each and/or all controlled variables. Once the linear effect of the control variable(s) has been removed from both the independent and dependent variables, the value derived from a simple correlation between these adjusted variables is what is known as partial correlation (Nie, Hull, Jenkins, Steinbrenner, and Bent, 1975).

Assumptions of the Study

According to Hays, it is not necessary to make any assumptions about the form of the distribution, the variability of Y scores within X columns, or the true level of measurement represented by the scores in order to utilize regression and correlation indices to describe a given set of data. "So long as there are N distinct cases, each having two numerical scores, X and Y, then the descriptive statistics of correlation and regression may be used" (Hays, 1973).

It is only in those cases where inferences about true linear relationships in populations, and in some applications of regression equations to predictions beyond the sample, that assumptions become necessary. In such cases it is necessary to assume that the Y scores are normally distributed at each set of values for X and that

the Y scores have equal variances (homoscedasticity) at each X point; however, according to Kerlinger and Pedhazur (1973), "it has convincingly been shown that the F and T tests are 'strong' or 'robust' statistics, which means that they resist violations of the assumptions." Therefore, unless there are serious violations of normality, Kerlinger and Pedhazur are of the opinion that one can proceed with multiple regression or partial correlation without worrying too much about assumptions.

Several researchers (Carder, 1977; Gebhart and Hoyt, 1958; Goodstein and Heilbrun, 1962; Izard, 1962; Rothman, 1973a; Rothman, 1973b; and Uhlinger and Stephens, 1960) have clearly demonstrated the importance of adequately stratifying samples when studying motivational structure. In light of these findings, the present study was carefully designed so as to reduce the possibility of distorted results arising from the interaction of variables which are known to be confounding in nature. Accordingly, the age factor was controlled by removing all non-traditional cases (students 20 years and older) from the sample. All students who were graded strictly in Pass/Fail terms were also removed from the study. The remaining cases were then classified according to gender and three levels of ability. As a result, six mutually exclusvie groups were formed. The dependent variable was the first semester college GPA and the independent variables were course load, major, and twenty variables of personality. Following such a procedure enables a researcher to ascertain the relative importance of various personality traits at each level of stratification. It should be noted that the present

study differs from most others in that course load and academic major were statistically controlled so as to eliminate their potential as confounding variables. The rationale for following such a procedure was based on the fact that if a researcher fails to control these two factors among others, one leaves open the possibility of the results being influenced by the variability in course load, and by the attractiveness of one academic program over another.

A regression equation was developed for each of the six groups by forcing all non-personality variables into the equation first. Having controlled for these background variables, a series of observations and measurements for each member of the six defined and mutually exclusive groups was collected and tabulated.

Limitations of the Study

The current study was hampered by the lack of an opportunity to conduct a follow-up study at the end of the first year. Consequently, the quantity of information currently available is somewhat limited. Hence, it is recommended that future researchers consider conducting a longitudinal study.

Secondly, the relatively small sample size (N = 231) created inadequate cell sizes in some instances, which in turn limited the types of analyses which could be employed. In light of this fact, it is recommended that future researchers plan for at least 500 participants.

For those who might be interested in replicating the present study, consideration should be given to the fact that this study was

conducted at a small four-year state college; therefore, the results may not be applicable to an institution with a vastly different student population. Furthermore, the next freshman class may have an entirely different profile with respect to need structure.

Finally, the results of this study must be interpreted with caution because there is evidence of a low but significant correlation between student responses on the desirability scale and their responses on several other scales of the PRF.

In this chapter the design of the study was presented. The population and sample were described, and the methods of collecting relevant data were discussed. Included within this discussion was a description of the instruments employed, a restatement of the hypotheses, a review of the statistical model, and the assumptions on which the study was based.

In Chapter IV an analysis of the data will be presented as well as a discussion of the results.

CHAPTER IV

ANALYSIS OF RESULTS

In this chapter, an analysis of the data and a summary of the results will be presented. To facilitate the discussion, the summary will be divided into three parts as follows: (1) Summary Statistics, (2) Hypotheses, and (3) Symmary of Results.

Hypothesis I will be tested by employing Partial Correlation Analysis, whereas Hypotheses II and III will be tested using T-tests. In addition, several other analyses were conducted on various subgroups within the sample. Accordingly, these will be reviewed in the Summary of Results.

Summary statistics for the sample are listed in Table 4.1. The mean first semester college GPA was 2.36 and the average number of credit hours completed was 13.89.

The scores reported in Table 4.1 for the Personality Research Form (PRF) are scale scores which were derived by using the conversion table provided by Research Psychologists Press, Inc. These scores ranged from a mean of 40.33 for Understanding to 55.00 for Affiliation.

Mean subscores for the ACT are also reported in Table 4.1 and they range from 16.52 for Social Studies to 21.06 for Natural Science. The mean composite score for the ACT was 17.96, and as reported in Chapter III, the mean age for the sample was 17.9 years.

TABLE 4.1.--Summary Statistics.

Variable		Mean	Standard Deviation
Age		17.9	.45
GPA		2.36	.90
ACT SUBSCORES:*	English	16.89	5.00
	Math	17.15	6.52
	Social Studies	16.52	6.44
	Natural Science	21.06	5.27
	ACT Composite	27.53	4.88
STEP SUBSCORES:**	Reading	465.16	12.19
	Math	465.28	18.39
COURSE LOAD (Credits)		13.89	1.91
PRF SCORES:	Abasement	48.67	9.70
	Achievement	50.81	8.77
	Affiliation	55.00	8.12
	Aggression	52.05	9.87
	Autonomy	42.27	8.74
	Change	45.46	9.75
	Cognitive Structure	51.75	7.97
	Defendence	51.43	8.79
	Dominance	49.15	9.47
	Endurance	46.70	9.62
	Exhibition	50.72	8.93
	Harmavoidance	48.23	9.27
	Impulsivity	51.39	9.20
	Nurturance	53.31	7.58
	Order	50.21	9.09
	Play	51.91	8.68
	Sentience	45.50	9.13
	Social Recognition	53.61	7.82
	Succorance	52.54	9.57
	Understanding	40.33	10.40
		Percent	
MAJORS:	Business	18.61	
	Humanities	07.36	
	Social Science	11.69	
	Health Science	26.42	
	Physical Science & Engineering	06.49	
	Undecided	29.74	

Total Number = 231
Males = 90
Females = 141

* N = 205
** N = 200

Table 4.1 also contains the mean scores for the Sequential tests of Educational Progress (STEP). The means for Reading and Math were 465.16 and 465.28, respectively.

With respect to academic programs, Table 4.1 reflects the fact that 19 percent of the students in the sample were classified as Business majors; seven percent were Humanities majors; 12 percent were Social Science majors; 26 percent were Health Science majors; six percent were Physical Science and Engineering majors, and the remaining 30 percent were undecided. The academic programs within these major groupings can be found in Table 4.2.

In light of the discussion in Chapter III regarding the importance of adequately stratifying samples with respect to academic ability, three levels of ability were established through the utilization of ACT scores. Low ability students, as Table 4.3 reveals, were students with composite scores ranging from 7 to 14; students whose scores ranged between 15 and 19 were designated as Average, and High Ability students were those individuals with scores greater than 19.

At this juncture it is important to note that 26 of the 231 ACT Composite scores are actually estimated scores which were derived by using STEP scores as a predictor. This was accomplished by equating the STEP and ACT tests. The formula employed was as follows:

$$\text{estimated ACT} = 142.70 + .2298\ (\text{Step Reading}) + .1145\ (\text{Step Math})$$

TABLE 4.2.--Academic Programs: Major Groupings.

BUSINESS:	Accounting General Business Industrial Management Management Marketing Data Processing
HUMANITIES:	Art Elementary Education Music Polish Physical Education Spanish Speech and Theatre
SOCIAL SCIENCE:	History Political Science Psychology Criminal Justice Social Work
HEALTH SCIENCE:	Biology Bio-Chemistry Pre-Nursing Nursing Medical Technology Pre-Dental
PHYSICAL SCIENCE & ENGINEERING:	Applied Science-Mechanical Technology Computer Math Electrical Engineering Technology Environmental Studies Mechanical Technology Mathematics Physics Engineering Transfer Program Construction Technology

where:

y = estimated ACT score based on Reading and Math scores from STEP test

b_o = constant (-142.70)

x_1 = STEP Reading score

x_2 = STEP Math score

b_1 = Reading Coefficient (.2298)

b_2 = Math Coefficient (.1145)

The intercorrelations are reported in Table 4.4.

TABLE 4.3.--Levels of Academic Ability.

	ACT Composite Score	Frequency
Low Ability	7 - 9	10
	10 - 12	26
	13 - 14	31
Average Ability	15 - 16	34
	17 - 18	30
	19	22
High Ability	20 - 22	38
	23 - 25	24
	26 - 31	16
		N = 231

TABLE 4.4.--Correlation Between STEP and ACT.

Step Scores	ACT	Math (STEP)
Math	.64472	
Reading	.72320	.37676

Information regarding the mean and standard deviation for the six sub-groups (Low Ability Females; Low Ability Males; Average Ability Females; Average Ability Males; High Ability Females, and High Ability Males) can be found in Table 4.5.

For the first group, Low Ability Females, the mean composite ACT score was 11.75. This group of students was enrolled in an average of 13.21 hours of credit and earned a mean GPA of 1.89 by the end of their first semester.

Fifteen percent of the Low Ability Females were Business majors; whereas 17 percent were Humanities majors, seven percent Social Science, and 29 percent Health Science, while the remaining 32 percent were undecided.

With respect to the Personality Research Form (PRF), this group had scores ranging from 39.34 for Understanding to a high of 55.14 for Affiliation.

Low Ability Males, in comparison, completed the first semester with a mean GPA of 1.88 while carrying an average of 13.42 hours of credit. The mean composite ACT score for this group was

TABLE 4.5.--Means and Standard Deviations by Subgroup.

Variable	GROUP I Low Ability Females (N=41)		GROUP II Low Ability Males (N=26)		GROUP III Average Ability Females (N=53)		GROUP IV Average Ability Males (N=33)		GROUP V High Ability Females (N=47)		GROUP VI High Ability Males (N=31)	
	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation	Mean	Standard Deviation
First Semester GPA	1.89	.8390	1.88	.8321	2.42	.9598	2.27	.7849	3.00	.6716	2.43	.7910
Composite ACT Score	11.75	2.046	11.92	1.895	16.83	1.565	17.27	1.546	23.38	2.541	22.51	2.188
Total Credits	13.21	2.307	13.42	1.701	14.24	1.817	13.93	1.876	14.48	1.767	13.64	1.684
Variables of Personality:												
Abasement	48.19	8.204			48.49	9.172	48.63	10.876	49.91	8.853	47.29	10.976
Achievement	51.24	6.421	52.19	7.144	52.88	7.892	47.21	10.932	52.53	8.337	46.80	10.277
Affiliation	55.14	7.634			54.62	8.112	54.90	9.468	54.44	7.595	55.67	9.332
Aggression	49.60	7.169	52.73	9.938	52.83	9.227	51.15	11.565	51.53	10.920	55.12	10.171
Autonomy	41.78	7.023	40.76	8.571	45.05	8.134	39.66	8.454	41.61	9.347	43.22	10.433
Change	46.36	8.531			47.28	9.371	42.54	8.832	44.38	11.360	47.58	10.819
Cognitive Structure	53.65	6.044	52.88	7.157	51.01	8.340	50.81	7.816	52.55	8.772	49.35	8.837
Defendence	50.80	8.379			51.66	9.002	51.06	8.721	50.57	8.987	50.25	8.710
Dominance	50.07	8.204			51.03	9.139	45.48	9.931	50.02	9.391	45.74	10.082
Endurance	48.19	9.075	46.84	7.181	45.83	8.930	45.24	9.953	48.51	10.133	44.93	11.879
Exhibition	50.73	8.188			51.03	8.948	49.96	9.554	51.51	8.878	49.90	9.748
Harmavoidance	49.78	8.174			47.98	8.782	49.90	9.421	47.02	9.998	47.80	10.047
Impulsivity	48.07	7.679	50.19	6.758	52.32	9.651	52.45	9.086	51.55	10.741	53.87	8.991
Nurturance	52.97	7.122			54.73	7.158	53.36	6.985	53.76	8.062	50.83	8.633
Order	52.78	8.177	53.76	7.559	49.50	9.25	50.81	6.635	47.91	10.150	47.87	10.413
Play	49.04	8.706	50.53	8.958	52.11	9.518	54.36	6.744	50.87	9.202	55.51	6.355
Sentience	43.46	9.831			43.98	9.728	44.87	7.659	48.21		47.48	7.361
Social Recognition	52.39	6.621			53.15	8.279	55.48	8.757	53.89	7.997	54.38	7.526
Succorance	51.75	8.284	55.50	8.021	49.77	9.314	55.87	10.098	52.46	10.348	52.45	9.979
Understanding	39.34	9.702			41.83	11.043	36.93	10.64	46.51	9.124	37.41	9.663
	Percents		Percents		Percents		Percents		Percents		Percents	
Majors:												
Business	14.63		30.77		9.43		30.30		19.15		16.13	
Humanities	17.07		15.38		3.77		0.0		4.26		6.45	
Social Science	7.32		11.54		11.32		15.15		17.02		6.45	
Health Science	29.27		0.0		45.28		15.15		34.04		12.90	
Physical Science and Engineering	0.0		15.38		3.77		9.09		4.26		12.90	
Undecided	31.71		26.93		26.43		30.31		21.27		45.16	

11.92. With respect to academic programs, Low Ability Males were dispersed as follows: 31 percent were Business Majors, 15 percent Humanities, 15 percent Physical Science and Engineering, 12 percent Social Science, and the remaining 27 percent were undecided.

On the Personality Research Form, Low Ability Males had scores ranging from 40.76 for Autonomy to a high of 55.50 for Succorance.

In contrast, Average Ability Females finished the first semester with a GPA of 2.42 while carrying an average of 14.24 credits. The mean composite ACT score for this group was 16.83.

Nine percent of Average ability females were Business majors while approximately four percent were pursuing majors in Humanities. Social Science was the intended major for 11 percent of this group, while another four percent were following the Physical Science and Engineering curriculum. The largest segment within the average ability female group (45 percent) was comprised of Health Science majors, and the remaining 28 percent had not chosen a major.

The scores on the PRF for average ability females ranged from 41.83 for Understanding to a high of 54.73 for Nurturance. Average Ability males, on the other hand, had scores ranging from 36.93 for Understanding to 55.87 for Succorance.

This group of average ability males had a mean composite of 17.27 on the ACT, and earned a GPA of 2.27 while carrying 13.93 hours of credit. Approximately 30 percent of these students were Business majors and approximately 15 percent were Social Science majors. An

additional 15 percent were pursuing programs in Health Science while another nine percent were following the Physical Science and Engineering curriculum. The remaining 31 percent had not selected an academic program.

In comparison, High Ability Females were dispersed in the following manner: 19 percent were Business majors; four percent were following the Humanities curriculum; 17 percent were pursuing a major in Social Science, and 34 percent were Health Science majors. Four percent of this group were following the curriculum for Physical Science and Engineering. High Ability Females as a group had the smallest percentage (22 percent) of undecided students.

As a group, high ability females had a mean composite of 23.38 on the ACT and finished the first semester with an average of 3.00 while carrying 14.48 hours of credits. Students in this group had scores on the PRF ranging from 41.61 for Autonomy to a high of 54.44 for Affiliation.

High ability males, in contrast, had scores on the PRF ranging from 37.41 for Understanding to a high of 55.67 for Affiliation. With respect to academic programs, 16 percent of high ability males were Business majors, six percent were following the Humanities curriculum, and six percent were Social Science majors. Another 13 percent were classified as Health Science majors while an identical number were pursuing a major in Physical Science and Engineering. As a group, high ability males had the highest percentage (46 percent) of undecided students.

High ability males had a mean composite of 22.51 on the ACT but finished the first semester with a substantially lower GPA (2.43) than their counterparts, while carrying fewer (13.64) hours of credit.

In summary, Table 4.5 reveals that as a group, high ability males had the highest scores on Aggression (55.12), Play (55.51), and Impulsivity (53.87), but the lowest need for Achievement (46.80). With respect to academic achievement, females performed at a higher level than their male counterparts in every group. In contrast, as a group, males outscored females on the ACT in all cases except one, namely, males from the high ability group.

With the exception of females from the low ability group, women carried a greater number of credits than their male counterparts in all other groups. Females also had higher needs for achievement in all cases except one, the exception being females from the low ability group.

For each ability group, there was a greater concentration of females than males pursuing majors in the area of Health Sciences. Conversely, in all cases, there was a greater number of males than females completing majors in Physical Science and Engineering.

Finally, as far as undecided students are concerned, there was a greater percentage of undecided males than females in every ability group with the exception of the low ability group.

Hypotheses

For the present study, three hypotheses were developed. The first hypothesis was as follows:

There is a relationship between motivational structure and academic achievement.

This hypothesis was tested by employing a technique known as Partial Correlation Analysis. The results of the analysis are presented in Tables 4.6 through 4.12.

As reflected in Table 4.6, after controlling for sex, ability, course load, and major, a positive correlation was found between academic achievement and the following variables of personality: Achievement, Cognitive Structure, Endurance, Order, and Succorance. In addition, this table also reveals a negative correlation between academic achievement and the following: Aggression, Autonomy, Impulsivity, and Play.

In light of the data presented in Table 4.6, the first hypothesis was supported.

The first hypothesis was tested further in order to ascertain the nature of the relationship between motivational structure and academic achievement at various ability levels. Subsequently, six sub-groups (Tables 4.7 through 4.12) were analyzed and they were as follows: Low Ability Females, Low Ability Males, Average Ability Females, Average Ability Males, High Ability Females, and High Ability Males. Each of the sub-groups were controlled for differences in course load and major.

After accounting for differences in major and course load, it was determined through an analysis of the data presented in Table 4.7 that none of the correlations between academic achievement and motivational structure for low ability females were significant at the

TABLE 4.6.--Partial Correlation Coefficients between PRF and GPA for Entire Group, after Controlling for Sex, Ability, Course Load, and Major. (N = 231)

Source of Variation	Partial Correlation Coefficients	F-Ratio	P
Abasement	.06825	1.0344083	.310
Achievement	.18865	8.1557454	.005*
Affiliation	-.03719	.30601178	.581
Aggression	-.17828	7.2548876	.008*
Autonomy	-.22753	12.066229	.001*
Change	-.05449	.65810709	.418
Cognitive Structure	.18183	7.5562914	.006*
Defendence	-.04011	.35618259	.551
Dominance	.01216	.03268775	.857
Endurance	.16472	6.1636164	.014*
Exhibition	-.04129	.37748184	.540
Harmavoidance	.07427	1.2257724	.269
Impulsivity	-.15659	5.5553611	.019*
Nurturance	.01732	.06631702	.797
Order	.19212	8.4697947	.004*
Play	-.15532	5.4633235	.020*
Sentience	-.03339	.24663753	.620
Social Recognition	-.08869	1.7523344	.187
Succorance	.18789	8.0877721	.005*
Understanding	.08144	1.4754996	.226

*Significant at the .05 level.

TABLE 4.7.--Partial Correlation Coefficients between the PRF and GPA for Low Ability Females, after Controlling for Major and Course Load. (N = 41)

Source of Variation	Partial Correlation Coefficients	F-Ratio	P
Abasement	.08957	.27497955	.603
Achievement	-.05439	.10087721	.753
Affiliation	.11539	.45877425	.503
Aggression	.10608	.38698066	.538
Autonomy	-.13844	.66432412	.421
Change	-.06431	.14119332	.709
Cognitive Structure	.15864	.87774498	.355
Defendence	.10451	.37644436	.544
Dominance	-.04354	.06456245	.801
Endurance	-.04613	.07250439	.789
Exhibition	.20848	1.5449705	.222
Harmavoidance	.01028	.00359554	.953
Impulsivity	-.08981	.27645892	.602
Nurturance	-.13095	.59320059	.447
Order	-.04100	.05724547	.812
Play	-.04918	.08245002	.776
Sentience	-.11748	.47584042	.495
Social Recognition	.22552	1.8218736	.186
Succorance	.30673	3.5310816	.069
Understanding	-.09646	.31932724	.576

.05 level. In contrast, for low ability males (Table 4.8), Aggression was found to be negatively correlated, whereas, Order was positively correlated with academic achievement; however, one should note that the independent variable list for low ability males was reduced to 15 factors via multiple regression because of the small (n = 26) for this group. Whether this had a bearing on the results for this group is unknown.

TABLE 4.8.--Partial Correlation Coefficients between the PRF and GPA for Low Ability Males, after Controlling for Major and Course Load. (N = 26)

Source of Variation	Partial Correlation Coefficients	F-Ratio	P
Achievement	.36205	2.8661880	.107
Aggression	-.43872	4.5287597	.047*
Autonomy	-.19240	.73036053	.403
Cognitive Structure	.08813	.14874157	.704
Endurance	.32899	2.3060567	.145
Impulsivity	-.10144	.19752822	.662
Order	.44744	4.7561440	.042*
Play	-.32340	2.2192546	.153
Succorance	.22340	.99806002	.330

*Significant at the .05 level.

For average ability females (Table 4.9), a negative correlation was found between Defendence and academic achievement after accounting for differences in course load and major. Conversely, for average ability males (Table 4.10), Achievement and Endurance were found to be positively correlated with academic achievement whereas Aggression was negatively correlated.

With respect to high ability females (Table 4.11), it was determined that Defendence, Order, Succorance, and Understanding were all positively correlated with academic achievement. For high ability males (Table 4.12), however, Abasement was found to be positively correlated, and Aggression negatively correlated with academic achievement.

The second hypothesis was as follows:

> The first semester GPAs attained by freshmen possessing Dominant (N = 50, S.D. = +10) Group I traits (Achievement, Autonomy, Cognitive Structure, Endurance, Order, and Understanding) will be higher than those earned by freshmen possessing Latent (M = 50, S.D. = -10) Group I traits.

An attempt was made to test Hypothesis II by employing the T-test; however, it was found that meaningful results could not be derived once precautions were taken to guard against the influence of known confounding variables such as sex and ability. For once the necessary stratification was introduced, the cell sizes became so small that the results were virtually meaningless.

TABLE 4.9.--Partial Correlation Coefficients between the PRF and GPA for Average Ability Females, after Controlling for Major and Course Load. (N = 53)

Source of Variation	Partial Correlation Coefficients	F-Ratio	P
Abasement	.07952	.28634611	.595
Achievement	.19084	1.7007849	.199
Affiliation	-.11925	.64915984	.425
Aggression	-.28379	3.9414588	.053
Autonomy	-.27655	3.7265526	.060
Change	-.09124	.37776607	.542
Cognitive Structure	-.19865	1.8486618	.181
Defendence	-.29758	4.3721838	.042*
Dominance	-.13032	.77744259	.383
Endurance	.13882	.88418187	.352
Exhibition	-.13721	.86350790	.358
Harmavoidance	-.05293	.12643259	.724
Impulsivity	-.26139	3.3001783	.076
Nurturance	.03748	.06328994	.803
Order	.23973	2.7438991	.105
Play	-.10237	.47659762	.494
Sentience	-.10972	.54834534	.463
Social Recognition	-.20809	2.0366919	.160
Succorance	.00922	.00382710	.951
Understanding	-.00896	.0036168	.952

*Significant at the .05 level.

TABLE 4.10.--Partial Correlation Coefficients between the PRF and GPA for Average Ability Males, after Controlling for Major and Course Load. (N = 33)

Source of Variation	Partial Correlation Coefficients	F-Ratio	P
Abasement	.03585	.03346621	.856
Achievement	.40881	5.2171582	.031*
Affiliation	.04633	.05593997	.815
Aggression	-.42750	5.8143775	.023*
Autonomy	.00763	.00151255	.969
Change	.21636	1.2768902	.269
Cognitive Structure	-.01265	.00415885	.949
Defendence	-.17559	.82713552	.371
Dominance	.22161	1.3427919	.257
Endurance	.49132	8.2732807	.008*
Exhibition	.09568	.24023662	.628
Harmavoidance	-.07828	.16028920	.692
Impulsivity	-.20786	1.1740237	.289
Nurturance	.32923	3.1607124	.087
Order	.06151	.09874458	.756
Play	.22215	1.3497709	.256
Sentience	.11435	.34455120	.562
Social Recognition	-.30667	2.6989862	.112
Succorance	-.18361	.90710866	.350
Understanding	.28923	2.3735394	.135

*Significant at the .05 level

TABLE 4.11.--Partial Correlation Coefficients between the PRF and GPA for High Ability Females, after Controlling for Major and Course Load. (N = 47)

Source of Variation	Partial Correlation Coefficients	F-Ratio	P
Abasement	-.30457	3.9875881	.053
Achievement	.12379	.60690125	.441
Affiliation	-.01254	.06133670	.938
Aggression	.09931	.38850658	.537
Autonomy	-.24274	2.4417768	.126
Change	-.05391	.11367687	.738
Cognitive Structure	.27030	3.0740119	.087
Defendence	.48120	11.751592	.001*
Dominance	.24017	2.3872652	.132
Endurance	.25515	2.7157507	.107
Exhibition	.05883	.13544958	.715
Harmavoidance	.29672	3.7651926	.060
Impulsivity	-.09651	.36665748	.548
Nurturance	-.27964	3.3083713	.077
Order	.38991	6.9923483	.012*
Play	-.17047	1.1672635	.287
Sentience	.07874	.24328200	.625
Social Recognition	.25024	2.6053954	.115
Succorance	.35385	5.5820519	.023*
Understanding	.38986	6.9901051	.012*

*Significant at the .05 level.

TABLE 4.12.--Partial Correlation Coefficients between the PRF and GPA for High Ability Males, after Controlling for Major and Course Load. (N = 31)

Source of Variation	Partial Correlation Coefficients	F-Ratio	P
Abasement	.49236	7.3597064	.012*
Achievement	.06781	.10624287	.747
Affiliation	-.08041	.14966469	.702
Aggression	-.41625	4.8204441	.038*
Autonomy	-.39405	4.2277519	.051
Change	-.20747	1.0345061	.320
Cognitive Structure	.33163	2.8420266	.105
Defendence	-.08422	.16431898	.689
Dominance	-.13935	.45548463	.506
Endurance	.05967	.08219206	.777
Exhibition	-.32445	2.7059781	.114
Harmavoidance	.04091	.03854871	.846
Impulsivity	-.39395	4.2253843	.051
Nurturance	.10090	.23655351	.631
Order	.12633	.37303355	.547
Play	-.33144	2.8384009	.106
Sentience	-.20963	1.0571939	.315
Social Recognition	-.00287	.00018891	.989
Succorance	.36944	3.6352833	.069
Understanding	.16600	.65178061	.428

*Significant at the .05 level.

Hypothesis III was as follows:

> The first semester GPAs attained by freshmen possessing Latent (M = 50, S.D. = -10) Group II traits (Affiliation, Change, Impulsivity, Play and Succorance) will be greater than those attained by freshmen possessing Dominant (M = 50, S.D. = +10) Group II traits.

An attempt was also made to test Hypothesis III by using the T-test; however, the outcome was the same as for Hypothesis II because of inadequate cell sizes.

Summary of Results

Partial Correlation Analysis was employed in an effort to determine if there is a relationship between academic achievement and motivational structure, after controlling for all variables which are known to be confounding in nature. Accordingly, the following variables were controlled in this study: Sex, Age, Major, Course Load, and Ability.

Subsequently, three hypotheses were developed in an effort to determine if a relationship exists between motivational structure and academic achievement. Hypothesis I was established to ascertain whether there was a relationship between academic achievement and motivational structure for the group as a whole.

After accounting for differences in sex, ability, course load, and major, it was determined that a correlation does exist, at the .05 level of confidence, between academic achievement and motivational structure. More specifically, the data in Table 4.10 reveals the existence of a positive relationship between academic achievement and the following traits: Achievement, Endurance, Cognitive

Structure, Order, and Succorance. It is also apparent that a negative relationship exists between academic achievement and the following: Aggression, Autonomy, Impulsivity, and Play.

The first hypothesis was tested further to determine the nature of the relationship between Motivational Structure and academic achievement at various ability levels. Subsequently, six mutually exclusive sub-groups were developed and contrasted. The results from these analyses are presented in Tables 4.7 through 4.12, which reveal the fact that Hypothesis I was rejected for only one of the six sub-groups, namely, Low Ability Females.

Hypotheses II and III were developed for the purpose of investigating the relationship between Dominant and Latent traits and their influence on academic achievement; however, the resulting cells were too small for any meaningful results to be derived.

In Chapter V a summary of the findings will be presented along with conclusions, implications, and recommendations for future research.

CHAPTER V

THE PROBLEM, FINDINGS, CONCLUSIONS, IMPLICATIONS, AND RECOMMENDATIONS FOR FUTURE RESEARCH

The Problem

Numerous researchers have studied the problems which confront students as they make the transition from high school to college. Based on these studies, it is widely assumed that a significant number of students will experience great academic difficulty, especially during their first term of enrollment, as they make this transition. Even though many researchers have investigated this particular problem, educators are still at a loss in explaining why students of equal ability exhibit such divergent patterns with respect to their academic achievement.

Purpose

The purpose of this study was two-fold. First, to determine if there was a relationship between motivational structure and academic achievement, and secondly, to determine if certain traits could be used to differentiate between high achieving and less successful students.

Parameters of the Data

The study was conducted at a small, four-year state college in Michigan, during the fall of 1980. A total of 316 freshmen

participated in the study, each of whom was administered Form E of the Personality Research Form. Eighty-five of these students, however, had to be excluded for various reasons.

The remaining demographic data such as age, sex, GPA, major, course load, and other pertinent data were obtained from student and institutional records.

Findings

The findings for the study were as follows:

1. The partial correlation analysis indicated that after accounting for differences in sex, major, ability, and course load, there was a positive correlation between academic achievement and the following traits: Achievement, Cognitive Structure, Endurance, Order, and Succorance. It is also apparent that a negative correlation exists between academic achievement and the following: Aggression, Autonomy, Impulsivity, and Play.

2. For low ability females, after accounting for differences in major and course load, there was no correlation found between academic achievement and motivational structure.

3. For low ability males, after accounting for differences in major and course load, Order was found to be positively correlated with academic achievement, whereas Aggression was negatively correlated.

4. For average ability females, after accounting for differences in course load and major, Defendence was found to be negatively correlated with academic achievement.

5. For average ability males, after accounting for differences in major and course load, Achievement and Endurance were found to be positively correlated with academic achievement, whereas Aggression was negatively correlated.

6. For high ability females, after accounting for differences in major and course load, the following traits were found to be positively correlated with academic achievement: Defendence, Order, Succorance, and Understanding.

7. For high ability males, after accounting for differences in course load and major, Abasement was found to be positively correlated while Aggression was negatively correlated with academic achievement.

8. An attempt was made to determine the relationship between dominant (M = 50, SD = +10) and latent (M = 50, SD = -10) traits and their influence on academic achievement; however, the resulting cells were too small for any meaningful results to be derived.

9. The mean GPA for high ability males (2.43) was considerably lower than the mean GPA for high ability females (3.00).

Finally, the results of this study should be interpreted with caution, for there is evidence of a low but significant correlation between the responses on the social desirability scale and several other PRF scales. Hence, there is an indication that some individuals responded in a socially desirable fashion, as they completed the Personality Research Form.

Conclusions

Based on the findings of this study and others conducted in the past, it is clear that a relationship exists between motivational structure and academic achievement; however, at present the exact nature of that relationship is unclear, primarily because of the fact that very few researchers have completed studies which are not beset with serious limitations. Furthermore, those studies which have been properly carried out, in terms of controlling for known confounding variables, are quite often restricted to specific populations. As a result, the literature to date presents very few studies from which broad generalizations might be drawn.

The current study yielded two distinct patterns with respect to motivational structure. First, five traits (Achievement, Endurance, Order, Understanding, and Cognitive Structure) were found to be positively related to grade point average, a finding which is very consistent with the findings of numerous researchers who have studied this topic in the past. Individuals who score high on these traits tend to be industrious people who are highly organized, persistent, and goal-oriented. Furthermore, such individuals tend to approach problem solving situations in a systematic and very determined fashion, and place great value on the synthesis of ideas.

The second pattern was formed by two traits, Impulsivity and Play. These two traits were negatively related to academic achievement, which is quite consistent with the findings of other researchers. People who score high on these traits tend to be pleasure-seeking individuals who place high priority on social activities and other

amusements. Such individuals also tend to be highly spontaneous and impetuous in their behavior patterns.

In view of the findings of a considerable number of researchers, the writer expected to find Affiliation and Change to be negatively related to academic achievement; however, that did not prove to be true. Instead, Affiliation and Change were found to be unrelated to GPA. Consequently, the writer concluded that this particular finding was a function of sample variability.

Aggression, Defendence, and Abasement were all found to be related to academic achievement in the present study, but existing research does not reveal a clear pattern with respect to the function of these traits. In fact, the current study reveals a negative relationship between Defendence and GPA for average ability females, but for high ability females just the opposite was found. Such a finding suggests that much more research will have to be done before a definitive statement can be made about the role of these three traits.

Succorance is another trait whose function is questionable. In the present study it was found to be positively related to GPA; however, it has also been found to be negatively related in some cases (Capoor, 1974; Maudal, Butcher, and Mauger, 1974), and in several other instances (Gebhart and Hoyt, 1958; Merrill and Murphy, 1959; and Goodstein and Heilbrun, 1962) totally unrelated to academic achievement. Such lack of consistency suggests that with respect to academic achievement, Succorance might be a neutral trait linked to academic major.

Initially, it was thought that most high achieving students would have a correspondingly high need for Autonomy. This in fact proved to be true for upperclassmen (Loucks, Kobos, Stanton, Burstein, and Lawlis, 1979; Izard, 1962); however, just the opposite was found to be true for freshmen, with one exception (Gebhart and Hoyt, 1958). Although Gebhart and Hoyt's findings conflict with those of other researchers with respect to this particular trait, it must be pointed out that their sample was restricted to male freshmen engineering majors--a fact which severely limits the generalizability of the results.

In light of these findings, the writer concludes that freshmen tend to have greater needs for support than their upperclass counterparts who tend to be more autonomous.

With respect to academic performance, a great disparity was found between the GPAs of high ability males (2.43) and females (3.00); which further confirms the fact that non-intellectual factors play a great role in the academic performance of students.

Upon completion of the current research project, it became quite clear that the study would have been strengthened considerably if the writer had incorporated an instrument designed to assess self-concept of academic ability. For such an instrument would have enabled the writer to determine whether student performance was being unduly affected by low self-esteem. It is important, however, to distinguish between self-concept of academic ability and other definitions of self-concept or self. According to Brookover (1967), self-concept of academic ability "refers to behavior in which one indicates

to himself (publicly or privately) his ability to achieve in academic tasks as compared with others engaged in the same task." Brookover's definition was based largely upon the work of George H. Mead (1934) who developed the symbolic-interactionist theory. Brookover also indicated that individuals may possess more than one self-concept of academic ability and that these may vary in accordance with whom the individual happens to be comparing himself with at a given moment. He also indicated that although such variation is possible, individuals tend to be fairly stable in their self-concept responses.

Upon completion of his project, Brookover concluded that "the evaluation of significant others affects the student's conception of his academic ability and thus sets limits on his school achievement, but many students who have high self-concepts of ability do not have commensurate achievement."

These findings not only confirm the need to study self-concept of academic ability but they also point out the need to develop an instrument designed to assess the relative importance of academic achievement to the individual student. Only until then will educators have a better understanding as to why students' academic performance is often not commensurate with their ability.

The writer was unable to determine whether certain traits could be used to differentiate between high achieving and less successful students, due to the fact that the smallness of the sample did not lend itself to this type of analysis.

Finally, it is concluded that students who are achievement oriented have become accustomed to and therefore prefer a highly

structured, stable, and predictable environment, which accounts for the high scores on Achievement, Order, and Cognitive Structure and the low scores on Impulsivity and Play. Such students also tend to be very serious about their education and thus are very inquisitive, persistent, analytical and intellectually curious, which accounts for the high scores on Understanding and Endurance and the low score on Play.

Implications

The American Association for Higher Education (AAHE) predicts a dramatic decrease in the pool of traditional college students during the next 20 years. Furthermore, AAHE (1977) also expects zero population growth to be achieved by the year 2000, and Cope (1978) expects a 40 percent attrition rate for the next ten years.

If these predictions actually become a reality, many colleges will experience great difficulty maintaining current enrollment levels, especially when faced with soaring recruitment costs, sprialing operational costs, and declining appropriations.

Hence, educators would be wise to find effective methods for improving overall retention rates. To accomplish such an objective, those within the college community will have to substantially expand their knowledge based with respect to student needs; for although the information garnered from high school transcripts, aptitude tests, and freshman questionnaires is extremely valuable and serves an important function, it has limited utility. All too often, educators find themselves reacting to various crises which could in fact have

been anticipated and prevented if their knowledge base with regard to students' needs had been sufficient. Cognizance of this problem evidently prompted Doerman (1926) to make the following observation 56 years ago, and it is still quite apropos:

> If the freshman becomes singled out only after failure, the time for the most effective guidance will have passed. The college should aim, within the limits of its adjustive capacity, to give each student such courses and training which will conserve and strengthen his best talents and powers.

Furthermore, if educators are to substantially reduce the breath and magnitude of the problems encountered by students as they make the transition from one educational environment to another, they must provide a mechanism through which students might gain a better understanding of their needs, goals, and objectives. Concommitantly, it is essential that students understand how such variables interface with their educational environment.

The use of diagnostic tools, such as the Personality Research Form, by properly trained individuals within the college community, could prove to be extremely useful in helping students to understand their need structure and how those needs interface with the expectations of the institution.

Raines (1977), Jackson (1978), and others have developed a model designed specifically for that purpose, and their model is currently in use at Michigan State University. The model, known as the Adaptive Life-Lab, is designed to help students make the transition from one educational environment to another, whether they are transfer students or first semester freshmen. Upperclassmen serve as

facilitators (focalizers), working with small groups of students in an effort to help incoming students complete six crucial transactions: Re-aligning Expectations, Processing Losses, Building Relationships, Acquiring Resources, Increasing Self-Management, and Establishing Compatibility (Jackson, 1978). A description of these transactions is as follows:

1. Re-aligning Expectations: Favorable adaptation requires that adapting persons re-align their expectations in the direction of a commonly shared reality until there are no major discrepancies.

2. Processing Losses: Favorable adaptation requires that adapting persons process their self-perceived losses and confirm or discover self-perceived gains until the gains are experienced as outweighing the losses.

3. Building Relationships: Faborable adaptation requires that adapting persons establish a supportive group that responds to their needs for security, stimulation, and identity in the new environment.

4. Acquiring Resources: Favorable adaptation requires that adapting persons gain access to key resources in the new environment by learning where, when, and how to acquire basic information, materials and personal assistance.

5. Increasing Self-Management: Favorable adaptation requires that adapting persons establish sufficient self-direction to prevent or overcome the feeling of being at the mercy of the expectations of others in the new environment.

6. Establishing Compatibility: Favorable adaptation requires that adapting persons establish compatibility (if not full identification) with the customs, mores, traditions, and values of the new environment.

Through the use of various diagnostic tools and workshops such as the one described above, educators could become more effective in helping students achieve optimum performance.

Another area which should be of concern to faculty members and administrators alike, involves styles of learning. Many teachers realized long ago that some students learn better by listening to the instructor, some by discussion, and others by working on their own or in small groups. Recognition of these patterns of learning eventually evolved into what is currently known as "learning styles." Learning styles, therefore, simply refers to that mode of learning which describes the educational conditions under which the student learns most effectively.

According to PAR (Practical Applications of Research, 1980) learning styles emerge from:

> inborn natural inclinations which include preferred ways of learning (e.g., visual, auditory, tactile, etc.) and descriptions of personality characteristics that relate to learning (e.g., need for structure or flexibility; preference for working in large groups, small groups or alone, etc.).

Several researchers (Kolb, 1976; Dunn and Dunn, 1978; Hunt, 1978; and Gregorc, 1977) have explored the theoretical framework of learning styles in the past few years and their involvement has led to the articulation of four basic patterns of learning, similar to the one developed by Gregorc:

1. Concrete Sequential Learners (CS) are characterized by the tendency to derive information through direct, hands-on experience. They like touchable, concrete materials. They appreciate order, and logical sequence. They look for and follow directions and like clearly ordered presentations and a quiet atmosphere.

2. Concrete Random Learners (CR) have an experimental attitude and accompanying behavior. CR learners make intuitive leaps in exploring unstructured problem-solving experiences. They learn by trial-

and-error. CR learners work well by themselves or in small groups. They do not respond well to teacher intervention in their independent efforts.

3. Abstract Sequential Learners (AS) have excellent decoding abilities with written, verbal, and image symbols. AS learners have a wealth of conceptual "pictures" in their minds against which they match what they read, hear, or see in graphic and pictorial form. These learners prefer a substantive, rational, and sequential presentation. They learn well from authorities and like vicarious experiences.

4. Abstract Random Learners (AR) are attuned to nuances of atmosphere and mood. They associate the medium with the message and tie a speker's manner, delivery, and personality to the message being conveyed. They evaluate a learning experience as a whole. Abstract random learners prefer to receive information in an unstructured manner and therefore like activities which involve multisensory experiences and busy environments. They prefer freedom from rules and guidelines. AR learners seem to gather information and delay reaction. They organize material through reflection to get what they want.

The model presented above has unlimited potential, for instance, it could be used in conjunction with the PRF and other diagnostic tools to facilitate the counseling process, academic advising, or to help teachers increase their effectiveness in the classroom. Such utilization could result in a significant reduction in attrition, for it would enable one to identify potential problems and develop mechanisms for solving them.

It is the writer's opinion that the continued use and development of diagnostic tools such as the Personality Research Form can only enhance and advance our quest for knowledge in the area of human behavior.

Recommendations for Future Research

First, data should be gathered during freshman orientation sessions prior to the beginning of the regular academic year. Furthermore, all testing should be built into the regular testing program to ensure maximum participation and cooperation. Secondly, further research is needed to ascertain whether Abasement, Aggression, Autonomy, Defendence, and Succorance are stable traits with regard to the prediction of academic performance.

After completing the current study, it became evident that teaching and learning styles had been completely overlooked as possible confounding variables affecting academic achievement. Consequently, it is unknown as to whether the lack of achievement on the part of some students was partly a function of conflicting teaching and learning styles or some other factor. It is therefore recommended that future researchers explore the possibility of setting up a control group to study the affects of matched and unmatched teaching and learning styles on academic achievement.

The present study was conducted without the benefit of knowing whether students in the sample, particularly low ability students, were unduly affected by low self-concepts of academic ability. It is therefore recommended that future researchers include within their battery of tests an instrument designed to measure self-concept of academic ability. Within such a test battery, provisions should also be made to assess the relative importance of academic achievement to the individual student. Efforts should also be made to investigate the relationship between academic major and motivational structure.

In light of the recent reduction in the federal budget for Higher Education and the possibility of even greater reductions in financial aid awards, future researchers should seriously consider including the level of direct financial assistance as one of the factors affecting academic achievement. For if the present trend continues, large numbers of students will have to spend a greater percentage of their non-class time in the workplace in order to finance their education. Should this become a reality, the low ability students from the middle and lower economic strata could become the most seriously affected group.

The ramifications of such a scenario are numerous for low ability students of limited means. For example, there will be less time for studying and less time to seek the necessary supportive services needed to overcome their handicap. Accordingly, this will result in lower achievement, higher attrition rates, and for the more fortunate, extended graduation dates or a substantial indebtedness.

Finally, with respect to motivational structure, there is a great need for longitudinal and comparative studies, for the literature to date presents very few studies which are free of the problems discussed earlier in Chapter III.

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APPENDICES

LEGEND FOR VARIABLE LIST

APPENDICES A AND B

MAJORS:

M1	Business
M2	Humanities
M3	Social Science
M4	Health Science
M5	Physical Science and Engineering

TCR: Total Credits

VARIABLES OF PERSONALITY:

AB	Abasement
AC	Achievement
AF	Affiliation
AG	Aggression
AU	Autonomy
CH	Change
CS	Cognitive Structure
DE	Defendence
DO	Dominance
EN	Endurance
EX	Exhibition
HA	Harmavoidance
IM	Impulsivity
NU	Nurturance
OR	Order
PL	Play
SE	Sentience
SR	Social Recognition
SU	Succorance
UN	Understanding

A value of 99.00000 was printed if a coefficient could not be computed.

APPENDIX A

CORRELATION COEFFICIENTS FOR THE SIX SUB-GROUPS: LOW ABILITY FEMALES; LOW ABILITY MALES; AVERAGE ABILITY FEMALES; AVERAGE ABILITY MALES; HIGH ABILITY FEMALES; HIGH ABILITY MALES

APPENDIX TABLE A.1.--Correlation Coefficients for Low Ability Females (N = 41).

Variables	GPA	M1	M2	M3	M4	M5	TCR	AB	AC	AF	AG	AU	CH
M1	.15759												
M2	.53666	-.18787											
M3	-.01284	-.11634	-.12749										
M4	-.15942	-.26634	-.29188	-.18074									
M5	99.00000	99.00000	99.00000	99.00000	99.00000								
TCR	.06235	-.03987	-.01526	.21948	-.06195	99.00000							
AB	-.03051	.00706	-.15491	-.07611	.11020	99.00000	-.09343						
AC	-.13438	.03848	-.11964	-.11416	-.00783	99.00000	-.17408	.25056					
AF	.15769	.04687	.10295	.01939	-.02670	99.00000	-.18209	.01949	.08850				
AG	.14987	.20798	-.03907	.26679	-.00997	99.00000	-.03247	-.12236	-.09563	.11390			
AU	-.06138	.16231	.06108	-.19363	-.28874	99.00000	.12645	-.07430	.10321	-.34071	.06032		
CH	-.03844	-.01798	.12645	-.16780	-.33327	99.00000	-.00037	-.13391	.18633	-.07454	-.25798	.54002	
CS	.22798	-.11503	.24311	-.10944	.01883	99.00000	-.03751	.10019	.12780	-.08504	-.24606	-.20853	.14260
DE	.24663	.25989	.14384	.05189	-.12085	99.00000	-.01971	-.33000	-.25091	.12122	.51393	.02049	-.12277
DO	.09085	.17508	.18786	-.11811	-.23732	99.00000	-.15535	.11826	.51541	.25766	.11653	.18207	.46211
EN	.05667	-.10139	.14921	-.06881	.18334	99.00000	.11250	.36076	.46159	.04721	-.13982	-.00637	-.05519
EX	.38233	.26969	.32761	-.17596	-.30342	99.00000	.00452	-.12907	-.10189	.31499	.27669	.23239	.37611
HA	-.12472	-.01438	-.20442	-.05036	.10379	99.00000	-.02919	-.04929	-.16992	-.22181	-.35302	-.41627	-.35190
IM	-.06850	.16886	-.03001	.09607	-.23943	99.00000	-.25204	-.26014	-.21481	.15760	.36337	.13056	-.04697
NU	.07928	.11915	.11215	-.11885	.42896	99.00000	-.04378	.15924	.31935	.43551	.04045	-.30899	-.25288
OR	.05702	-.09981	.22900	-.39819	.13030	99.00000	-.03845	.07481	.07340	-.09038	-.46801	.13364	.18178
PL	-.00220	.24641	-.06288	.09643	-.15949	99.00000	.07038	.08736	-.13884	.36137	.32276	.19930	.13405
SE	.05879	.00156	.22533	-.25453	.16251	99.00000	.01303	.10237	.28050	.13431	-.13890	.18798	.28049
SR	.21883	-.20407	.22079	-.14565	-.00560	99.00000	-.00738	-.06586	-.20866	.10765	.41250	.06855	-.01764
SU	.20295	-.06355	-.01816	-.08319	.09778	99.00000	-.08212	.00145	-.27985	.23458	.18398	-.49118	-.48150
UN	.08855	.10046	.22057	-.12729	.02183	99.00000	-.10504	.11504	.47131	.24470	-.05303	-.00217	.17876
	GPA	M1	M2	M3	M4	M5	TCR	AB	AC	AF	AG	AU	CH

APPENDIX TABLE A.1.--continued

Variables	CS	DE	DO	EN	EX	HA	IM	NU	OR	PL	SE	SR	SU
A1													
M2													
M3													
M4													
M5													
TCR													
AB													
AC													
AF													
AG													
AU													
CH													
CS													
DE	-.26693												
DO	.35189	-.04088											
EN	.51171	-.39959	.38154										
EX	-.04180	.26192	.31175	-.25933									
HA	-.05215	-.16488	-.41572	-.18846	-.39193								
IM	-.54671	.34252	-.08540	-.60718	.36132	-.03359							
NU	.08227	-.18818	.18656	.45803	.05818	-.12848	-.18738						
OR	.34138	-.23961	-.11265	.09559	-.09386	.11856	-.39545	-.01040					
PL	-.18972	.11117	.39228	-.14093	.54234	-.43261	.34696	.05848	-.33659				
SE	.30313	-.12057	.30733	.29765	.22704	-.24227	-.30114	.34257	.36045	-.04905			
SR	.04839	.12126	-.10822	-.03333	.29062	-.17435	.07514	-.03531	-.06163	.02525	.09931		
SU	.24094	.15415	-.16266	.03523	.08156	.20996	-.01700	.02150	-.04509	-.02999	-.10907	.25334	
UN	.23268	-.19259	.44312	.50406	.18275	-.16357	-.37549	.50519	.10684	.03354	.42578	.01928	-.04030
	CS	DE	DO	EN	EX	HA	IM	NU	OR	PL	SE	SR	SU

APPENDIX TABLE A.2.--Correlation Coefficients for Low Ability Males (N = 26)

Variables	GPA	M1	M2	M3	M4	M5	TCR	AC	AG	AU	CS	EN	IM	OR	PL
M1	-.08948														
M2	.38892	-.28427													
M3	-.05567	-.24077	-.15400												
M4	99.00000	99.00000	99.00000	99.00000											
M5	-.11014	-.28427	-.18182	-.15400	99.00000										
TCR	-.12471	-.26900	-.17205	.48576	99.00000	.14747									
AC	.12960	.38614	-.40733	-.07865	99.00000	.12524	-.09912								
AG	-.33075	.02697	.03366	-.01473	99.00000	-.22888	-.30294	-.33952							
AU	-.16879	-.20974	-.02634	-.00441	99.00000	.04976	-.13020	-.11421	.18661						
CS	.11819	-.26715	-.15890	-.01122	99.00000	.25003	.14544	-.11611	-.17928	-.46470					
EN	.19232	.08557	-.24802	-.18016	99.00000	.06987	-.24330	.50267	-.09532	-.08898	.13972				
IM	-.06763	-.38398	.00371	.08034	99.00000	-.15713	-.02128	-.08943	.18779	.43649	-.54278	.06326			
OR	.23824	.14442	-.21682	-.08620	99.00000	.25775	.32173	.24082	-.31766	-.41633	.54140	.36256	-.51737		
PL	-.19569	-.05035	.15588	.27935	99.00000	-.17175	-.05492	-.30166	.36201	.28715	-.41384	-.31885	.20103	-.46706	
SU	.19959	.06357	.04066	.42091	99.00000	-.31172	.18908	.25791	-.00778	-.53701	.14109	-.05624	-.07563	.06003	.01224

	GPA	M1	M2	M3	M4	M5	TCR	AC	AG	AU	CS	EN	IM	OR	PL

APPENDIX TABLE A.3.--Correlation Coefficients for Average Ability Females (N = 53).

Variables	GPA	M1	M2	M3	M4	M5	TCR	AB	AC	AF	AG	AU	CH
M1	-.07090												
M2	.26060	-.06391											
M3	-.09165	-.11532	-.07075										
M4	-.13766	-.29361	-.18015	-.32504									
M5	.11271	-.06391	-.03922	-.07075	-.18015								
TCR	-.22325	-.00812	-.08197	.01747	-.01867	-.02698							
AB	.03796	-.08137	.04380	.10524	.03015	.01110	-.14230						
AC	.26741	-.17697	.09152	-.06338	.00832	.20551	.15210	.02734					
AF	-.03527	.10352	.09555	-.12402	.10404	-.18785	.27765	-.06310	-.12472				
AG	-.19744	.08368	.02535	-.05851	-.01628	.11201	.15502	-.37139	-.04595	-.08667			
AU	-.34215	.08586	-.08741	.34485	-.12870	.02319	-.25848	.27952	.11392	-.18734	.07853		
CH	.03159	.00407	.08996	.07892	-.21149	.05796	.25663	-.10159	.21754	.26728	.11021	.14989	
CS	.22459	-.34454	.11941	.03523	.14016	.22728	.00857	.06574	.26034	-.07294	-.14439	-.04254	-.06921
DE	-.27734	.12812	-.17013	-.12664	-.05887	.08527	.02282	-.47288	.13722	-.12397	.50006	.04964	.13155
DO	-.10107	-.00848	.08667	.18926	-.01635	-.04457	.07814	.01079	.16294	.15010	.26459	.04964	.13155
EN	.17436	-.30028	-.06336	-.03353	.06888	.17170	.12700	-.12080	.57183	.12650	-.26989	.31450	.20598
EX	-.04529	.03504	.13321	.07910	.06455	.07735	.22997	-.07872	-.06501	.46139	.30844	.12863	.26863
HA	-.11306	-.14770	.03458	-.10190	.09347	-.17030	-.32254	-.02399	.06405	-.15125	.00708	-.22637	-.24877
IM	-.27260	.26601	-.00664	-.03691	-.09793	-.21379	-.08459	.03468	-.20173	.15729	.36190	.17319	.12726
NU	-.06280	-.18827	-.04848	.25688	.23170	-.13227	-.08952	.15314	.03963	.37743	-.16491	.10232	.14132
OR	.16977	-.28540	-.17296	.11652	.06106	.10777	-.03042	-.17193	.12581	-.14410	-.15497	-.26493	-.02164
PL	-.04311	.11936	.30218	.02097	-.13153	.01863	-.14056	.01411	-.18797	.36515	.21217	.21202	.36398
SE	-.01862	-.20704	.20590	.18610	.15913	.02094	.18297	.05980	.15802	.10420	.27697	.15336	.21881
SR	-.19523	.15147	-.13645	-.20988	.14964	-.00364	.11505	-.13241	-.21514	.22131	.22185	-.23798	-.01791
SU	-.00833	-.02007	-.31711	-.12032	.12093	.16584	.18849	-.00790	-.14920	.15638	.19600	-.50974	-.18189
UN	.01892	-.12482	.04833	-.02167	.05571	-.07839	.05768	-.22888	-.03817	-.00974	.01085	-.20198	-.13982
		M1	M2	M3	M4	M5	TCR	AB	AC	AF	AG	AU	CH

APPENDIX TABLE A.3.--Continued.

Variables	CS	DE	DO	EN	EX	HA	IM	NU	OR	PL	SE	SR	SU
M1													
M2													
M3													
M4													
M5													
TCR													
AB													
AC													
AF													
AG													
AU													
CH													
CS													
DE	-.03014												
DO	.09258	.13713											
EN	.37106	-.09833	.19374										
EX	.00102	.00279	.53161	.09249									
HA	.33764	-.04241	-.06971	.04997	-.29607								
IM	-.54934	.20890	-.05639	-.45183	.11631	-.11904							
NU	.06838	-.16616	.26794	.15361	.32021	-.05453	.02408						
OR	.44319	-.08280	.08022	.39529	-.14671	.18176	-.44178	.16980					
PL	-.25439	.00023	.07754	-.19658	.35938	-.26889	.39985	.10855	-.28850				
SE	.03295	-.03697	.21348	.05441	.41135	-.15306	-.10665	.22970	-.25996	.08310			
SR	-.00478	.33302	.32215	-.13228	.16708	-.03381	.09773	.03962	.03435	.15448	-.12388		
SU	.09388	.13186	-.21969	-.12531	.02964	.15346	-.05929	-.03293	.00716	-.05263	.02882	.39420	
UN	.02760	.01372	-.04623	.03246	-.11280	.11794	-.24415	-.12003	-.03130	-.28778	.17236	-.22707	-.00805

	CS	DE	DO	EN	EX	HA	IM	NU	OR	PL	SE	SR	SU

APPENDIX TABLE A.4.--Correlation Coefficients for Average Ability Males (N = 33).

Variables	GPA	M1	M2	M3	M4	M5	TCR	AB	AC	AF	AG	AU	CH
M1	.22531												
M2	99.00000	99.00000											
M3	-.07866	-.27864	99.00000										
M4	-.01305	-.27864	99.00000	-.17857									
M5	-.35506	-.20852	99.00000	-.13363	-.13363								
TCR	.11873	.02210	99.00000	-.17281	.20114	.06890							
AB	.09899	-.04533	99.00000	-.30928	.46413	-.09752	.35251						
AC	.39004	-.01910	99.00000	-.03186	.17213	-.05515	.13913	.01406					
AF	.07398	-.02893	99.00000	.05851	.02225	-.00822	.28729	-.15539	.01166				
AG	-.35689	.02598	99.00000	.09089	-.18381	-.09681	-.52959	-.37833	-.21871	-.44613			
AU	-.09231	-.11616	99.00000	.04737	.15904	.21524	.05905	-.03840	-.06713	-.49540	.02899		
CH	.21631	-.13233	99.00000	-.11396	.21644	-.06831	.16976	.05515	.41859	.27490	-.46913	.14313	
CS	.00370	-.02726	99.00000	-.11081	.21862	-.03362	.08849	.28261	.29431	.27129	-.35454	-.19531	.28758
DE	-.18737	.17962	99.00000	.02654	-.04235	.01004	-.49156	-.47054	-.07482	-.35151	.73701	.12573	-.27158
DO	.25144	.14261	99.00000	.00498	.10868	-.20969	-.14915	-.30382	.42674	.42221	-.11961	-.28906	.33428
EN	.38098	-.08359	99.00000	.02404	.30860	.07822	.28811	.26122	.51010	.05230	-.35151	.06264	.22738
EX	.08412	.09324	99.00000	-.05254	.07323	.01222	-.03574	-.14205	-.00651	.48292	-.06136	-.10072	.16834
HA	.11638	.26231	99.00000	-.12339	-.19626	-.24685	.24534	.07407	-.12199	.17470	.04546	-.41388	-.34901
IM	-.14488	.06967	99.00000	-.04036	.10132	-.20455	-.40850	-.09882	-.18208	-.42629	.57707	.06508	-.31586
NU	.39155	-.04444	99.00000	-.14520	.21109	-.24656	.30388	.15932	.41319	.27076	-.38032	.01799	.46164
OR	.23344	.24036	99.00000	-.28574	.32219	-.34611	.26326	.27748	.34108	.32056	-.29541	-.47795	.22357
PL	-.21147	-.29423	99.00000	.10412	-.06131	-.03319	-.01583	-.08973	-.42335	.38860	-.04883	.00493	.17861
SE	.03473	-.14676	99.00000	-.25092	.11884	.00508	-.34939	.05272	.18492	.00286	.19644	-.12948	.41859
SR	-.23465	.18466	99.00000	.01544	.05464	-.05445	.01938	-.11095	-.11658	-.00925	.37430	-.18979	-.12514
SU	-.01115	.17380	99.00000	-.22431	.11563	-.19754	.27936	.27726	-.20484	.31592	-.16580	-.60477	-.08648
UN	.29092	.08559	99.00000	-.11850	.35721	-.13896	.06856	.33504	.48800	.11684	-.21299	-.11968	.46904
	GPA	M1	M2	M3	M4	M5	TCR	AB	AC	AF	AG	AU	CH

Variables	CS	DE	DO	EN	EX	HA	IM	NU	OR	PL	SE	SR	SU
M1													
M2													
M3													
M4													
M5													
TCR													
AB													
AC													
AF													
AG													
AU													
CH													
CS													
DE	-.40831												
DO	.11832	.18438											
EN	.07530	-.09882	.35917										
EX	.10287	.12491	.60550	.16308									
HA	.19879	-.20644	-.26869	-.32600	-.07988								
IM	-.49556	.55881	.02034	-.15536	-.02107	-.05425							
NU	.11800	-.17323	.41087	.44544	.48009	-.16376	-.15185						
OR	.55731	-.18449	.36937	.06031	.17737	.39911	-.28728	.31968					
PL	-.03902	-.16136	-.00085	-.05210	.28631	.00644	-.13230	.02961	-.16327				
SE	.08836	.24758	.24029	.00450	.29416	-.38770	.19253	.21518	-.02046	.17267			
SR	-.11783	.50860	.14453	-.08170	.21344	.20090	.25711	-.10922	.24302	-.20095	.02792		
SU	.30060	-.26532	-.03834	-.15484	.05308	.46198	-.08520	.08171	.59006	-.06127	-.03817	.27629	
UN	.34692	-.11306	.28820	.37444	.24181	-.14401	-.08080	.46972	.46351	-.02188	.45829	-.15019	.18104

	CS	DE	DO	EN	EX	HA	IM	NU	OR	PL	SE	SR	SU

APPENDIX TABLE A.5.--Correlation Coefficients for High Ability Females (N = 47)

Variables	GPA	M1	M2	M3	M4	M5	TCR	AB	AC	AF	AG	AU	CH
M1	.15507												
M2	.15742	-.10260											
M3	-.06651	-.22042	-.09548										
M4	-.14402	-.34963	-.15146	-.32538									
M5	-.28676	-.10260	-.04444	-.09548	-.15146								
TCR	.25398	.26578	-.23981	-.02962	.00437	-.23981							
AB	-.26590	-.09405	.01408	-.13134	.06337	-.02202	-.07090						
AC	.17672	.06040	-.03915	-.15962	-.06810	-.07749	.07340	.05099					
AF	.04372	.12938	-.09671	.15390	-.29968	-.06865	.04165	.37915	.07547				
AG	.16578	.54162	.07743	-.06422	-.26396	-.05916	.05379	-.40020	-.15742	.03429			
AU	-.11725	.02016	-.00267	-.17715	.07831	-.28764	-.02262	-.15591	.03252	-.26333	.24674		
CH	.05843	.28171	.13350	-.02047	-.19227	-.26041	-.12644	.02821	.05426	.22295	.37681	.44687	
CS	.15921	-.14941	-.08632	-.01582	.20773	.12017	.06067	-.17265	.25478	-.10070	-.21669	-.35608	-.29470
DE	.39519	.12668	.01009	.03441	-.05652	.15236	.07360	-.57066	-.18868	-.23792	.57316	.16467	-.05309
DO	.23141	.15021	.03355	.09646	-.37861	-.04587	-.18659	-.16679	.10147	.24734	.36851	.11104	.32654
EN	.27154	-.20278	-.02125	-.24895	.02611	-.08434	.07070	.01309	.54965	-.00472	-.30660	-.02864	-.10748
EX	.11009	.31032	.04775	.12837	-.27693	-.22828	-.16725	-.08407	-.20375	.33828	.44380	.08728	.39050
HA	.31850	.15748	-.18161	.01047	-.05148	-.00045	.49136	-.07414	-.12374	.07401	-.11737	-.39300	-.38588
IM	.01820	.17312	.15765	.25878	-.26134	-.18952	.02665	-.15356	-.37571	.25777	.55211	.15783	.26686
NU	-.23687	.07529	-.05989	.00619	-.20409	.13833	.04177	.55732	.07756	.59706	-.05559	-.17775	.21863
OR	.28434	-.02280	.02278	-.21039	.22071	.13824	.02539	-.08257	.40640	-.03869	-.18805	-.31951	-.32848
PL	-.11142	.33945	-.18230	.18048	-.35984	.01454	.04134	-.18078	-.04613	.36444	.46948	-.02307	.35149
SE	.03785	.04137	-.10398	.24265	-.05695	-.14387	-.11960	.22337	.03458	.46177	-.03341	-.08690	.39104
SR	.22544	.17056	-.02381	.04902	-.10384	.04280	.04835	-.17451	-.01609	-.02425	.18734	-.10001	-.08854
SU	.25418	.19959	.06244	.16179	-.38373	.29926	-.01161	.03888	-.22393	.25286	.00852	-.64786	-.18722
UN	.27667	-.25516	.02311	-.00681	.09366	.08149	-.12230	.10819	.24125	-.27972	-.28837	.10736	.07546

	GPA	M1	M2	M3	M4	M5	TCR	AB	AC	AF	AG	AU	CH

APPENDIX TABLE A.5.--Continued

Variables	CS	DE	DO	EN	EX	HA	IM	NU	OR	PL	SE	SR	SU
M1													
M2													
M3													
M4													
M5													
TCR													
AB													
AC													
AF													
AG													
AU													
CH													
CS													
DE	.08164												
DO	-.16719	.11292											
EN	.31761	-.13887	.09879										
EX	-.28452	.14201	.60816	-.16945									
HA	.17906	.17452	-.36139	-.09790	-.26926								
IM	-.46267	.17994	.26839	-.33777	.61747	-.21830							
NU	-.04055	-.33771	.05921	.08531	.09737	-.04065	.01734						
OR	.46149	.06965	-.10625	.40135	-.21854	.21463	-.44417	-.03398					
PL	-.28619	.03613	.24530	-.10536	.44386	-.16937	.47996	.24835	-.28987				
SE	.04766	-.23542	.39410	.09175	.48658	-.29432	.17343	.45210	-.03271	.28577			
SR	.14308	.17749	.15150	-.17098	.15325	.08566	.10344	-.24244	-.03225	.20451	.05141		
SU	.16018	-.01675	.31307	-.19264	.24840	.24047	.13002	.07508	.08835	.08191	.21048	.21653	
UN	.24111	.04062	.06406	.38176	-.22495	-.07018	-.35295	-.10354	.09624	-.33268	.06064	.02310	-.07396

	CS	DE	DO	EN	EX	HA	IM	NU	OR	PL	SE	SR	SU

APPENDIX TABLE A.6.--Correlation Coefficients for High Ability Males (N = 31).

Variables	GPA	M1	M2	M3	M4	M5	TCR	AB	AC	AF	AG	AU	CH
M1	-.00509												
M2	.22982	-.11516											
M3	.00876	-.11516	-.06897										
M4	-.07619	-.16879	-.10108	-.10108									
M5	.04747	-.16879	-.10108	-.10108	-.14815								
TCR	-.04906	-.11783	.05624	.21475	.08243	.19859							
AB	.45567	-.23110	.02942	-.18947	.04312	.31047	-.06817						
AC	-.01093	-.24317	-.38459	.06996	.01689	.22627	-.13697	.15978					
AF	-.04728	.20648	.06644	.03783	-.15418	-.15418	-.14962	.15096	-.19355				
AG	-.029487	.23978	-.01651	.08848	-.01458	-.29348	.02222	-.63094	-.14931	-.02308			
AU	-.40114	-.39420	-.19768	.01981	.04779	-.02722	.08059	-.10684	.23948	-.41314	-.00248		
CH	-.20103	-.16401	-.17471	-.16237	-.24703	.13270	-.17674	.13130	.30112	-.03209	-.12641	.60921	
CS	.31562	.13342	.03459	.09500	.09497	-.20387	-.18609	-.05264	.06244	-.22813	-.05801	-.29192	-.33412
DE	-.11714	.03797	-.08453	-.05388	.4456	-.10143	.03599	-.55727	.06351	-.47053	.48989	.15560	-.13146
DO	-.11125	-.10354	-.09907	.27159	-.09670	.08762	-.15868	.01305	.42732	.35262	.22103	-.14012	.05978
EN	.14564	-.14768	.25987	-.17832	-.08021	.33971	-.12113	.28927	.38921	-.01793	-.26366	-.01628	-1.4735
EX	-.21737	-.05045	.11219	.01634	-.26705	.17447	-.21332	-.00160	.08265	.52252	.14360	-.08893	.25751
HA	.07370	.29252	.24425	.04499	.16329	-.36239	-.06329	-.38996	-.06267	-.00033	.16399	-.35252	-.49352
IM	-.36440	-.00352	-.12977	-.15946	-.09229	.25582	-.09337	-.07999	-.17486	.31966	.12083	.09590	.29239
NU	.10311	-.23951	.09775	-.41244	.02997	.10928	-.19204	.50140	.10031	.22604	-.13210	-.14280	.02958
OR	.08371	-.19995	-.13768	.05458	.15513	.17392	.09233	.10736	.14800	-.36641	-.17041	.00764	-.10286
PL	-.29184	.06200	.08333	.02032	.12213	-.10873	-.09443	-.04379	-.17499	.44970	.05875	.09521	.26891
SE	-.15516	-.28363	-.30766	.25443	-.03901	.33304	-.28950	.23788	.18985	.03922	-.08322	.03803	.22362
SR	-.01024	.19030	.14588	-.12014	.16183	-.47500	-.06769	-.15030	-.20326	.10435	.14955	-.33015	-.22882
SU	.38382	.20317	.20192	.05480	.15872	.00190	-.18252	.05597	-.39107	.24070	-.05445	-.69063	-.60207
UN	.11474	-.22232	-.20496	-.16352	.09436	.45876	-.07862	.42306	.51636	-.15147	-.17760	.15045	.31195
	GPA	M1	M2	M3	M4	M5	TCR	AB	AC	AF	AG	AU	CH

APPENDIX TABLE A.6.--Continued.

Variable	CS	DE	DO	EN	EX	HA	IM	NU	OP	PL	SE	SR	SU
M1													
M2													
M3													
M4													
M5													
TCR													
AB													
AC													
AF													
AG													
AU													
CH													
CS													
DE	.06416												
DO	.01618	-.01592											
EN	-.07851	-.21213	.26784										
EX	-.43836	-.24625	.42332	.33902									
HA	.34765	.23787	-.10283	-.22099	-.15334								
IM	-.60513	-.00722	-.08825	-.18045	.42845	-.10138							
NU	-.19188	-.25342	-.00126	.24332	.26993	-.23361	.06327						
OR	.48005	.05293	.01745	.20282	-.40467	-.15252	-.47933	-.06883					
PL	-.39387	-.15724	.05937	-.15054	.28223	-.15759	.31852	-.05250	-.27344				
SE	-.18410	-.22244	.13916	.05335	.33048	-.31775	.34442	.13501	.13042	-.09101			
SR	.27750	.11487	-.10889	-.22228	-.02946	.37392	-.27359	.13283	.03936	.12112	-.36688		
SU	.21167	-.09074	-.11210	-.19713	.05803	.33632	.05751	.08018	.05222	-.05005	.16935	.15337	
UN	-.09313	-.06390	.29057	.50285	.14163	-.44816	-.02813	.29249	.08502	-.10134	.24961	-.53074	-.21564
	CS	DE	DO	EN	EX	HA	IM	NU	OP	PL	SE	SR	SU

APPENDIX B

INTERCORRELATIONS FOR PRF-E SCALES

APPENDIX TABLE B.--Intercorrelations for PRF-E Scales (N = 231)

Variables	AB	AC	AF	AG	AU	CH	CS	DE	DO	EN	EX
AB	1.000	.1174	.0411	-.3686	-.0361	.0097	.0443	-.4429	-.0974	.1324	-.0844
AC	.1174	1.000	-.0292	-.1613	.0828	.2099	.2012	-.0398	.3338	.4957	-.0217
AF	.0411	-.0292	1.000	-.0746	-.2907	.1337	-.0720	-.1708	.3053	.0411	.4454
AG	-.3686	-.1613	-.0746	1.000	.1203	.0557	-.2141	.5102	.1760	-.2677	.2237
AU	-.0361	.0828	-.2907	.1203	1.000	.1203	.0557	.0965	.0849	-.0123	.0690
CH	.0097	.2099	.1337	.0557	.3913	1.000	-.1187	-.0758	.2650	.0714	.3014
CS	.0443	.2012	-.0720	-.2141	-.2485	-.1187	1.000	-.0766	.0550	.2478	-.1621
DE	-.4429	-.0398	-.1708	.5102	.0965	-.0758	-.0765	1.000	.1104	-.1510	.0801
DO	-.0974	.3338	.3053	.1760	.0849	.2650	.0550	.1104	1.000	.2502	.5170
EN	.1324	.4957	.0411	-.2677	-.0123	.0714	.2475	-.1510	.2502	1.000	.0494
EX	-.0844	-.0217	.4454	.2237	.0690	.3014	-.1621	.0801	.5170	.0494	1.000
HE	-.1048	-.1028	-.0307	-.0479	-.3497	-.3179	.2137	.0146	-.2029	-.1548	-.2162
IM	-.0875	-.2349	.0907	.4109	.1625	.1119	-.5379	.2077	-.0024	-.3329	.2723
NU	.3111	.1881	.3686	-.1323	-.0718	.0978	-.0073	-.1862	.1850	.2210	.2217
OR	.0002	.2145	-.0846	-.2426	-.2176	-.0802	.4631	-.0374	.0285	.2663	-.1699
PL	-.0483	-.2244	.3890	.2691	.1184	.2502	-.2860	-.0151	.1354	-.1729	.3816
SE	.1439	.1343	.1723	.0812	.0460	.2602	.0265	-.1005	.2376	.0952	.3340
SR	-.0917	-.1487	.1094	.2403	-.1782	-.0881	.0613	-.0917	-.1487	.1094	.1565
SU	.0723	-.2182	.2368	.0215	-.6009	-.2756	.1757	.0723	-.2182	.2368	.0956
UN	.1484	.3133	-.0353	-.1219	-.0156	.1344	.1340	.1484	.3133	.0353	.0373
DY	.1146	.3406	.2907	-.3524	-.1278	.0293	.2350	-.0239	.0415	-.2043	.1010
IN	-.0239	.0415	-.2043	.0263	.0812	.0754	-.0897	-.1146	.3406	.2907	-.0412
	AB	AC	AF	AG	AU	CH	CS	DW	DO	EN	EX

APPENDIX TABLE B.--Continued.

Variables	HA	IM	NU	OR	PL	SE	SR	SU	UN	DY	IN
AB	-.1048	-.0875	.3111	.0002	-.0483	.1439	-.0917	.0723	.1484	.1146	-.0239
AC	-.1028	-.2349	.1881	.2145	-.2244	.1343	-.1487	-.2182	.3133	.3406	.0415
AF	-.0307	.0907	.3686	-.0846	.3890	.1723	.1094	.2368	-.0353	.2907	-.2043
AG	-.0479	.4109	-.1323	-.2428	.2691	.0812	.2403	.0215	-.1219	-.3524	.2063
AU	-.3497	.1625	-.0718	-.2176	.1184	.0460	-.1782	-.6009	-.0156	-.1278	.0812
CH	-.3179	.1119	.0978	-.0802	.2502	.2802	-.0881	-.2756	.1344	.0293	.0754
CS	.2137	-.5379	-.0073	.4631	-.2860	.0265	.0613	.1757	.1340	.2350	-.0897
DE	.0146	.2077	-.1862	-.0374	-.0151	-.1005	.2289	.0229	.0803	-.2213	.0746
DO	-.2029	-.0024	.1850	.0285	.1354	.2376	.0830	-.0466	.1583	.2118	-.0157
EN	-.1548	-.3329	.2210	.2663	-.1729	.0952	-.1250	-.1282	.3080	.3950	.0030
EX	-.2162	.2723	.2217	-.1699	.3816	.3340	.1565	.0956	.0373	.1010	-.0412
HE	1.000	-.1323	-.1078	.1220	-.2041	-.2639	.0838	.2719	-.1093	.0679	-.0521
IM	-.1323	1.000	-.0229	-.4419	.3485	.0685	.0651	.0066	-.1856	-.3604	-.0289
NU	-.1078	-.0229	1.000	.0254	.0887	.2854	-.0215	.0561	.1630	.1984	-.0947
OR	.1220	-.4419	.0254	1.000	-.3099	-.0543	-.0073	.1115	.0286	.2443	.0733
PL	-.2041	.3485	.0887	-.3099	1.000	.1313	.1160	.0023	-.1766	-.1155	-.1428
SE	-.2639	.0685	.2854	-.0543	.1313	1.000	-.0152	.0707	.2534	.1122	-.0457
SR	.0838	.0651	.0215	-.0073	.1160	-.0152	1.000	.2779	-.1339	-.0299	.0199
SU	.2719	.0066	.0561	.1115	.0023	.0707	.2779	1.000	-.0458	-.0275	-.1255
UN	-.1093	-.1856	.1630	.0286	-.1766	.2534	-.1339	-.0458	1.000	.1761	.0238
DY	.0679	-.3604	.1984	.2443	-.1155	.1122	-.0299	-.0275	.1761	1.000	-.1423
IN	-.0521	-.0289	-.0947	.0733	-.1428	-.0457	.0199	-.1255	.0238	-.1423	1.000
	HA	IM	NU	OR	PL	SE	SR	SU	UN	DY	IN