THE VALIDATION OF AN OBJECTIVE MEASURE OF ACADEMIC ACHIEVEMENT MOTIVATION FOR MALE COLLEGE FRESHMEN

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ABSTRACT

THE VALIDATION OF AN OBJECTIVE MEASURE
OF ACADEMIC ACHIEVEMENT MOTIVATION
WITH MALE COLLEGE FRESHMEN

by Samuel Henry Pettigrew

This study was concerned with (1) the validation of a theory-based, objective measure of academic achievement motivation (the experimental form of the Generalized Situational Choice Inventory (GSCI) from the Farquhar research project[1]) with a male college population, and (2) a factor analysis of the discriminating items. The present study constituted a replication of research conducted by Farquhar with a sample of high school students which resulted in the validation of items from the GSCI, a forced choice inventory designed to measure academic achievement motivation. The inventory was based on a modification and polarization of McClelland's theory of Need-achievement and was viewed as being related specifically to the academic setting.

The sample, 865 males, was selected from the total population of first-quarter freshmen at Michigan State University in 1961. Two academic aptitude measures (the total score of the College Qualification Test and the Michigan State University Reading Test score), an academic achievement measure (cumulative GPA for one academic year), and responses on the GSCI were obtained for each student.

Employing the Two Stage Regression Technique developed by Farquhar,

statistically defined samples of over- and under-achieving students were identified by regression analysis from their scores on the CQT, MSU-R, and GPA. The criterion groups consisted of 115 over- and 106 under-achievers which were randomly divided into sub-samples for validation and cross-validation purposes. The achievement criterion (GPA) reliability was estimated for random samples of statistically defined discrepant and normal achievers. The reliability estimates for the GPA fell slightly below the minimum desired ($r = .704$ to $.786$). Responses to each item of the GSCI were analyzed by the chi square model. Alpha was set at the .20 level for validation and at .10 for cross-validation. Five items of the GSCI were found to be significant after cross-validation in the direction of the theory. Two items attained significance in the direction opposite to that originally hypothesized. It was concluded that the GSCI items do not discriminate between over- and under-achievers in a male college freshman sample. Plans to factor analyze the expected item intercorrelations were abandoned.

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[1]W. W. Farquhar, Motivation Factors Related to Academic Achievement: Final Report of Cooperative Research Project No. 846, College of Education (East Lansing, Michigan: Michigan State University, 1963).

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CHAPTER I

DEFINITION AND FORMULATION OF THE PROBLEM

In a highly developed society there is a constant and growing demand for college trained persons needed to fill professional positions. Of the youth who enter institutions of higher learning, many do not complete the courses of study. There is ample evidence that lack of skill or aptitude can account for only part of this failure. Likewise, there is relatively little understanding of the factors operating within those individuals who do not meet the institutional standards but who appear to possess the skill and aptitude qualification for higher learning. A possibility exists that personality factors other than academic skill or aptitude may account for lack of academic success.

There has been a marked increase in recent years in research into non-intellective factors associated with academic achievement. These efforts have been directed in part towards motivational factors in achievement but have been limited in success, particularly in determining the underlying nature of motivation as an academic achievement variable. The present study was conducted with the hope of clarifying some of the questions associated with this area.

Purpose of the Study

The purpose of the study was to investigate motivational factors related to academic achievement of a selected sample of university freshmen

males. Concomitant goals included: (1) the development of an objective inventory of academic achievement; (2) identification of inventory items which discriminate significantly between high and low academic achievement motivated students for both validating and cross-validating groups; (3) an inventory which can be interpreted on the basis of a theory of achievement motivation and which would engender further research into academic motivation; (4) increased understanding of motivation as an achievement variable.

Need for the Study

The development and analysis of an instrument to measure academic achievement motivation can be justified by three arguments for its value: (1) it would contribute toward better educational selection and placement; (2) a factor analysis of the instrument should reveal the underlying dimensions of the instrument and thereby make possible the development of an even better instrument; (3) by increasing understanding of motivational characteristics of students, curriculum, teaching methods, and counseling methods could become more effective.

Statement of the Problem

There have been a number of studies of non-intellective characteristics of students in relationship to their academic achievement. These studies, however, have typically used instruments that (1) lacked a clearly defined theoretical basis, or (2) were projective measures which are difficult to administer, score, and interpret. Moreover, the instruments were lacking

in evidence of reliability, and/or were developed for purposes other than the measurement of academic achievement motivation.

Farquhar broadly defined academic motivation as "a combination of forces which initiate, direct, and sustain behavior toward a scholarly goal."[1] This definition is followed in the present study.

The Generalized Situational Choice Inventory (GSCI), an experimental objective research measure of academic achievement motivation was recently developed by Farquhar and associates.[2] The purpose of the present research is to determine the validity of items of the experimental form of the GSCI in the academic achievement of a college population.

Rationale of the Study

McClelland and associates[3] hypothesized that N-achievement (Need-Achievement) consists of (1) long-term involvement, (2) unique accomplishment, and (3) competition with a standard of excellence. Farquhar and associates modified and extended McClelland's theory by hypothesizing three additional dimensions. (See Table 1)

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[1]W. W. Farquhar, Motivation Factors Related to Academic Achievement: Final Report of Cooperative Research Project No. 846, College of Education (East Lansing, Michigan: Michigan State University, 1963), p. 3.

[2]Ibid.

[3]D. C. McClelland, J. W. Atkinson, R. A. Clark, and E. L. Lowell, The Achievement Motive (New York: Appleton Century Crofts, Inc., 1957), pp. 110-113.

Table 1

Summary of a Polar Theory of High and Low Academic Achievement Motivation

High Academic Achievement Motivation	Low Academic Achievement Motivation
1. Need for Long-Term Involvement	1. Need for Short-Term Involvement
2. Need for Unique Accomplishment	2. Need for Common Accomplishment
3. Need to Compete with a Maximal Standard of Excellence	3. Need to Compete with a Minimal Standard of Excellence

The constructs were polarized by postulating a continuum of achievement motivation with the low motivation or N-achievement being opposite in composition from that advocated by McClelland and associates. Furthurmore, the constructs were viewed as being related specifically to the academic setting.[4]

Evidence that the above personality variables can be measured and objectively quantified has been demonstrated at the high school level in the Farquhar research project.

Of the 200 items in the experimental form of the GSCI, 45 items significantly discriminated between statistically defined discrepant male achievers.[5] It is the purpose of the present study to replicate the Farquhar research with a college population using his original 200 items. Thus it

[4]Farquhar, op. cit., p. 10.

[5]Ibid., p. 94.

is hoped to construct an inventory which would discriminate significantly between criterion groups of over- and under-achievers at a first term freshman college level.

Statement of the Hypotheses

The research hypotheses to be tested in the study are:

Major Hypothesis I: Under- and over-achieving Freshmen college students will differ significantly on an objective measure of academic achievement motivation, the under-achieving students responding in the direction of low motivation and the over-achieving students responding in the direction of high motivation.

Major Hypothesis II: Factor analysis of the items screened through tests of Hypothesis I will yield an interpretable structure which will support the polar dimension postulates of academic motivation.

Organization of the Study

The organization of the dissertation is as follows: Chapter II consists of a review of previous research related to the investigation. The general design of the study, including sample selection, instrumentation, data collection procedures, and methods used in analyzing the data is presented in Chapter III. The analysis of the data is presented in Chapter IV, while the summary, conclusions, and implications for further research are presented in Chapter V.

CHAPTER II

REVIEW OF THE LITERATURE

The following review of research (covering the period 1960-1964) on the relationship between non-intellective variables and academic achievement is presented under five headings. Each of the five sections includes reports according to the theoretical orientation (or lack of orientation) upon which the studies were developed.

For each study, the sample, design, and results are examined. Each study is subjected to a brief critical analysis based in part on the criteria posited by Farquhar and Payne[1] and in part on other criteria of research.

Broad, Exploratory Studies

The first category of studies reviewed are those in which no specific, clearly defined theories were involved but in which several measures of non-intellective variables were included in the design. In each case, the employment of a given instrument implied a certain attention to personality or motivational factors but there was typically no unified interpretation of the results. Likewise, in most studies of this type, the theoretical framework underlying the instruments was not made explicit as it was conceived to be related to achievement in college.

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[1] W. W. Farquhar and D. A. Payne, "A Classification and Comparison of Techniques Used in Selecting Under- and Over-Achievers," Personnel and Guidance Journal, 42 (1964), pp. 874-884.

Brown and Dubois

Brown and Dubois sought to determine the differential correlates of academic success of two curricular programs within a university.[2]

Sample:--Two samples of high ability male freshmen were drawn from a population of students enrolled in the College of Sciences and Humanities and the College of Engineering at Iowa State University. The samples were restricted to men whose predicted grade point averages (GPA)[3] were 2.75 or better (A=four points). The GPA prediction was derived by a regression equation using a combined score of a mathematics test and high school GPA. All subjects were volunteers contacted by mail or telephone. The sample size attained was 76 Science and Humanities and 125 Engineering students.

Design:--A single and a multiple correlation method were employed. Three scholastic aptitude measures, high school GPA, and three types of non-intellective measures were predictors. The non-intellective instruments included the Brown-Holtzman Survey of Study Habits and Attitudes (SSHA), a Biographical Inventory constructed by the authors, the usual diagnostic and validity scores of the Minnesota Multiphasic Personality Inventory (MMPI) and seven extra MMPI scales developed by Dahlstrom and Welsh. Fifty-six raw scores were zero order correlated

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[2]F. G. Brown and T. E. Dubois, "Correlates of Academic Success for High Ability Freshmen Men," Personnel and Guidance Journal, 42 (1964), pp. 603-607.

[3]Hereinafter all grade point averages are referred to as GPA.

with the GPA of combined winter and spring quarters of the subjects separately for each college. All scores that correlated at the .05 level of significance were multiple correlated with the criterion. Because of item overlap, Dahlstrom and Welsh MMPI scores were combined in the multiple correlation.

Results:--Twelve zero order coefficients were found to be significant at a .05 level or higher in the Science and Humanities sample and 20 were significant in the Engineering sample. Seven scores (the mathematics test, Educational Acceptance Scale of the SSHA, Mother's education, student's expectation of GPA, and the Ae (College Achievement) scale of the MMPI) were significant in both samples. The greatest differences between the groups was seen in four Biographic items related to the amount of time spent studying which correlated with the Engineering GPA but not the Science and Humanities GPA. The best single predictor for the Science and Humanities sample was high school GPA and the best multiple predictors were high school GPA plus the mathematics test scores. For the Engineering sample, the best single predictor was the Delay Avoidance score of the SSHA.

Critical Analysis:--The research by Brown and Dubois was comprehensive in scope and the separation of the curricular groups proved to be valuable in yielding data. The predictive variables chosen for study were relevant to academic achievement and encompass important factors related to success. Concomitantly, the authors presented no research hypotheses

nor any explicit rationale for the choice of variables. The sample was restricted to high ability students and there was no apparent control of regression effects on the sample. The use of volunteers may have introduced a bias in the sample. There was no evidence that subjects who produced unacceptable low scores on the validity scales of the MMPI were eliminated. No description of the testing conditions or procedures was provided. There was no data concerning the reliability of the instruments, neither those used to select the samples nor those used in measuring the correlates with achievement. No tests of significance were employed in the multiple correlation method.

Holland

Holland's study was designed primarily to explore the usefulness of measures of non-intellectual factors in predicting college grades.[4]

Sample:--The sample consisted of 651 men and 311 women randomly drawn from 7500 Finalists in the National Merit Scholarship Corporation competition in 1958. They attended 277 institutions of higher learning. The sexes were divided in the analyses.

Design:--Testing of the students was conducted three months prior to entrance into college during the fall term. The predictors included Form A of Cattell's 16 PF test, the National Merit Student Survey, and the Vocational Preference Inventory as well as achievement variables

[4] J. L. Holland, "The Prediction of College Grades from Personality and Aptitude Variables," Journal of Educational Psychology, 51 (1960), pp. 245-253.

(high school rank and Scholastic Aptitude Test). The measures included 40 variables which were product moment correlated with the grade point averages (GPA) after converting the grading systems of all colleges to a scale where A=4. The samples of male and female subjects were dichotomized based on the Talent Supply Index, and correlations were obtained for samples of students attending colleges of "high" and "low" talent supply. The Talent Supply Index is an estimate of the average scholastic aptitude of a college's student body and was derived in an earlier study by Thistlethwaite. The samples were classified by means of Ph.D. productivity indexes for National Sciences, and for Arts, Humanities, and Social Sciences. Correlations were computed for student samples attending colleges which fell above and below the median on these two indexes. Finally, correlation between grades and predictors were obtained for the two institutions with the largest student samples.

Results:--The results revealed the male college achievers to be dependent, serious, persistent, responsible, submissive, quiet, feminine, naive, self-sufficient and self-controlled. High school rank was consistently the best predictor of college grades. For males attending colleges high on the National Science index, high grades were associated with dedication to scholarship, dominance, superego, and emotionality. High grades at low National Science index institutions were associated with submissiveness, timidity, or lack or adventurousness, naivete, and passivity. Differences between students at two institutions high in

percentage of National Merit Scholarship Corporation scholars (Harvard and Massachusetts Institute of Technology) revealed that Harvard scholars were unstable, feminine, naive, and emotional, while MIT scholarship, in contrast, was associated with superego and persistence.

Critical Analysis:--The design employed by Holland yielded valuable data by including controls of variables associated with different colleges. However, the sample represented a highly restricted portion of the college population making generalization of the findings to a more normal population inadvisable. The sample, though large, was not adequately described. No theoretical formulations or research hypotheses were offered.

Diener

Diener investigated the differences between under- and over-achieving students on a number of measures.[5]

Sample:--From a population of 1,038 sophomores, juniors, and seniors at the University of Arkansas, a sample of 74 over-achievers and 64 under-achievers were selected. Discrepancy of achievement was measured by identifying students whose T scores for cumulative grade point averages (GPA) were 15 or more points above or below the T scores for their American Council on Education Psychological Examination for Freshmen (ACE). The sample was divided by sex for analysis of differences in study habits, personality measures and vocational preferences.

[5]C. L. Diener, "Similarities and Differences Between Over-Achieving and Under-Achieving Students," Personnel and Guidance Journal, 39 (1960), pp. 396-400.

Design:--For the two groups of over- and under-achievers, F and t ratios were computed to check for significant differences (at the .05 level) between the means for nine factors associated with school success (ACE, GPA, reading ability, high school grades, and mechanics of expression) and the use of out-of-school time (hours spent studying, in extra-curricular activities, and in working). The male groups of under- and over-achieving students were analyzed for differences on aptitude, activities, achievement, study habits (with the Brown-Holtzman Survey of Study Habits and Attitudes: SSHA), vocational preference (with the Kuder Vocational Preference Record) and personality (with the Edwards Personal Preference Schedule: EPPS). Correlation coefficients between the ACE and study habits data, Kuder Vocational Preference Record and EPPS were reported. For variables in which coefficients with aptitude were significant at the .05 level, analysis of covariance was made to rule out the aptitude factor.

Results:--All characteristics except study habits, certain aspects of vocational preference, and personality were the same in both groups. Over-achieving males had better study habits as measured by the SSHA. Under-achievers had higher (Kuder Vocational Preference Record) artistic interests and over-achievers had higher n-order (EPPS) scores.

Critical Analysis:--Diener's method of sample selection was parsimonious. The instruments were selected to cover a broad range of important personality variables related to achievement. The instruments

are well known and ample validity and reliability reports have been published concerning them. However, the author proposed neither research hypotheses nor theoretical bases for the choice of instruments. The inclusion of a mixed sample of sophomores, juniors and seniors made possible a bias due to regression effects on the sample. A certain rationale was implicit in the choice of measures but this was not made explicit. No data concerning the reliability of the measures was provided. There was no evidence that the consistency score of the EPPS was used in sample selection. Testing procedures or conditions were not described.

Long

Long investigated sex differences of factors predictive of academic achievement.[6]

Sample:--The sample consisted of 113 women and 303 men who were new freshmen at Norfolk College of William and Mary in 1957.

Design:--Multiple regression by stepwise procedure on an electronic computer yielded coefficients from six kinds of variables predictive of academic success in college. The variables included high school grade point average (GPA), three aptitude measures, the Kuder Vocational Preference Record and the Guilford-Zimmerman Temperament Survey. Student t-values were computed to test the significance of the coefficients. The achievement criterion was the cumulative GPA for the freshman year. All analyses were done separately for men and women.

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[6] J. M. Long, "Sex Differences in Academic Prediction Based on Scholastic, Personality, and Interest Factors," Journal of Experimental Education, 32 (1964), pp. 239-248.

Results:--Academic predictors (high school GPA, total score of School and College Aptitude Test) accounted for most of the variance. Non-academic factors emerged at the third step and accounted for about 25 percent of the variance. Distinct differences between men and women in the sample were found. For women, the important non-academic variables included inactivity-activity (Guilford-Zimmerman Survey), Artistic interest and Persuasive interest (Kuder Vocational Preference Record). For men, the important non-academic variables were impulsiveness-restraint and subjectivity-objectivity (Guilford-Zimmerman Survey) and Scientific Interest (Kuder Preference Record). For men, personality factors seem more important than verbal ability while the converse is true for women. For men, quantitative ability was more important than verbal ability while the converse is true for women. The patterns indicate that academic prediction should be improved by attempting to predict success based on intended curriculum.

Critical Analysis:--Long used a wide range of ability groups and a method of analysis that yielded maximal information. The author provided no theoretical basis for the choice of predictive variables and no research hypotheses in the design. The results were difficult to interpret because there was no indication of the direction of the correlation of the Guilford-Zimmerman scale factors with high or low academic achievement.

Watley

Watley studied the predictive validity of several intellectual and non-intellectual measures related to academic success in a college of business administration.[7]

Sample:--One hundred fourteen first quarter freshmen males in the College of Business Administration, University of Denver, served as subjects. They were divided into subgroups according to their major: (1) Hotel and Restaurant Management (N:34), (2) Accounting (N:39), and (3) Marketing and Management (N:41). They were selected during the fall quarters of 1958 and 1959.

Design:--Product moment correlations were calculated for the three samples using GPA for three academic quarters as the dependent and several intellectual and non-intellectual measures as independent variables. The measures included high school rank, the mathematics and verbal parts of the Scholastic Aptitude Test (SAT), Bruce Business Judgment Test, and the Guilford Zimmerman Temperament Survey. Partial correlation coefficients were then computed and beta weights reported.

Results:--High school rank had little value as a predictor. One major group, Hotel and Restaurant Management, yielded a negative correlation (-.26) between rank and GPA. The SAT scores were the best predictors (r_s = .29 to -.34) except with the Hotel and Restaurant group

[7] D. J. Watley, "The Effectiveness of Intellectual and Non-Intellectual Factors in Predicting Achievement for Business Students," Journal of Educational Research, 57 (1964), pp. 402-407.

where they added little in accounting for variance. Personality measures (Guilford-Zimmerman Survey) were of some value but varied from one curricular group to another. The best predictor combinations for the accounting majors, for example, were the Ascendence scale of the Guilford-Zimmerman Survey (.32), Mathematics score from the Scholastic Aptitude Test (.29) and Verbal score from the Scholastic Aptitude Test (.40). The Hotel and Restaurant Management sample, on the other hand, yielded higher coefficients on the Ascendence and Thoughtfulness scales in the opposite direction (-.27 and -.32 respectively), along with the Bruce test (.21) and high school rank (-.26).

Critical Analysis:--The author offered no rationale for the use of the predictive instruments nor any research hypotheses. Watley's separation of the total sample into sub-groups on the basis of their curricular major was respectable. Reliability estimates, however, are lacking on all measures in the study.

Self-Concept Studies

The second group of studies were developed on theories of self-concept factors as they are associated with achievement in college.

Berger

Berger studied the relationship between scores on a measure of the ability to "accept limitations" on college achievement.[8] The study

[8] E. M. Berger, "Willingness to Accept Limitations and College Achievement: A Replication," Journal of Counseling Psychology, 1963, 10(2), 176-178.

described here was a replication and expansion of a previous investigation by the same author.[9]

Sample:--The subjects were all entering students at the University of Minnesota. Most were men and women entering the College of Science, Literature and the Arts, the remainder being men entering the Institute of Technology. They were grouped into 377 matched pairs (N-754). The pairs were divided into sub-groups by curricular programs, by their percentile ranking in their high school graduating class, and their percentile rating on the Minnesota Scholastic Aptitude Test.

Design:--All subjects were matched when they were within five percentile points on high school rank and on the Minnesota Scholastic Aptitude Test. Institute of Technology students were matched if they met the conditions for the rest of the sample and were within five raw score points on a mathematics test. Pairs were made up of students who met the matching conditions but were as different as possible on "Willingness to Accept Limitations" scale, a measure consisting of 16 true-false items developed by the author. The scale is based on self-concept theory and on the hypothesis that emotionally secure persons are more self-accepting of their personal limitations. Two criteria of college achievement were used: first quarter and first year grades. The differences between the mean grades of individuals within pairs were tested. With groups of less than

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[9] _____, "Willingness to Accept Limitations and College Achievement," Journal of Counseling Psychology, 1961, 8, 140-146.

30, t-ratios were obtained, for Ns of 30 or greater, critical ratios (CR). The minimal level set for significance was .05.

Results:--T-ratios or CRs are reported for each group. Support for the hypothesis that high Willingness to Accept Limitation scorers will achieve better scholastically than low scorers was confirmed for high performing, high aptitude, high school graduates who enter the College of Science, Literature and Arts and also for high performing, moderate aptitude men who enter this college. The hypothesis was not confirmed for Technology men.

Critical Analysis:--The authors hypotheses and instruments represent original approaches to personality variables associated with achievement. However, no reliability estimates were reported for any of the measures. This limits the usefullness of the report, particularly in reference to the Willingness to Accept Limitations scale. The sample was not adequately described and it appears that only upper-level ability students were used. The matching procedure can be criticized in that no effort was made to ascertain the equivalence of the high schools upon which the ranking and matching were based.

Borislow

Borislow's research was designed to study the importance of self-evaluation as a non-intellectual factor in academic achievement.[10]

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[10]Bernard Borislow, "Self Evaluation and Academic Achievement," Journal of Counseling Psychology, 9(3), 1962, 246-254.

Sample:--One hundred and ninety-seven freshmen in the College of Arts and Sciences at the University of Pennsylvania were the subjects in the study. They were divided into groups of achievers (N:139) and under-achievers (N:47) by a regression analysis of the grade point averages (GPA) and total scores of the Scholastic Aptitude Test (SAT) of the entire freshman class (N:361). The under-achievers were defined as those students whose attained GPA fell one half a standard error of estimate below the GPA predicted by the regression formula. The achievers were all other students who completed questionnaires used in the study. The sample was further divided into groups of "strivers" and "non-strivers" according to their indication on a questionnaire that they did or did not hold academic achievement as a prime goal. Thus, the groups consisted of achievers-strivers (N:84) and non-strivers (N:55), under-achievers strivers (N:21) and non-strivers (N:26).

Design:--The students were given a personal history questionnaire and a Student Behavior Description upon admission to the college. The Student Behavior Description was given a second time just after the beginning of the semester. The Student Behavior Description consists of four adjective scales (self, student self, ideal self, and ideal student). The experimental sample was studied to determine its similarity to the freshman class on the variables of SAT and GPA by chi square analysis. Differences within the sample were analyzed by the Mann-Whitney U test.

Results:--Under-achievers could not be distinguished from achievers on the basis of general self-evaluation regardless of an intention to strive for scholastic achievement as a prime goal prior to or subsequent to their first semester in college. Students who under-achieve had a poorer conception of themselves as students than did achievers subsequent to their academic performance. When scholastic achievement was a prime goal, and the student who had a good self-concept as a student was successful, his general self-concept as a student was successful, his general self-concept became more favorable. This was not true when achievement was not a prime goal. The results supported the usefulness of a more specific self-evaluation theory.

Critical Analysis:--Borislow's study was unique and valuable because it investigated concomitantly two important variables related to achievement: aspiration and self-concept. Moreover, it included an inquiry into the variables both before the students began their experiences in college and after they had had some experiences. The design produced useful information by this method. Unfortunately, data concerning the reliability of the variables was lacking in Borislow's report. It would have been desirable to separate the sexes and to separate the over-achievers from the achievers.

Erb

Erb studied the relationship between a measure of conformity and college achievement.[11]

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[11] E. D. Erb, "Conformity and Achievement in College," Personnel and Guidance Journal, 39 (1961), pp. 361-366.

Sample:--The subjects of the study were 50 male and 50 female students in a freshman class at East Texas State College.

Design:--The author administered a Q-sort on "self as you are" and "self as you would like to be." The Q-sort instrument had been previously developed to study conformity and yielded scores calculated on the basis of communality of placement of cards in the end boxes of six possible boxes. The degrees of conformity were calculated separately for the male and female sample. From the sample, 20 high conforming and 20 low conforming students of each sex were selected. Differences between the conforming and non-conforming students were studied by t-tests and analysis of variance in regard to their grade point averages (GPA) of first semester grades and their scores on the School and College Ability Test (SCAT).

Results:--Mean differences on the SCAT between the high- and low-conforming students were found to be statistically insignificant. The higher conforming females were found to be more successful academically than the low conforming females (significant at the .05 level of confidence). The female group as a whole was found to be more conforming than the male. No differences were found in the male sample in regard to GPA.

Critical Analysis:--The hypotheses tested in Erb's study were directed toward important questions about achievement. The design was simple and appropriate. On the other hand, whether the measure used in the study actually measured conformity or whether it measured some other

personality variable (e.g., "adjustment") was uncertain. The instrument needed further study of its validity. The study reported reliability estimates on none of the measures. The sample was inadequately described.

Jourard

Jourard investigated the relationship between "self-disclosure to parents and peers" and academic success in a school of nursing.[12] Self-disclosure refers to revealing information about the self.

Sample:--Forty-seven female sophomores in the school of nursing at the University of Florida were given the Self-Disclosure Questionnaire. Attrition reduced the sample used in the study to 23 students.

Design:--Jourard constructed the 25 item questionnaire on the theory that emotionally secure individuals hold themselves in high esteem and are not defensive. They are able to reveal information about themselves without fear of criticism. The author postulated that this characteristic is measurable on the true-false item Self-Disclosure Questionnaire. The questionnaire scores (to Mother, Father, Male Friend, Female Friends and Total) of the subjects were correlated by the product moment method to their grade point averages (GPA) based on grades during the four year course of study. Four kinds of GPA were used in the correlations analyses: Junior and senior nursing courses, all nursing courses, all non-nursing courses, and all courses.

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[12] S. M. Jourard, "Self-Disclosure Scores and Grades in Nursing College," Journal of Applied Psychology, 45 (1961), pp. 244-247.

Results:--Correlations significant at the .05 level were found between all the GPA for nursing courses and disclosure to Mother (.75), Female Friend (.59), and total disclosure scores (.78). The GPA for all courses were correlated with disclosure to Mother (.70), Female Friend (.53), and total disclosure scores (.68) (all significant at .05 level). Disclosure to Father was correlated to grades in all nursing courses (.46) and nursing courses in the junior year and senior year (.44). Disclosure to Male Friend was not significantly correlated with any GPA.

Critical Analysis:--The hypothesis and instrument represented original contributions. However, the questionnaire upon which the author based his study was limited in validation information. No reliability estimates were reported by the author on any of the variables used in the study although he stated that the questionnaire had been studied for reliability and had concurrent validity.

Need-System Studies

The third group of studies include those directed toward the investigation of need systems (particularly by the use of the Edwards Personal Preference Schedule) and of n-Achievement factors.

Bachman

Bachman investigated the relationship between scores on the n-Achievement scale of the Edwards Personal Preference Schedule and academic achievement.[13]

[13] J. S. Bachman, "Prediction of Academic Achievement Using the Edwards Need Achievement Scale," Journal of Applied Psychology, 48 (1964), pp. 16-19.

Sample:--Two samples, each consisting of subjects selected from an introductory psychology class at the University of Pennsylvania, were the validation and cross-validation groups. The subjects were all sophomore males who participated in a special program of testing. The first sample (N:37) was in one section and the second sample (N:24) was in another section of the class.

Design:--Two criterion of academic success were used: freshman year grade point averages (GPA) and the total points earned on the final examination in the psychology class. The Scholastic Aptitude Test (SAT) total score was used as the aptitude measure. Two scores for each student were computed on the relationship between his SAT score (dependent) and his GPA and his psychology test score (independent variables). A regression equation yielded his predicted GPA and predicted psychology score which were converted into positive or negative standard (z) scores. Each student was assigned two scores representing his obtained GPA and psychology score minus his predicted GPA and psychology score. Product moment correlations were computed between all measures. Multiple correlations were conducted combining SAT and n-Achievement scores.

Results:--The n-Achievement scale correlation with GPA was not significant (.05 set as minimal level of confidence). No increase in predictive value of the SAT was found by multiple correlation. Differences were found between the two sections of psychology. The author concluded that there was no evidence of predictive validity in the use of the Edwards n-Achievement scale.

Critical Analysis:--Bachman did not make clear the nature of the sample selection procedure. He wrote that the subjects were all sophomore males who "participated in a special program of testing" but did not explicate the way this participation occured (e.g., by volunteering). The sample itself was very small and its size limited the value of the findings. There was no evidence that Edward's recommendations in regard to the Consistency scale were followed in the study.[14] Moreover, the report provided no data concerning the reliability of the measures used either in the sample selection process or in the correlational study itself.

Demas and Spolyar

Demas and Spolyar used the Edward Personal Preference Schedule (EPPS) to study differences between over-and under-achievement among college students.[15]

Sample:--The sample consisted of 245 male and female incoming freshmen students who completed two full-time semesters at Long Beach State College in California.

Design:--All subjects were administered the EPPS and the School and College Ability Test (SCAT) upon admission to college. The sample was divided into four groups on the basis of their scores on the SCAT and their

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[14]The manual advises against the use of test results which have Consistency scores of less then nine. See A. L. Edwards, Edwards Personal Preference Schedule Manual (New York: Psychological Corporation, 1959), p. 16.

[15]G. D. Demas and L. J. Spolyar, "Academic Achievement of College Freshmen in Relation to the Edwards Personal Preference Schedule," Educational and Psychological Measurement, 21 (1961), pp. 473-479.

grade point averages (GPA) for two semesters. The GPA of 2.47 (A = 4 points), apparently the mean GPA for the freshman class, was used to separate those students who scored above the 90th percentile on the SCAT. Those students whose GPA was above 2.45 were classified as achievers (N=51) while those students whose GPA was below 2.45 were classified as under-achievers (N=76) among the high ability group. A sample of students whose scores on the SCAT were below the 63rd percentile were divided into two groups. Students whose GPA were above 2.47 were classified as over-achievers (N=42) while those whose GPA was below 2.47 were classified as non-achievers (N=72). The high ability achievers were compared with the high ability under-achievers and the middle- or low-ability over-achievers were compared to the middle- or low-ability non-achievers. T-tests of the differences between the means of the two pairs of groups on the 15 variables of the EPPS were computed. The level of confidence was set at .05.

Results:--No significance differences between the means of the two pairs of groups were found.

Critical Analysis:--The study posited no rationale for the choice of instruments and presented no research hypothesis. There was no evidence that the Consistency score of the EPPS was used to eliminate unreliable responses as is recommended by the Edwards manual.[16] The authors

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[16]A. L. Edwards, Edwards Personal Preference Schedule Manual (New York: Psychological Corporation, 1959), p. 16.

provided no data on the reliability of the SCAT, GPA, or EPPS. There was no information indicating the correlation between the SCAT and the GPA. The failure to separate the sexes in the analysis also reduced the value of the findings. Finally, to characterize some of the students in the sample as "achievers" or "under-achievers" on the basis of splitting the total sample into four sections was questionable. Undoubtedly, some of the subjects were achieving as expected when the standard error of estimate of the regression relationship between the aptitude and achievement variables is taken into account.

Hurley

Hurley studied the relationship between "achievement pressure" and grades in a psychology class.[17] Achievement pressure was defined as the effect of internalized parental domination which manifests itself as a pressure to achieve academically.

Sample:--The subjects consisted of three groups (Ns=60, 38, 41) of students taking classes in psychology at Michigan State University. All students had taken either the College Qualification Test (CQT) or the American Council on Education Psychological Examination (ACE).

Design:--Twenty-seven statements designed to measure achievement pressure were interspersed among 178 statements on child rearing practices. The subjects were required to mark each item on one of five alternatives

[17] J. R. Hurley, "Achievement Pressure: An Attitudinal Correlate of College Course Grades," Psychological Review, 10 (1962), pp. 695-702.

which ranged from strongly disagree to strongly agree. The responses were scored on a three point scale with the low score indicating high achievement pressure. The instrument's internal reliability was tested by the odd-even method with a sample of 43 subjects. Product moment correlation coefficients were calculated between achievement pressure scores and grades earned in the psychology courses and the aptitude measures.

Results:--The achievement pressure scale correlated negatively with grades in the psychology classes (-.44 and -.40, significant at the .01 level and -.32, significant at the .05 level). Low non-significant negative correlations were reported between achievement pressure scores and the aptitude measures (-.10 to 0.15). Aptitude correlated positively at the .01 level with two classes but was not significant with another class (.05 set as the limit). An internal consistency reliability coefficient of .86 was reported.

Critical Analysis:--The investigator's method of presenting the scale items imbedded in a test of information probably reduced the amount of distortion due to faking or response set. As the author of the study admitted, it was unclear that the achievement pressure was actually related to parental pressures for achievement. The report was lacking in description of both the sample and the nature of the courses from which the samples were drawn. The failure to separate the sexes in the analysis limited the value of the findings. Moreover, the practice of grouping together scores from the CQT and the ACE as aptitude measures was open to criticism.

Lang, Sferra, and Seymour

Lang, Sferra, and Seymour studied the use of the Edwards Personal Preference Schedule (EPPS) to predict academic achievement.[18]

Sample:--The sample consisted of 38 male and 49 female freshmen entering Farleigh Dickinson University in the fall of 1959. The students were a cross-section of four colleges: Liberal Arts, Science and Engineering, Business Administration, and Education. The sample included only those students whose Consistency score on the EPPS was at or above the level recommended by the manual and for whom a rating of "academic achievement with respect to estimated intellectual capacity" by five faculty members was available.

Design:--The EPPS was given to orientation classes. Faculty ratings of students in the sample were collected at the end of the academic year. The ratings were on a five point scale and for each subject a median rating was determined. The lower the rating, the greater the degree of underachievement. Product moment correlations were computed between the ratings and scores obtained on the 15 EPPS variables.

Results:--A table of correlation coefficients was presented. For female freshmen, n-Achievement and n-Dominance correlated positively (.447 and .374, significant at .01 level) and n-Nurturance correlated negatively (-.410, significant at .01 level) with achievement. For men,

[18] G. Lang, A. Sferra, and M. Seymour, "Psychological Needs of College Freshmen and Their Academic Achievement," Personnel and Guidance Journal, 41 (1962), pp. 359-360.

two scales achieved the .05 level: n-Order (.28) and n-Dominance (-.325).

Critical Analysis:--The lack of a rater reliability estimates greatly reduced the value of the report. The study was also lacking in theoretical basis for the selection of the predictor measure and achievement criterion. Contrasting correlations with grade point averages would have enhanced the study.

Special, Limited Theory Studies

The three studies described here were built around "small theories" - theories that are concerned with relatively limited (though perhaps important) aspects of personality and their relationship with college achievement.

Brown and Abeles

Brown and Abeles presented a study describing the development and use of a measure of "facade orientation" and its relationship to grade point averages.[19]

Sample:--Three samples of freshmen students (N:103, 301, 190) were used successively in three stages of developing the facade orientation instruments. The final validation and cross-validation samples consisted of 199 freshmen men and 213 freshmen women at the Texas State Teachers College and 129 freshmen men and 141 freshmen women at the University of Texas. The samples were separated by sex in the validation and cross-validation studies.

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[19] W. F. Brown and N. Abeles, "Facade Orientation and Academic Achievement," Personnel and Guidance Journal, 39 (1960), pp. 283-286.

Design:--Responding to the suggestion of Tiebout[20] that over- and under-achieving students differ in their orientation toward presenting a facade or faking on personality inventories, the authors constructed two scales for the detection of facade. The two keys measured facade by scoring the number of false definitions to false or synthesized words. The process of developing the facade orientation instruments involved presenting a number of synthesized words randomly mixed in a list of real words to groups of students. The students were requested to check the real words. False words that were checked by less than 10 percent or more than 20 percent of the samples were eliminated and new false words were substituted in the list. The process resulted in the 100 item test (the Word Recognition Check List) that includes three keys: (1) a list of 60 true words that measures knowledge of synonyms, the Synonym Recognition Test, (2) a list of 20 false synonyms, the Vocabulary Knowledge Differential, and (3) a list of 20 false words to be checked when the subject recognizes them as "true" words (the False Word Count). The two facade tests correlated .80 with one another and were thought to measure the same factor. The test of knowledge of synonyms was considered a measure of verbal ability.

The validation study of the final instruments involved product moment correlations of the instruments with grade point averages (GPA) for one

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[20]H. M. Tiebout, "The Misnamed Lazy Student," Journal of Educational Research, 24 (1943), pp. 113-129.

semester of the subjects. A table of coefficients of correlation was presented in the report.

Results:--All coefficients were negative and significant at the .01 level of confidence. The False Word Count scale correlations with GPA were -.33 and -.31 with men and -.40 and -.29 with women. The Vocabulary Knowledge Differential scale correlations with GPA were -.31 and -.28 with men and -.37 and -.24 with women. The facade measures correlated moderately with the verbal measure. It was concluded that high scholarship students are conservative and low scholarship students liberal in their use of facade.

Critical Analysis:--The instrument represented an original contribution in the area of personality measurement. As the authors stated however, the meaning of "facade" is uncertain. The instrument developed and employed in the study needed further validation study. Moreover, there was no data to indicate its reliability.

Drake

Drake investigated the ability of the MMPI scales to predict college underachievement.[21]

Sample:--The validation sample consisted of 1004 entering male freshmen at the University of Wisconsin who scored above the fiftieth percentile of the total entering male freshman class on the American Council

[21] L. E. Drake, "MMPI Patterns Predictive of Underachievement," Journal of Counseling Psychology, 9 (1962), pp. 164-167.

on Education Psychological Examination for Freshmen (ACE). The sample was divided into three groups on the basis of their first semester grade point averages (GPA): (1) 0.00 to 1.99, (2) 2.00 to 2.49, (3) 3.50 to 4.00. A cross-validation sample of 1834 males in the entering freshman class of 1958-1959 was also drawn. The latter sample was tested by the College Qualification Test (CQT) and selected on the basis of being above the fiftieth percentile.

Design:--All subjects were administered the MMPI upon admission to the university. Frequenty tables for all possible combinations of the three MMPI scales that coded highest with each of the two scales that coded lowest were distributed into categories by GPA. These distributions were compared with the base rate or total. Differences were tested by chi square and only those that yielded difference at the .01 level of significance in the direction of lower achievement were studied further. The distributions were then compared with those of the cross-validation group.

Results:--The two scales that differentiated best and which survived cross-validation were 4 (Pd) and 9 (Ma) either alone or in combinations, especially when scale 5 (Mf) was eliminated from the distribution when 5 scored high. It was concluded that scale 5 appears to act as a suppressor variable.

Critical Analysis:--The sample in Drake's study was limited to students in the upper level of ability. The report was grossly lacking in information about the sample, the statistical relationship between the measures

used in selecting the sample, the reliability of the measures, and the distribution of the sample into the categories of achievement.

Kuethe

Kuethe investigated the effects of stress tolerance and acquiescence response set on academic performance.[22]

Sample:--The subjects consisted of 351 male freshmen students at Johns Hopkins University. The sample was divided by type of academic major: (1) 107 in engineering, (2) 83 in biological sciences, (3) 66 in physical sciences, and (4) 77 in social sciences and humanities.

Design:--All subjects were administered the Minnesota Multiphasic Personality Inventory (MMPI) and two measures of acquiescence response set (one developed by Gass and one by Kuethe). The Psychasthenia (Pt) scale (as a measure of stress tolerance) of the MMPI was used in the study. The subjects' scores on the Scholastic Aptitude Test (SAT) and their decile standing at graduation from high school were also used in the analyses. Success in college was measured by the GPA for one academic year. Intercorrelations of the measures of each group and the total sample were reported. The confidence limit was set at the .05 level.

Results:--Correlations between Pt scores and GPA were consistently negative and non-significant. This was also true for the correlations

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[22] J. L. Kuethe, Personality Traits Related to "Stress Tolerance" as Determinants of Academic Achievement, Final Report of Cooperative Research Project No. 1218 (Baltimore, Maryland: Johns Hopkins University), U. S. Department of Health Education and Welfare; November 1961.

between the measures of acquiescence response set and GPA. Non-significant correlations between Pt and acquiescence response set were low positive. Decile standing in high school and SAT scores were the best predictors of college GPA.

Critical Analysis:--The use of the MMPI, particularly with normal populations, is of dubious value. The validity of the Pt scale in particular has been questioned by several authors.[23] The report by Kuethe was also lacking in data concerning the validity and reliability of the acquiescence response set scales. The author did not indicate that subjects producing low scores on the validity scales of the MMPI were eliminated from the sample.

A Predictive Study Lacking Theory

The following study by Anderson (1964) is unique in that a motivational instrument was constructed on an entirely empirical basis.

Anderson

Anderson used a purely empirical approach to investigate the possibility of constructing an instrument that measures academic achievement motivation with a college population.[24]

Sample:--Four samples consisting of all freshman students who completed one academic year at Wisconsin State College from 1957 through

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[23] L. J. Cronbach, Essentials of Psychological Testing, Second Edition (New York: Harper and Brothers, 1949), p. 478.

[24] Philip S. Anderson, "A Test of Academic Motivation," Journal of Educational Research, 1964, 57 (5), 274-275.

1960 were selected to construct the motivation instrument. From the 1960-1961 freshman class, 248 men and 132 women were employed to study the correlation of the instrument with GPA of one academic year. A sub-sample of 78 freshmen were used in a reliability study of the instrument in 1960. The samples were divided by sex in the correlation analysis.

Design:--A regression equation technique was used to identify over- and under-achieving freshmen as those students whose GPA was more than one standard error of estimate from that predicted by their total scores on the College qualification Test (CQT). Each successive sample was administered an experimental academic achievement motivation instrument consisting of items which were ambiguous and represented no hypothesis other than some might discriminate between over- and under-achievers (e.g., "I often feel unimportant," "Normal school life is sometimes quite dull."). Item discrimination between discrepant achievers was analyzed by the chi square method with the level necessary for significance set at .05. All significant items were retained and readministered to the following sample with new items added for validation testing. This process eventuated in a 47 item instrument called the Test of Academic Aspiration. The validity of the instrument was tested by correlating Test of Academic Aspiration scores of the sample with their GPA. Reliability estimates were made by a test-retest method separated by a three month interval.

Results:--The test-retest reliability of the Test of Academic Aspiration was estimated at .768. The correlation between the Test of Academic

Aspiration and GPA was equal to that between the CQT and GPA (.54 for the total sample). The coefficient of correlation between the motivation instrument and the CQT was .196 while the multiple correlation between the CQT + Test of Academic Aspiration and GPA was .70.

Critical Analysis:--The research design employed was quite defensible and represented a large expenditure of time and resources. However, the author provided no data on the regression analyses used in selecting the over- and under-achievers and no data on the chi square analysis to validate the Test of Academic Aspiration items other than the number of items included in each test and the number of items validated. The report was outstanding in its complete disregard of a theoretical basis for the inclusion of items in the motivational instrument. No estimates of reliability of the aptitude and achievement measures (CQT and GPA) were provided by the author. Data concerning the size of the samples of discrepant achievers was lacking. The last testing of item validity (in 1960) did not include a cross-validation group.

Discussion of the Studies

Several of the studies presented evidence to indicate that personality variables were related to achievement in college. The findings were, however, contradictory in some instances and lacking in cohesiveness in others.

One common limitation of the studies is in regard to a comprehensive theory of academic achievement motivation. Other inadequacies of the

studies include (1) the inclusion of inadequately delineated and non-randomized samples, and (2) lack of validity and reliability data on the instruments used in selecting the samples or in studying the non-intellective variables.

The impression is gained by several of the studies that the design and instrumentation was dictated by ease and availability of the data and facilities for investigation. The personality measures used have not been developed for the purpose of measuring academic achievement in college. The present study is designed to validate an instrument for this purpose.

Summary

A review of the literature reporting studies investigating non-intellective variables as they relate to academic achievement has been presented. The studies were presented according to the kinds of theoretical orientation (or lack of orientation).

The findings are diverse and generally inconsistent. These difficulties are seen here as being in part the result of a lack of appropriate academic motivation instrumentation and a lack of knowledge about the phenomena under consideration.

CHAPTER III

DESIGN AND METHODOLOGY

The design of this research was directed towards the study of relationships between three variables: aptitude scores, achievement measures, and responses on an experimental instrument of academic achievement motivation. The design was constructed to select over- and under-achieving male college students and to ascertain the extent to which items of the motivation instrument discriminate between the two contrasting groups.

The aptitude measures and the achievement criterion (grade point averages) were used to identify the over- and under-achieving students among a sample of college freshmen. The process of identifying the discrepant achievers involved Farquhar's Two Stage Regression Technique.[1] The selection of discrepant achievers was accomplished in order to test the validity of items of the motivation instrument. The instrument had been developed by Farquhar et al. to investigate academic achievement motivation among high school students and was found to have predictive validity.[2] The present study replicates Farquhar's research with a higher educational population and attempts to validate items from the experimental

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[1] W. W. Farquhar, Motivation Factors Related to Academic Achievement: Final Report of Cooperative Research Project No. 846, College of Education (East Lansing, Michigan: Michigan State University, 1963), pp. 25 ff.

[2] Ibid., p. 94.

form of the instrument with a sample of male college freshmen.

Two Stage Regression Technique

The method of selecting over- and under-achieving students used in the present study was developed by Farquhar in order to meet certain criteria of research. The following citation clarifies the purposes, techniques, and advantages of the regression model replicated in the present study.

> The purposes of the selection technique was to identify individuals for whom there was a high probability of correct classification as an over- or under-achiever. Therefore more concern was given to the reduction of the type one error (rejecting an individual as an over- or under-achiever when he would have been selected) than to type two error (classifying an individual as an over- or under-achiever when he should have been rejected). To meet the imposed limitation, a regression technique was developed which involved two stages.
>
> Stage I: A regression line was constructed which represented the regression of X on Y, and Y on X of two aptitude predictors; ....(This line is easily located by determining the point of intersection of the means and standard deviation of the two aptitude predictors.) The line represents the regression between the two variables if the correlation were +1.00. Two lines were drawn parallel to and above the regression line which were a distance away equivalent to the average of the standard error of estimate of the two aptitude predictors. Only those individuals who fell within the limits around the regression line were included in the study. (Stage I is graphically presented in Figure 2.1.)
>
> The traditional measurement model which assumes an individual's "true score" to be a function of his test score plus random error needs to be expanded if the first stage of the Two Stage Regression Model selection effects are to be incorporated. The use of Stage I is an attempt to separate error due to instability over time from the random

residual .... Therefore, an individual's true score is postulated as a function of his test score, plus error due to stability unreliability and random error. Stage I is a rather crude device for controlling stability unreliability to reduce a proportion of those individuals who receive randomly high or low scores which are not commensurate with their true aptitude.

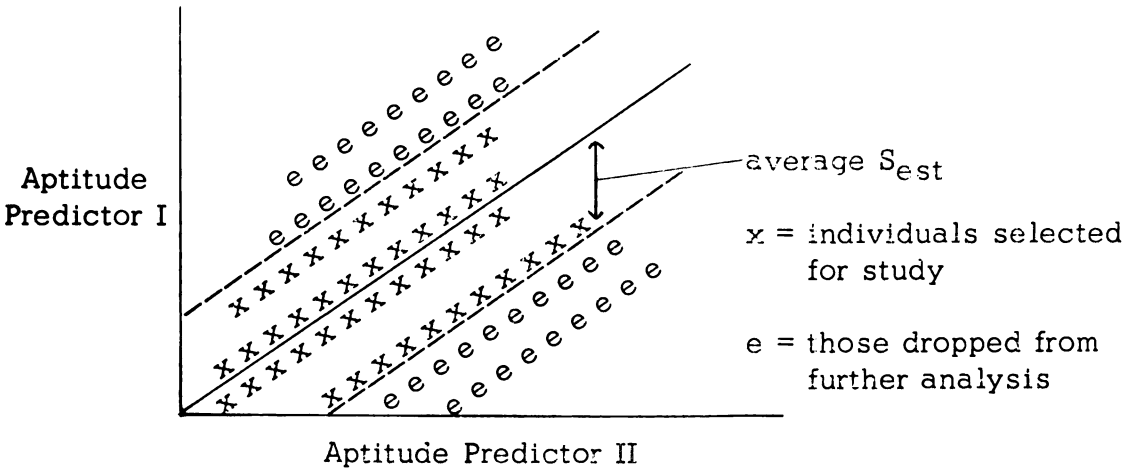

Figure 2.1

Graphic Representation of Individuals Who Have Increased Probability of Stable Estimated Aptitude

A further point concerns the choice of aptitude measures. The first stage would have been more defensible if the same aptitude measure had been used twice rather than using different ones as was done in this study ....

Stage II: The aptitude predictor ... which correlated highest with the achievement criterion was used to build a regression line predicting achievement. The standard error of estimate was used to establish limits. Underachievers were defined as those individuals whose actual grade point averages fell at least one standard error of estimate below the regression line prediction of achievement. Similarly, over-achievers were by definition those individuals whose grade point averages fell one standard error of estimate above the regression line. (Stage II is graphically represented in Figure 2.2)

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[3]W. W. Farquhar, Motivation Factors Related to Academic Achievement: Final Report of Cooperative Research Project No. 846, College of Education

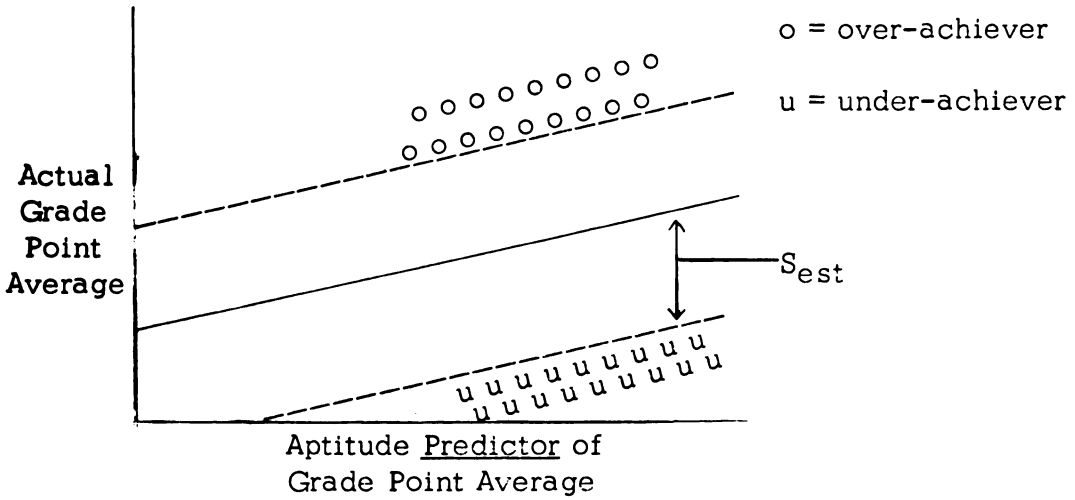

Figure 2.2

Graphic Representation of Method of Selecting Over- and Under-Achievers

The present study, in adopting Farquhar's Two Stage Regression Technique, used the College Qualification Test (CQT) Total score and the Michigan State University Reading Test (MSU-R) score in the first stage to eliminate subjects whose scores were unstable. The CQT and grade point averages (GPA) were employed in the second stage to identify over- and under-achievers among the sample of male college freshmen.

Population and Sample

The population consisted of 2367 first quarter male freshmen at Michigan State University in the Fall Term, 1961.

The sample consisted of all entering male freshmen who attended the

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(East Lansing, Michigan: Michigan State University, 1963), pp. 25-28; W. W. Farquhar and D. A. Payne, "A Classification and Comparison of Techniques Used in Selecting Under- and Over-achievers," Personnel and Guidance Journal, 1964, 42, 874-884.

first five Counseling Clinics during the summer of 1961. The freshmen attending the Clinics were used due to their availability for testing purposes under the auspices of the Office of Evaluation Services of Michigan State University. The following three criteria were set for inclusion of individuals in the study: (1) completion of the experimental motivational instrument; (2) completion of the two aptitude instruments; (3) completion of one school year (three quarter terms) at Michigan State University.

Sample Size Attained

Of the 962 male freshmen subjects in the original sample, three did not complete the motivational instrument and 103 failed to complete a full school year, leaving 856.

The College Qualification Test mean for the sample was 141.42 (s.d. 22.04). The Michigan State University Reading Test mean for the sample was 29.83 (s.d. 5.55). A comparison of the means and standard deviations of the two aptitude measures of the sample with the means and standard deviations for the total freshman population indicated that the sample was representative of the general male freshman population (CQT mean: 142.40, s.d. 22.08; MSU-R mean: 29.58, s.d. 5.70).[4]

By using Farquhar's Two-Stage Regression Technique of selecting subgroups of over- and under-achieving students, the sample was further reduced. Thirty-three subjects were eliminated by the first stage procedure,

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[4]Arvo Juola, Office of Evaluation Services, Michigan State University, personal communication.

leaving 823 subjects for further analysis. The second stage analysis yielded 115 subjects identified as "over-achievers" and 106 subjects identified as "under-achievers." The sub-samples were then bifurcated by the use of a table of random numbers into sub-groups for validation and cross-validation purposes. The validation group consisted of 57 "over-achievers" and 53 "under-achievers." (See Table 2.)

Table 2

Sample Size of Over- and Under-Achievers

Sample	Validation	Cross Validation
Over-Achievers	57	58
Under-Achievers	53	53

Data Collection and Processing Methods

The three instruments (CQT, MSU-Reading, and GSCI) were administered to all subjects during their attendance at the Counseling Clinics for Freshmen. While the GSCI was not presented as a timed test, the subjects were requested to complete the inventory within a 75 minute period due to a limitation imposed by the Office of Evaluation Services.

Administration of the tests and the inventory was done in large groups by proctors. Subjects were instructed to read the instructions on the first page of the inventory and to raise their hands if they had any questions. Responses were entered on IBM answer sheets for machine scoring.

The scores for the two aptitude instruments were obtained for each

subject from the Counseling Center. The accumulated grade point averages were obtained from the Office of the Registrar at the end of the school year. The scores for the aptitude measures and the grade point averages were punched on IBM cards for each subject as a preliminary step in analyzing the data. The computations necessary to select the over- and under-achieving students were accomplished by the least squares method of regression analysis with the help of MISTIC, a presently dismantled electronic computer formerly used on the campus of Michigan State University.

Aptitude Measures

For the purpose of the study, two scores were used as measures of aptitude: the Total Score of the College Qualification Test (CQT) and the score yielded by the use of the Michigan State University Reading Test. Both of these tests were administered as part of a battery of aptitude tests to freshmen at Michigan State University.

The College Qualification Test

The College Qualification Test, published by the Psychological Corporation, is a multi-purpose battery designed to serve colleges in their admission, placement, and guidance procedures. The CQT includes three sub-tests:

1. Verbal: a 15 minute test containing 50 questions consisting of 50 synonyms and 25 antonym questions.
2. Numerical: a 35 minute test containing 50 questions drawing on arithmetic, algebra, and geometry.
3. Information: a 30 minute test composed of 75 questions from the fields of science (physics, chemistry, biology) and social studies (history, government, economics, geography).

Scores on the three sub-tests are summed to yield the CQT Total Score.

The Michigan State University Reading Test

The Michigan State University Reading Test (MSU-R) was used as the second aptitude measure. It is a 50 minute (42 item) test of reading comprehension. The score indicates the student's ability to answer questions based on reading passages representative of several academic areas at M.S.U. The score is interpreted as a measure of reading skill and of factors involved in critical thought.

Grade Point Average (GPA)

Achievement in college was indicated by the accumulative grade point average of each subject earned on the basis of grades for all courses taken during the first school year (three quarter terms). Grade points at Michigan State University are computed on the following scale: A = 4 points, B = 3 points, C = 2 points, D = 1 point, F = 0 points. The grade point average was calculated by dividing the total points earned by the total course credits carried during the terms the student was enrolled.

Construction of an Objective Measure of Motivation

On the basis of the logical extension of McClelland's theory, Farquhar and associates constructed a 200 item dichotomized forced-choice inventory, the Generalized Situational Choice Inventory (GSCI). One alternative of each item was related to the high academic motivation pole and the other to the low academic motivation pole. Students were instructed to choose the alternative which they would most prefer. Responses were

scored either zero or one with the high score in the direction of high motivation.

In the Farquhar study, 45 male and 30 female items remained after cross-validation. Reliability estimates were obtained by Hoyt's analysis of variance technique. Reliability for the males ranged from .80 to .84 and for the females from .77 to .90. The correlation of the GSCI with grade point criterion was .50 for males and .32 for females (significant at .01 level).

Because McClelland's theory was found to be most valid for males and because the GSCI was found by Farquhar at the high school level to be most predictive of grade point averages with a male sample, it was decided to confine the present research to male college population.

Item Validity Analysis

Each item of the experimental instrument (GSCI) was analyzed by the chi square model. Responses of the over- and under-achievers to each of the two alternatives were entered in a two-by-two contingency table. Alpha was set at the .20 level for item validation and all statistically significant items were cross-validated at the .10 level (two-tailed tests). The more stringent cross-validation significance level was used to minimize rejection of the Null Hypothesis when it should have been accepted (Type I error).

Null Hypothesis

In the present study the relationships of the items in the GSCI to the

GPA and the two measures of aptitude, the CQT and the MSU-R, are stated in the following:

Null Hypothesis: There is no difference between college over- and under-achievers in frequency of response to one of two item alternatives of the Generalized Situational Choice Inventory.

Alternate Hypothesis: There is a difference with both over- and under-achievers responding in direction prescribed by the polar dimension of the academic motivation theory.

Factor Analysis Hypothesis

Because the research design did not consist of testing the factor analysis hypothesis against an error model, it was not reformulated in Null form.

Hypothesis: Factor analysis of the items screened through tests of the Alternative Hypothesis will yield an interpretable structure which will support the polar dimension postulates of academic motivation.

Summary

Farquhar and associates have demonstrated the feasibility of constructing and validating an objective scale of academic achievement motivation (the GSCI) on a sample of eleventh grade high school students. In the present study an attempt is made to investigate the applicability of the experimental instrument upon which the scale was based to a group of male college freshmen.

Using a sample of college freshmen, groups of over- and under-achieving students were identified by Farquhar's Two Stage Regression

Technique. Their responses on the GSCI were analyzed by chi square analysis. The research design of the study called for calculating reliability estimates of the validated items and for factor analysis of intercorrelations between the items.

CHAPTER IV

ANALYSIS OF DATA

The data was subjected to three kinds of analyses: (1) calculation of reliability estimates of the achievement criterion, (2) regression analysis of the aptitude and achievement measures, and (3) item analysis of the motivation instrument.

Reliability Estimates

The reliability of the three measures employed in the Two Stage Regression Technique to identify the under- and over-achieving students was explored. The data necessary to compute reliability estimates with the aptitude measures, the CQT and the MSU-R, was not available. However, the College Qualification Test manual provides estimates indicating satisfactory reliability. The reported estimates for total scores with males were .97 (odd-even) and .91 (test-retest).[1] The Office of Evaluation Services at Michigan State University reported a reliability coefficient for the M.S.U. Reading Test of .87 for males.[2]

To estimate the reliability of the grade point criterion variable, random samples of 50 over-achievers, 50 under-achievers, and 50 "normals"

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[1] Manual for the College Qualification Test, Revised 1961 (New York: Psychological Corporation, 1961), p. 53.

[2] Arvo Juola, Office of Evaluation Services, Michigan State University, personal communication.

were selected from the total group. The cumulative GPAs for the academic year of the subjects were correlated with their GPAs for the following fall quarter. This method yielded reliability estimates for the under-achievers of .704, for the over-achievers of .762, and for the normals of .786. The reliability estimate for the combined sample was .752. The coefficients are summarized in Table 3.

Table 3

Summary of Reliability Estimates for the Grade Point Averages

Samples		Coefficients
Under-achievers	50	.704
Over-achievers	50	.762
Random normals	50	.786
Combined sample	150	.752

The reliability estimates for the CQT and MSU-R were considered satisfactory. The reliability estimates for the GPA fell slightly below the minimum desired .80.

Regression Analysis Results

The first stage of the Two Stage Regression Technique consisted of calculation of regression analysis of the CQT and the MSU-R. The two aptitude measures correlated .685 (significant at the .01 level). The standard error of estimate was 16.28 when the MSU-R was the independent variable and 4.10 when the CQT was the independent variable. Thirty-three subjects were eliminated because their scores fell above or below

the average standard error of estimate of the two regression analyses.

The scores of the two aptitude measures were then independently analyzed by regression analysis with the GPA. The CQT correlated .46 while the MSU-R correlated .44 with the grade point criterion (both coefficients significant at the .01 level). Because the CQT correlated slightly higher with the GPA, it was chosen as the predictor and employed to select samples of under- and over-achievers. One standard error of estimate was used to establish limits above and below the regression line calculated by the regression equation between the CQT scores and the GPA. Students whose scores were above one standard error of estimate were "over-achievers." Students whose scores fell more than one standard error of estimate below the regression line were defined as "under-achievers."

Item Analysis Results

The following Null and Directional Hypotheses were tested on the Generalized Situation Choice Inventory (GSCI):

Null Hypothesis: There is no difference between male college over- and under-achievers in frequency of response to one of two item alternatives of the GSCI.

Alternate Hypothesis: There is a difference with both male college over- and under-achievers responding in the direction prescribed by the polar dimension of the academic motivation theory.

The number of GSCI items identified at various chi square significance levels are tabulated in Table 4. Items in Table 4 were validated in the direction of the theory. (Response frequencies and chi square values are reproduced in Appendix A.)

Table 4

Number of Generalized Situational Choice Inventory Items for Various Chi Square Significance Levels (Validated in the Direction of the Theory)

Sample	Number of Items: Chi Square Significance Level .20	.10	.05	.01	Total Identified
Validation	9	5	5	2	21
Cross-Validation		2	2	1	5

Five GSCI items survived cross-validation in the direction of the theory. The items are: (Numbers) 13, 28, 52, 61 and 198.

Because few GSCI items were validated in the direction of the theory, additional computations were conducted. All items whose contingency table frequencies indicating significance in the direction opposite to the theory were analyzed by the chi square method. The number of these GSCI items predicting in the direction opposite to the theory are tabulated in Table 5.

Table 5

Number of Generalized Situational Choice Inventory Items for Various Chi Square Significance Levels (Predicting in the Direction Opposite to Theory)

Sample	Number of Items: Chi Square Significance Level .20	.10	.05	.01	Total Identified
Validation	8	10	5	6	28
Cross-Validation			2		2

Forty-five items yielded frequencies too small in the rows to be used in chi square analysis. Forty-three of the items were responded to by the validation group in the direction of the theory by choosing the high achievement alternative. Two of the items were responded to by the validation group in the direction opposite to the theory.

The null hypothesis of no difference between male college over- and under-achievers in frequency of response to one of two item alternatives of the GSCI was accepted with the exception of the five items validated in the direction of the theory. Two items predicted in the direction opposite to the theory. The GSCI appears to have little utility with a male college population.

Factor Analysis

Because of the lack of success in validating items from the GSCI, the plans to calculate reliability estimates for the GSCI and to factor analyze the item analysis results were abandoned.

Summary

The reliability of the grade point criterion was estimated by correlating the cumulative GPA for the academic year of random samples of over- and under-achievers and normals with their GPA for the following fall quarter. Reliability coefficients were .762 (over-achievers), .704 (under-achievers), .786 (random normals), and .752 (combined sample). The reliability estimates for the GPA were considered somewhat less than satisfactory. Reported reliability estimates for the aptitude measures were considered satisfactory.

A regression model was used to identify sub-groups of over- and under-achieving male students in the total sample. The use of Farquhar's Two Stage Regression Technique employing the College Qualification Test and the Michigan State University Reading Test as aptitude measures and the cumulative grade point average for one academic year as the achievement criterion identified 115 over-achieving and 106 under-achieving students. The aptitude measures correlated .68 with each other. The CQT correlated slightly higher than the MSU-R with GPA and was used in the second stage of the regression analysis to identify the discrepant achievers. The CQT correlated .46 with GPA.

The validity of items of the GSCI was tested by chi square analysis. Five items survived cross-validation in the direction of the theory. Two items subjected to cross-validation predicted in the direction opposite to the theory. The null hypothesis that there is no difference between male college over- and under-achievers in frequency of response to one of two item alternatives of the GSCI was accepted with the exception of the five items. The GSCI appears to have little utility with a male college population. Because of the lack of success in validating items from the GSCI, plans to estimate reliability coefficients for the validated GSCI items and to factor analyze intercorrelations between the items were abandoned.

CHAPTER V

SUMMARY, CONCLUSIONS AND IMPLICATIONS

The major problem of this study was to determine whether a theory-based, objective measure of academic achievement motivation could be validated with a sample of male first quarter college freshmen. The present study constituted a replication of the research conducted by Farquhar with a sample of eleventh grade high school students which resulted in the validation of items from a forced-choice inventory, the Generalized Situational Choice Inventory. Farquhar and associates had developed the motivational inventory by polarizing and modifying McClelland's theory of Need-achievement and by viewing the constructs as being related specifically to the academic setting. The design of the present study included plans to validate the items from the GSCI with a college population, to intercorrelate all items found to be significant, and to factor analyze the coefficients of correlation in order to arrive at an understanding of the psychological factors underlying the motivation instrument.

For the pusposes of the study, a sample was selected from the general population of first-quarter freshmen males at Michigan State University. A comparison of the sample means of the CQT and MSU-R with the means of the freshman male population provided evidence that the sample was similar in academic aptitude to the male freshman population of the University.

Two measures of academic aptitude, the CQT and the MSU-R, responses on an experimental form of the GSCI, and a measure of academic achievement (GPA for one academic year) were obtained for each student.

Due to the lack of availability of the necessary data, the CQT and MSU-R were not examined for reliability. The reported reliability of these instruments was considered satisfactory. Criterion reliability was estimated for random samples of statistically defined discrepant and normal achievers. The selection of achievers was by regression analysis of the students' CQT and GPA scores. The samples consisted of 50 over-, 50 under-achievers and 50 normal achievers. Reliability estimates were calculated by correlating their cumulative GPA for the academic year with their GPA for the following quarter. The results were slightly below the satisfactory level.

Using the Two Stage Regression Technique developed by Farquhar, statistically defined samples of over- and under-achieving students were identified by regression analyses of their scores on the CQT, MSU-R, and GPA. The criterion groups consisted of 115 over-achievers and 106 under-achievers which were randomly divided into sub-samples for validation and cross-validation purposes. Each item of the experimental instrument was analyzed by the chi square model. Responses of the over- and under-achievers to each of the two alternatives were entered in contingency tables. Alpha was set at the .20 level for item validation. Significant items were cross-validated at the .10 level in order to minimize rejection

of the Null Hypothesis when it should have been accepted (Type I error). Five items of the GSCI were found to be significant after cross-validation in the direction of the theory. Two items attained significance in the direction opposite to that originally hypothesized. The Null Hypothesis that there is no difference between over- and under-achievers in a male college freshman population in frequency of response to one of two item alternatives of the GSCI was accepted with the exception of the five items. Plans to factor analyze the expected item intercorrelations were abandoned.

Conclusions

On the basis of these findings, it is concluded that for the obtained sample the GSCI items do not discriminate between over- and under-achievers in a male college freshman population.

Discussion of the Results

The following discussion considers various factors that might account for the failure of the GSCI to discriminate more effectively between the samples of over- and under-achieving male college students. The discussion is presented under a series of propositions which could be tested. The discussion takes the form of considering the evidence to support or deny the proposition.

1.) The sample used in the present study was not representative of the male college freshman population.

All present evidence indicates that the sample used in the study was representative of the male freshman population. The mean scores and the

standard deviations of the scores of the aptitude measures, the CQT and the MSU-R, of the sample were almost identical with those of the male freshman population of the entering freshman class. Likewise, the correlation between the CQT and the MSU-R with the GPA for an academic year were quite similar. The correlation coefficients between the aptitude measures and the GPA used in the study were .44 (MSU-R) and .46 (CQT), while the correlations between the same variables reported by the Office of Evaluation Services were .44 (MSU-R) and .48 (CQT).[1]

2.) The aptitude measures, the CQT and the MSU-R, were lacking in reliability.

Because the data was not available, there were no estimates of reliability calculated with the aptitude measures in the study. The reliability estimates reported by the manual published with the CQT (odd-even estimates of .97 and .96 and test-retest estimates of .89 and .91)[2] are satisfactory. The reliability estimate provided by the Office of Evaluation Services (odd-even estimate of .87) was likewise satisfactory. Moreover, the use of the Two Stage Regression Technique also controlled stability unreliability to some extent. Thirty-three subjects whose aptitude scores fell above or below one standard error of estimate around the regression line between the two predictors were eliminated from the sample. This technique provided further confidence that the aptitude scores used in the study were reliable.

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[1] Arvo E. Juola, Office of Evaluation Services, Michigan State University, Personal communication.

[2] Manual for the College Qualification Test, Revised 1961 (New York: Psychological Corporation, 1961), p. 53.

3.) The aptitude measures were lacking in validity.

If the aptitude measures, the CQT total score and the MSU-R score, were lacking validity the samples of over- and under-achievers would have been incorrectly identified. The degree to which any aptitude measure is valid is, of course, problematical. The CQT was chosen by the Office of Evaluation Services as measures valuable for the prediction of academic success because it appeared to have a high degree of predictive validity in comparison to other similar measures.[3] The scores yielded by the administration of the CQT and the MSU-R were used in the present study because they were readily available for the sample and because they appeared to be appropriate for the purposes of the research.

One source of error is seen in the differential predictability of the CQT total score as contrasted to its part scores. Juola[4] found the predictive validities of the three CQT subscores to vary in prediction of grades for diverse curricular groups.

> In technical courses...differential weighting of subscores results in predictions which are markedly superior to those made on the basis of the total score of the CQT alone. The basis for this pattern is obviously attributable to the high degree of relationship between the N-score (Numerical Score) and grades in the technical courses. The "relatively technical" nature of the CQT-N score items seem to enhance

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[3] A. E. Juola, "The Predictive Validity of Five College-Level Academic Aptitude Tests at One Institution," Personnel and Guidance Journal, 38 (1960), pp. 637-641.

[4] A. E. Juola, "The Differential Validity of the College Qualification Tests for Diverse Curricular Groups," Personnel and Guidance Journal, 39 (1961), pp. 721-724.

> the predictive validity of the scale for technical academic areas. Not only is this quantitative subscore superior to the other subscores but it is also superior to the total score on the CQT in prediction of several of the technical grade criteria considered here.
>
> The arithmetic sum of subscore, as reflected in the total score of the CQT, seems to be as efficient in the prediction of the over-all grade point average of students largely in nontechnical curricula as optimal weighting of subscores as in multiple regression analysis.

The design of the present study did not involve determining the curricular programs of the various students used in the sample. The degree to which the kind of error suggested here in regard to the differential predictability of the aptitude measures is a matter of speculation.

4.) The achievement criterion, grade point averages, were lacking in validity.

Correlative to the question of aptitude measurement is that of the validity of grade point averages as achievement criterion. The question of the validity of GPA in research was recently reviewed by Chansky[5] who pointed out that course grades have several shortcomings and have no inherent stable meaning. Chansky argues that the assumption of normality of distribution of GPA is not permissable and that parametric statistics would be more defensible.

Locke,[6] in a factor analytic study of the scholastic performance of

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[5]N. M. Chansky, "A Note of the Grade Point Average in Research," Educational and Psychological Measurement, 24 (1964), pp. 95-99.

[6]E. A. Locke, "The Development of Criteria of Student Achievement," Educational and Psychological Measurement, 23 (1963), pp. 299-307.

academically superior students, concluded that there were two factors involved: (1) structured achievement which consisted of course grades and teacher ratings, and (2) self-initiated achievement, which consisted of the amount and quality of independent work accomplished. Locke concluded that his findings were similar to those of Holland. Holland, in an article on the prediction of college grades from personality and aptitude variables,[7] writes:

> The implications of the present investigation, which are consistent with our growing knowledge of creativity, argue against the uncritical use of high school and college grades as predictors of post-college achievement and as unqualified criteria for selecting persons for admissions, scholarships, fellowships, or jobs. Similarly, the prediction of college grades appears to be an increasingly dubious research enterprise. It seems preferable to develop more valid criteria of independent achievement and creativity, even though colleges may not recognize and reward these tendencies. To continue the prediction of college grades only reinforces their somewhat specious validity and delays the development of more adequate criteria and subsequent re-examination of educational goals and practices.

It may be that we need to broaden or redefine academic achievement. Concomitantly, to define academic achievement operationally by grades or GPA is not only feasible but is generally defensible since high grades are the goal of most students and reflect the considered judgment of the faculty.

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[7] J. L. Holland, "The Prediction of College Grades from Personality and Aptitude Variables, Journal of Educational Psychology, 51 (1960), pp. 245-254.

5.) The achievement criterion, GPA, was not a reliable measure of academic success.

A lack of reliability of the GPA can be seen as another source of unaccounted for variance. The problem of estimating the reliability of grades was reviewed by Clark.[8] He stated that (1) the correlation of the grades of one term(s) to another is analogous to but not the same as the test-retest method of estimating reliability of psychological or educational instruments since terms do not represent repetition of measures, (2) "correlated error" occurs when adjacent terms are correlated because some courses may be continuous from term to term, and (3) the omission of deviant students who do not re-enroll the second term biases the results. Clark recommends a method of estimating the reliability of course grades by use of a ratio of standard deviations formula.

The correlation method of estimating the reliability of GPA used in the present study yielded coefficients similar in magnitude to those reported in other studies[9] and to those reported by Farquhar in his report on the research with high school students.[10] The failure of the present study to validate a motivational instrument found to be predictive by Farquhar would indicate that the failure under consideration here was not due to the lack of reliability of the achievement criterion.

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[8]E. L. Clark, "The Reliability of Grade Point Averages," Journal of Educational Research, 57 (1964), pp. 428-430.

[9]Ibid.

[10]Farquhar, op. cit., p. 173.

6.) Response set and/or faking tended to distort the results of the GSCI item validation study.

Many authors have reported research results indicating that students will give responses on personality measures that will present themselves in what they perceive to be the most favorable light.[11] Several personality instruments contain scales designed to detect faking, inconsistency, or response set.[12] The students in the present study were instructed on the face sheet of the GSCI that "there are no right or wrong answers" and that "the results will in no way affect...grades in school." It can reasonably be assumed, never-the-less, that some faking or response set to present the perceived most socially desirable responses occurred in the sample. The extent to which this occurred is also a matter of speculation. The sample of over- and under-achievers selected the high achievement alternative of 43 items so preponderantly that chi square analysis of the frequencies was ruled out because there were too few responses in the low achievement rows of the contingency tables. Farquhar reported only one item yielded the same type of results.

Whether the one-sided results of the 43 items in the present study were responded to almost entirely in the high achievement direction because

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[11] P. E. Meehl and S. R. Hathaway, "The K Factor as a Suppressor Variable in the MMPI," Journal of Applied Psychology, 30 (1946), pp. 525-564.

[12] A. L. Edwards, The Social Desirability Variable in Personality Assessment and Research (New York: Dryden Press, 1957), pp. 1-58.

of a social desirability or faking factor or for some other reason cannot be determined conclusively. It is also possible that the 43 responses represent a valid assessment of the preferences of the group. The differences between the responses of the present group of over- and under-achievers and the responses of Farquhar's samples could be due to the differences between the population being sampled. It seems logical to assume that "under-achievers" and many students who do not achieve as expected in the high school population do not continue on into college. Thus, a college population, when compared to a high school population, is logically composed of a larger proportion of "over-achievers" when achievement is defined from the standpoint of high school performance.

7.) The assumption of homogeneity of the samples in academic achievement motivation accounted for the failure of the GSCI items to discriminate between the samples of discrepant achievers: students in diverse curricular programs may be motivated by different forces.

The question of the relationship between the homogeneity of samples and motivational factors operating within the samples can be examined by considering two types of studies: (1) studies which investigated hypothesized differences between curricular groups, and (2) studies in which the primary concern was with intellective or non-intellective variables associated with academic achievement, and in which the samples were divided into various curricular groups.

William Krathwohl[13] investigated the specificity of "industriousness" by analyzing the relationship between the achievement tests and grades in various courses of 184 male freshmen and 308 sophomores at the Illinois Institute of Technology. He concluded that over- and under-achievement was specific rather than general. Among the engineering students there were four sets of courses: English, chemistry, mathematics and physics which were independent or had only small relationships with respect to the extent to which the students were motivated to exhibit "industriousness." Thus, he concluded that students tended to be highly motivated to achieve academically in some courses but not in others.

Another study contrasting students in different curricular programs is that of Brizee[14] who studied the process of identification in the choice of an occupation. He selected samples of doctoral students majoring in chemistry and in student personnel work who were interviewed and who Q-sorted cards indicating different values associated with their occupational roles. Brizee found statistically significant differences between the values of the two groups of students. The student personnel doctoral candidates considered the following three values most important: (1) to help another person directly, (2) to do something of ultimate benefit to

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[13]W. C. Krathwohl, "Specificity of Over- and Under-Achievement in College Courses," Journal of Applied Psychology, 36 (1952), pp. 103-106.

[14]R. L. Brizee, "Identification as a Process in the Choice of an Occupation: A Study of the Significant Adults of Chemists and Personnel Workers" (unpublished Ph.D. dissertation, Michigan State University, 1959).

mankind, and (3) to have close relationships to others. The chemistry students, on the other hand, chose the following values as most important: (1) to do work one is good at and enjoys, (2) to have a chance to discover and understand why things happen.

The following studies found differences between students in various curricular programs in the process of investigating the relationships between non-intellective variables and academic achievement. The studies are described in greater detail in Chapter II of the present report.

Berger[15] attempted to validate a scale designed to measure "willingness to accept limitation" with students in the College of Science, Literature, and Arts and with students in the Institute of Technology at the University of Minnesota. He found a significant relationship between the scores on the personality measure and grades with the sample of Science, Literature and Arts students but not with the Technology students.

Brown and Dubois[16] studied the relationship between scores on several intellective and non-intellective instruments and grade point averages of two samples of high ability male students enrolled in the College of Sciences and Humanities and in the College of Engineering at Iowa State University. Of the 56 scores presumed to be predictive of academic

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[15]E. M. Berger, "Willingness to Accept Limitations and College Achievement: A Replication," Journal of Counseling Psychology, 1963, 10(2), 176-178.

[16]F. G. Brown and T. E. Dubois, "Correlates of Academic Success for High Ability Freshmen Men," Personnel and Guidance Journal, 42 (1964), pp. 603-607.

success in college, 12 yielded significant coefficients (at the .05 level) in the Science and Humanities sample and 20 were significant in the Engineering sample. Seven of the 56 scores yielded significant coefficients common to both samples. The greatest difference between the two curricular groups was in regard to study habits, study habits being important to Engineering but not to Science and Humanities students.

Watley[17] found differences between students enrolled in different majors within the College of Business Administration at the University of Denver. The groups consisted of students in (1) Hotel and Restaurant Management, (2) Accounting, and (3) Marketing and Management (the latter representing a combined group). The author reports differences between the coefficients yielded by correlation of various intellective and non-intellective variables and grades which differed according to the major of the subjects.

Another pertinent study is that of Long[18] who used a vocational interest test, the Kuder Vocational Preference Record with several other instruments. While Long did not subdivide the sample into groups on the basis of curricular programs, the patterns that emerged from multiple step-wise regression analysis of the data led him to conclude that academic

[17] D. J. Watley, "The Effectiveness of Intellectual and Non-Intellectual Factors in Predicting Achievement for Business Students," Journal of Educational Research, 57 (1964), pp. 402-407.

[18] J. M. Long, "Sex Differences in Academic Prediction Based on Scholastic, Personality, and Interest Factors," Journal of Experimental Education, 32 (1964), pp. 239-248.

prediction should be improved by attempting to predict success based on the intended curriculum.

Holland's[19] study of National Merit Scholarship finalists resulted in evidence of differences between samples of students enrolled in various colleges. Holland concludes:

> The investigation of academic achievement for different college atmospheres reveals that different kinds of colleges reward different kinds of students... More desirable studies would entail larger samples and single college by college comparisons.

On the basis of the review of the research literature briefly described above, it can be concluded that it is possible that the GSCI items, with a few exceptions, failed to discriminate between over- and under-achievers because of the homogeneity of the samples. It is possible that college populations are more heterogenous than high school populations with respect to motivational forces.

8.) The GSCI items did not discriminate effectively between achievers because the experimental instrument was not constructed on a scaling model that ascribed variability to both position of the stimuli and differences within each subject.

The question here is whether or not to consider the responses in respect to achievement motivation as reflecting variations in the positions of the stimuli on given continua that are common to or typical of a given

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[19] J. L. Holland, "The Prediction of College Grades from Personality and Aptitude Variables," Journal of Educational Psychology, 51 (1960), pp. 245-254.

population of subjects, or as also reflecting preferences that may differ with each subject. The experimental form of the GSCI used in the study was constructed on the former model and the design of the research was oriented toward measuring differences between samples assumed to represent different populations. Naturally, the theories underlying the present study pre-supposed differences within and between individuals but the scale construction itself was developed without concern for these differences other than by testing the differential item selection by the samples of over- and under-achievers.

The GSCI scale construction by Farquhar and associates proceeded by defining the class of elements (i.e., the polar dimensions of academic motivation). Instead of proceeding in this manner, a determination of the attributes of academic achievement motivation could have been initiated by the response approach of Guttman in which both the preferences of the subjects and the items themselves became variables to be measured by the Guttman formulations. The Guttman approach differs particularly with respect to the ordering of items.[20] This would involve the ordering of scale items by derivative procedures consisting of investigating individual items and sample members concomitantly.

Implications for Further Research

1. Conduct a study investigating the validity of GSCI items using a

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[20] W. S. Torgerson, Theory and Methods of Scaling (New York: John Wiley and Sons, 1960), pp. 49 ff.

design similar to that used in the present study (with the Two Stage Regression Technique) but making use of the Numerical score of the CQT to identify over- and under-achieving students in technical curricula.

2. Conduct a study of academic achievement motivation in which the achievement criteria include measures of success other than grade point averages such as independent creative and student leadership activities.
3. Conduct a study of academic achievement motivation employing an instrument containing items that are more subtle measures of motivation in order to eliminate or reduce the effects of faking or social desirability response set.
4. Conduct a study of academic achievement motivation similar in design and in theoretical bases to those used in the present study but dividing the sample into groups by curricular majors.
5. Conduct a study of academic achievement motivation similar in design and theory but making use of the Guttman techniques of scale construction.
6. Conduct a study investigating the utility of the GSCI in discriminating between female over- and under-achievers in a college population.
7. Construct a new objective measure of academic achievement motivation for a college population using a methodology similar to that of the GSCI but on a different theoretical basis. For example, the

following need factors could be explored: n-Avoid failure, n-Affiliation, n-Autonomy and n-Nurturance.

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APPENDIX

APPENDIX A

Generalized Situational Choice Inventory Male Response Frequencies and Chi Square Values for Validation and Cross-Validation Samples of Over- and Under-Achievers

Legend: A = N-Achievement
B = Non N-Achievement
---= Frequencies too small
(*) = Significant in direction opposite to theory

		Validation				Cross-Validation			
Item	Response	Over-Achiever (N=57)	Under-Achiever (N=53)	Chi Square	p	Over-Achiever (N=58)	Under-Achiever (N=53)	Chi Square	p
1	A	43	33	.040					
	B	14	20						
2	A	56	51	---					
	B	01	02						
3	A	48	43	.182					
	B	09	10						
4	A	31	21	2.40	.20	25	29	1.49	
	B	26	32			33	24		
5	A	30	28	.000					
	B	27	25						
6	A	53	52	---					
	B	04	01						
7	A	38	29	1.64	.20	33	34	1.04	
	B	19	24			25	19		
8	A	16	20	1.16					
	B	41	33						
9	A	49	49	1.18					
	B	08	04						
10	A	02	02	---					
	B	55	51						

Item	Response	Validation Over-Achiever (N=57)	Validation Under-Achiever (N=53)	Validation Chi Square	Validation p	Cross-Validation Over-Achiever (N=58)	Cross-Validation Under-Achiever (N=53)	Cross-Validation Chi Square	Cross-Validation p	
11	A	42	25	.764						
	B	15	18							
12	A	45	43	.081						
	B	12	10							
13	A	13	06	2.53	.20	19	06	7.29	.01	*
	B	44	47			39	47			
14	A	24	24	.535						
	B	33	27							
15	A	13	15	.441						
	B	44	38							
16	A	14	08	1.53						
	B	43	45							
17	A	54	50	---						
	B	03	03							
18	A	21	36	.938						
	B	20	33							
19	A	17	23	2.18	.20(*)	27	21	.541		
	B	40	30			31	32			
20	A	48	48	.998						
	B	09	05							
21	A	43	29	9.29	.01	32	29	.002		
	B	14	28			26	24			
22	A	47	45	.120						
	B	10	08							
23	A	38	38	.309						
	B	19	15							

Item	Response	Validation Over-Achiever (N=57)	Validation Under-Achiever (N=53)	Validation Chi Square	Validation p	Cross-Validation Over-Achiever (N=58)	Cross-Validation Under-Achiever (N=53)	Cross-Validation Chi Square	Cross-Validation p	
24	A	42	32	2.20	.20	42	33	1.30		
	B	15	21			16	20			
25	A	17	21	.803						
	B	40	32							
26	A	40	40	.388						
	B	17	13							
27	A	30	31	.381						
	B	27	22							
28	A	19	10	2.96	.10	23	10	5.72	.02	*
	B	38	43			35	43			
29	A	53	48	---						
	B	04	05							
30	A	14	20	2.23	.20(*)	40	33	.552		
	B	43	33			18	20			
31	A	42	36	.441						
	B	15	17							
32	A	41	40	.177						
	B	16	13							
33	A	55	48	---						
	B	02	05							
34	A	30	19	3.13	.10	25	20	.331		
	B	27	34			33	33			
35	A	49	50	2.14	.20(*)	49	47	.415		
	B	08	03			09	06			
36	A	40	35	.252						
	B	17	18							

Item	Response	Validation Over-Achiever (N=57)	Validation Under-Achiever (N=53)	Chi Square	p	Cross-Validation Over-Achiever (N=58)	Cross-Validation Under-Achiever (N=53)	Chi Square	p	
37	A	55	47	---						
	B	02	06							
38	A	21	16	.544						
	B	36	37							
39	A	15	27	7.63	.01(*)	16	26	5.42	.02	*
	B	42	-----26			42	27			
40	A	39	28	2.80	.10	35	28	.637		
	B	18	25			23	25			
41	A	45	50	5.52	.02(*)	49	44	.043		
	B	12	03			09	09			
42	A	48	47	.465						
	B	09	06							
43	A	38	35	.004						
	B	19	18							
44	A	55	42	---						
	B	02	09							
45	A	45	34	2.97	.10	40	36	.013		
	B	12	19			18	19			
46	A	23	25	.519						
	B	34	28							
47	A	32	35	1.12						
	B	28	18							
48	A	32	29	.022						
	B	25	24							
49	A	49	43	.468						
	B	08	10							

Item	Response	Validation Over-Achiever (N=57)	Validation Under-Achiever (N=53)	Validation Chi Square	Validation p	Cross-Validation Over-Achiever (N=58)	Cross-Validation Under-Achiever (N=53)	Cross-Validation Chi Square	Cross-Validation p	
50	A	54	49	---						
	B	03	04							
51	A	52	53	---						
	B	05	00							
52	A	50	42	1.44						
	B	07	11							
53	A	56	49	---						
	B	01	04							
54	A	46	42	.036						
	B	11	11							
55	A	47	48	1.53						
	B	10	05							
56	A	47	45	.120						
	B	10	08							
57	A	30	23	.938						
	B	27	30							
58	A	48	46	.147						
	B	09	07							
59	A	38	36	.019						
	B	19	17							
60	A	35	35	.254						
	B	22	18							
61	A	32	17	6.43	.02	33	21	3.30	.10	*
	B	25	36			25	32			
62	A	53	49	---						
	B	04	04							

Item	Response	Validation Over-Achiever (N=57)	Validation Under-Achiever (N=53)	Validation Chi Square	Validation p	Cross-Validation Over-Achiever (N=58)	Cross-Validation Under-Achiever (N=53)	Cross-Validation Chi Square	Cross-Validation p
63	A	52	41	4.04	.05	49	40	1.41	
	B	05	12			09	13		
64	A	27	19	1.49					
	B	30	34						
65	A	55	51	---					
	B	02	02						
66	A	24	14	.299					
	B	33	39						
67	A	44	45	1.05					
	B	13	08						
68	A	37	43	.036					
	B	20	10						
69	A	47	39	1.19					
	B	10	14						
70	A	51	46	.189					
	B	06	07						
71	A	29	34	9.57	.01(*)	33	31	.028	
	B	28	19			25	22		
72	A	32	27	.298					
	B	25	26						
73	A	49	42	.867					
	B	08	11						
74	A	44	48	3.58	.10(*)	50	53	.003	
	B	13	05			08	08		
75	A	19	31	7.01	.01(*)	32	33	.593	
	B	38	22			26	20		

Item	Response	Validation Over-Achiever (N=57)	Validation Under-Achiever (N=53)	Validation Chi Square	Validation p	Cross-Validation Over-Achiever (N=58)	Cross-Validation Under-Achiever (N=53)	Cross-Validation Chi Square	Cross-Validation p
76	A	47	48	.893					
	B	10	05						
77	A	52	50	---					
	B	05	03						
78	A	47	43	.032					
	B	10	10						
79	A	42	45	3.69	.10(*)	53	48	---	
	B	15	08			05	05		
80	A	42	50	8.56	.01(*)	43	43	.776	
	B	15	03			15	10		
81	A	30	35	2.04	.20(*)	30	27	.006	
	B	27	18			28	26		
82	A	40	33	.770					
	B	17	20						
83	A	54	49	---					
	B	03	04						
84	A	27	20	1.04					
	B	30	33						
85	A	30	20	2.45	.20	30	28	.013	
	B	27	33			28	25		
86	A	56	49	---					
	B	01	04						
87	A	28	29	.344					
	B	29	24						
88	A	55	45	---					
	B	02	08						

Item	Response	Validation Over-Achiever (N=57)	Validation Under-Achiever (N=53)	Validation Chi Square	Validation p	Cross-Validation Over-Achiever (N=58)	Cross-Validation Under-Achiever (N=53)	Cross-Validation Chi Square	Cross-Validation p
89	A	40	33	.770					
	B	17	20						
90	A	56	50	---					
	B	01	03						
91	A	43	42	.226					
	B	14	11						
92	A	20	09	4.63	.05	23	16	1.26	
	B	37	44			35	37		
93	A	45	36	1.71	.20	37	36	.209	
	B	12	17			21	17		
94	A	45	38	.779					
	B	12	15						
95	A	49	43	.468					
	B	08	10						
96	A	30	38	.642					
	B	17	15						
97	A	33	38	.024					
	B	14	15						
98	A	53	53	---					
	B	04	00						
99	A	27	30	.938					
	B	30	23						
100	A	40	27	4.26	.05	36	33	.000	
	B	17	26			22	20		
101	A	37	43	3.64	.10(*)	40	33	.552	
	B	20	10			18	20		

Item	Response	Validation Over-Achiever (N=57)	Validation Under-Achiever (N=53)	Validation Chi Square	Validation p	Cross-Validation Over-Achiever (N=58)	Cross-Validation Under-Achiever (N=53)	Cross-Validation Chi Square	Cross-Validation p
102	A	55	49	---					
	B	02	04						
103	A	23	27	1.24					
	B	34	26						
104	A	48	45	.010					
	B	09	08						
105	A	51	43	1.53					
	B	06	10						
106	A	51	52	---					
	B	06	01						
107	A	56	49	---					
	B	01	04						
108	A	39	30	1.64	.20	35	37	1.08	
	B	18	23			23	16		
109	A	21	20	.009					
	B	36	33						
110	A	46	42	.036					
	B	11	11						
111	A	54	51	---					
	B	03	02						
112	A	43	42	.226					
	B	14	11						
113	A	15	23	3.54	.10(*)	21	18	.061	
	B	42	30			37	35		
114	A	55	51	---					
	B	02	01						

Item	Response	Validation Over-Achiever (N=57)	Validation Under-Achiever (N=53)	Validation Chi Square	Validation p	Cross-Validation Over-Achiever (N=58)	Cross-Validation Under-Achiever (N=53)	Cross-Validation Chi Square	Cross-Validation p
115	A	43	38	.197					
	B	14	15						
116	A	32	41	5.53	.02(*)	42	37	.091	
	B	25	12			16	16		
117	A	26	33	3.06	.10(*)	22	24	.616	
	B	31	20			36	29		
118	A	52	50	---					
	B	05	03						
119	A	53	50	---					
	B	04	03						
120	A	25	28	.885					
	B	32	25						
121	A	01	10	8.59	.01(*)	11	09	.073	
	B	56	43			47	44		
122	A	19	20	.232					
	B	38	33						
123	A	24	20	.218					
	B	33	33						
124	A	41	43	2.25	.20(*)	45	43	.212	
	B	16	10			13	10		
125	A	55	48	---					
	B	02	05						
126	A	48	48	.998					
	B	09	05						
127	A	54	45	2.94	.10	51	45	.216	
		03	08			07	08		

Item	Response	Validation Over-Achievers (N=57)	Validation Under-Achiever (N=53)	Validation Chi Square	Validation p	Cross-Validation Over-Achiever (N=58)	Cross-Validation Under-Achiever (N=53)	Cross-Validation Chi Square	Cross-Validation p
128	A	53	48	---					
	B	04	05						
129	A	46	42	.036					
	B	11	11						
130	A	42	46	2.94	.10(*)	44	42	.181	
	B	15	07			14	11		
131	A	54	41	7.04	.01	52	46	.216	
	B	03	12			06	07		
132	A	56	52	---					
	B	01	01						
133	A	42	41	.200					
	B	15	12						
134	A	38	32	.173					
	B	29	21						
135	A	30	21	1.86	.20	32	27	.415	
	B	27	32			26	26		
136	A	43	37	.438					
	B	14	16						
137	A	52	51	---					
	B	05	02						
138	A	40	40	.388					
	B	17	13						
139	A	49	46	.015					
	B	08	07						
140	A	47	43	.032					
	B	10	10						

Item	Response	Validation Over-Achievers (N=57)	Validation Under-Achievers (N=53)	Validation Chi Square	Validation p	Cross-Validation Over-Achievers (N=58)	Cross-Validation Under-Achiever (N=53)	Cross-Validation Chi Square	Cross-Validation p
141	A	56	51	---					
	B	01	02						
142	A	24	28	1.26					
	B	33	25						
143	A	45	37	1.20					
	B	12	16						
144	A	54	51	---					
	B	03	02						
145	A	23	23	.104					
	B	34	30						
146	A	03	05	---					
	B	54	58						
147	A	18	21	.776					
	B	39	32						
148	A	33	40	3.80	.10(*)	38	35	.003	
	B	24	13			20	18		
149	A	28	32	1.40					
	B	29	21						
150	A	42	43	.867					
	B	15	10						
151	A	39	41	1.10					
	B	18	12						
152	A	30	36	2.67	.20(*)	33	27	.395	
	B	27	17			25	26		
153	A	20	26	2.20	.20(*)	22	22	.148	
	B	37	27			36	31		

Item	Response	Validation Over-Achiever (N=57)	Validation Under-Achiever (N=53)	Validation Chi Square	Validation p	Cross-Validation Over-Achiever (N=58)	Cross-Validation Under-Achiever (N=53)	Cross-Validation Chi Square	Cross-Validation p	
154	A	25	32	3.00	.10(*)	25	35	5.86	.05(*)	*
	B	32	21			33	18			
155	A	22	21	.012						
	B	35	32							
156	A	44	41	.000						
	B	13	12							
157	A	56	53	---						
	B	01	00							
158	A	41	42	.793						
	B	16	11							
159	A	44	37	.771						
	B	13	16							
160	A	53	48	---						
	B	04	05							
161	A	53	50	---						
	B	04	03							
162	A	33	35	.771						
	B	24	18							
163	A	21	28	3.39	.10(*)	19	25	2.40		
	B	36	25			36	29			
164	A	13	12	.000	---					
	B	44	41							
165	A	43	43	.521						
	B	14	10							
166	A	42	35	.764						
	B	15	18							

Item	Response	Validation Over-Achiever (N-57)	Validation Under-Achiever (N=53)	Validation Chi Square	Validation p	Cross-Validation Over-Achiever (N=58)	Cross-Validation Under-Achiever (N=53)	Cross-Validation Chi Square	Cross-Validation p
167	A	45	42	.001					
	B	12	11						
168	A	32	24	1.29	.30	31	31	.285	
	B	25	29			27	22		
169	A	40	41	.729					
	B	17	12						
170	A	54	47	---					
	B	03	06						
171	A	55	53	---					
	B	02	00						
172	A	36	36	.275					
	B	21	17						
173	A	27	34	3.13(*)	.10(*)	28	27	.076	
	B	30	19			30	26		
174	A	21	30	4.31	.05(*)	26	21	.307	
	B	36	23			32	32		
175	A	53	48	---					
	B	04	05						
176	A	09	10	.182					
	B	48	43						
177	A	37	36	.111					
	B	20	17						
178	A	35	35	.254					
	B	22	18						
179	A	54	52	---					
	B	03	01						

Item	Response	Validation Over-Achiever (N=57)	Validation Under-Achiever (N=53)	Validation Chi Square	Validation p	Cross-Validation Over-Achiever (N=58)	Cross-Validation Under-Achiever (N=53)	Cross-Validation Chi Square	Cross-Validation p
180	A	53	51	---					
	B	04	02						
181	A	52	40	4.98	.05	50	44	.217	
	B	05	13			08	09		
182	A	51	47	.017					
	B	06	06						
183	A	51	49	---					
	B	06	04						
184	A	29	43	11.11	.001(*)	35	33	.042	
	B	28	10			23	20		
185	A	16	26	5.12	.05(*)	25	18	.809	
	B	41	27			33	35		
186	A	51	50	---					
	B	06	03						
187	A	09	05	.998					
	B	48	48						
188	A	48	50	2.63	.20(*)	48	45	.093	
	B	09	03			10	08		
189	A	50	50	---					
	B	07	03						
190	A	55	48	---					
	B	02	05						
191	A	44	40	.045					
	B	13	13						
192	A	40	37	.001					
	B	17	16						

Item	Response	Validation Over-Achiever (N=57)	Validation Under-Achiever (N=53)	Validation Chi Square	Validation p	Cross-Validation Over-Achiever (N=58)	Cross-Validation Under-Achiever (N=53)	Cross-Validation Chi Square	Cross-Validation p	
193	A	52	47	.198						
	B	05	06							
194	A	19	17	.019						
	B	38	36							
195	A	24	21	.070						
	B	33	32							
196	A	10	06	.855						
	B	47	47							
197	A	17	20	.770						
	B	40	33							
198	A	53	45	1.84	.20	53	42	3.30	.10	*
	B	04	08			05	11			
199	A	50	47	.024						
	B	07	06							
200	A	42	47	3.99	.05(*)	44	39	.076		
	B	15	06			14	14			

APPENDIX B

The Generalized Situational Choice Inventory

This is a survey of your choices. There are no right or wrong answers. The results will in no way affect your grades in school.

The inventory is made up of pairs of statements. Read each pair carefully. Choose the one you would most prefer or like to do.

Answer all questions as honestly and frankly as you can. Only in this way will the results be meaningful. Remember this inventory is about you and you alone. This is not a survey of what you can do, but of what you would like to do.

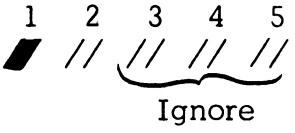
Do Not Write On This Booklet. You will be given an answer sheet and a special pencil to mark your answers with. Mark between the small lines under the letter of your choice.

EXAMPLE:

Which would you prefer to do?

1. 1. Go to a party
   2. Read a book

Answer Sheet



This person marked under the number "1" on the answer sheet which means that he would prefer to go to a party to reading a book. Ignore columns "3", "4", and "5".

If you have any questions, raise your hand. If not, turn to the next page and answer all the questions. Do Not Skip Any Questions! Work as rapidly as you can and do not spend too much time on any one item.

Remember this is not a survey of what you can do
but of what you would prefer to do.

PLEASE DO NOT WRITE ON THIS BOOKLET

I would prefer to:

1. 1) Find out why a piece of machinery won't work, or
   2) Put together a piece of machinery

2. 1) Avoid failing in school, or
   2) Do well in school

3. 1) Use my fee time to watch television, or
   2) Give up my fee time to learn something

4. 1) Have no outstanding abilities but be liked by others, or
   2) Be able to do things well, even though others didn't like me for it

5. 1) Successfully complete a group project, or
   2) Successfully complete a project by myself

I would prefer to:

6. 1) Make my own plans, or
   2) Follow someone else's plans

7. 1) Be praised at home, or
   2) Be praised at school

8. 1) Face danger with a group, or
   2) Face danger alone

9. 1) Be quick, but often incorrect, or
   2) Be slow, but often correct

10. 1) Find out how well I did on a school test right away, or
    2) Find out how well I did on a test later, if at all

I would prefer to:

11. 1) Be thought of as being clever in dealing with people, or
    2) Be thought of as being clever in working with ideas

12. 1) Work hard for what I get, or
    2) Just get what I want

13. 1) Create something useful, or
    2) Create a thing of beauty

14. 1) Be graded on how much the teacher thinks I have learned, or
    2) Be graded on how much I think I have learned

15. 1) Work hard to satisfy my own curiosity, or
    2) Work hard to become famous

I would prefer to:

16. 1) Be alone, or
    2) Be with people

17. 1) Make something I have planned myself, or
    2) Make something planned by somebody else

18. 1) Be thought of as being intelligent, or
    2) Be thought of as being practical

19. 1) Play all games or sports about average, or
    2) Be exceptionally outstanding in one sport or game

20. 1) Accomplish a task slowly, but in an orderly manner, or
    2) Accomplish a task in a hurry, but less carefully

I would prefer to:

21. 1) Receive a grade on the basis of how well I did on the teacher's test, or
    2) Get a grade on the basis of how hard I tried

22. 1) Be known as someone who doesn't need others, or
    2) Be known as someone who depends on others

23. 1) Solve an easy puzzle that I had difficulty with, or
    2) Solve a puzzle that other people have difficulty with

24. 1) Work hard to be smart, or
    2) Take it easy and become rich

25. 1) Be graded compared to the rest of the class, or
    2) Be graded compared to a standard held by the teacher

I would prefer to:

26. 1) Be thought of as being a studious person, or
    2) Be thought of as being a carefree person

27. 1) Receive one of several "A's" in class, or
    2) Receive the highest test grade and get the only "A"

28. 1) Work with others, or
    2) Work alone

29. 1) Have the best teachers in the state in my school, or
    2) Have a large recreation center in my school

30. 1) Have a few expensive clothes, or
    2) Have lots of less expensive clothes

I would prefer to:

31. 1) Be the holder of one state record, or
    2) Be the holder of several city records

32. 1) Write for a weekly newspaper, or
    2) Write for a paper which has nation-wide distribution

33. 1) Buy a car, or
    2) Continue my education

34. 1) Go to an amusement park, or
    2) Buy a book

35. 1) Finish a very important job, or
    2) Finish several less important jobs

I would prefer to:

36. 1) Be able to do difficult things better than other people, or
    2) Be able to do difficult things just as well as other people

37. 1) Be well prepared for a job after graduation from high school, or
    2) Be well prepared to continue learning

38. 1) Be known as a person who can solve problems better than anyone else, or
    2) Be known as a person who can solve problems well

39. 1) Work on a difficult short puzzle, or
    2) Work on a difficult long puzzle

40. 1) Be on a quiz program, or
    2) Be on a give-a-way program

I would prefer to:

41. 1) Pass a usual classroom examination, or
    2) Pass a college entrance examination

42. 1) Draw a freehand picture which may or may not be good, or
    2) Trace an excellent picture drawn by someone else

43. 1) Wait and receive one large award, or
    2) Receive several small awards

44. 1) Have the teacher give everyone the same grade at the beginning of the term and know I had passed, or
    2) Take chances on getting a higher or lower grade at the end of the course

45. 1) Develop a <u>new</u> product which may or may not be good, or
    2) Make a product as good as the best one available

I would prefer to:

46. 1) Receive a gift I could use right away, or
    2) Receive a gift I had to put together in order to use

47. 1) Be disliked but do well in the activities I undertake, or
    2) Be well liked but be relatively unsuccessful at most jobs

48. 1) Have friends that are a lot of fun, or
    2) Have friends that I learn something from

49. 1) Receive money for my good grades, or
    2) Be allowed to take any course I wanted because of good grades

50. 1) Be successful in finishing a job, or
    2) Finish a job

I would prefer to:

51. 1) Play a game against experts and lose but learn how to play better, or
    2) Play a game against inexperienced players and win

52. 1) Get excellent grades because I have a great deal of ability, or
    2) Get average grades because I have average ability

53. 1) Be graded at the end of a course with the possibility of making an "A", or
    2) Get a "C" at the beginning of a course along with everyone else

54. 1) Be thought of as a person with usual ideas, or
    2) Be thought of as a person with unusual ideas

55. 1) Get one of many "C's" in a course and learn something, or
    2) Get the only "A" and not learn as much

I would prefer to:

56. 1) Make quick decisions and sometimes be right and sometimes wrong, or
    2) Deliberate over decisions and usually be right

57. 1) Be known to my parents as an intelligent person, or
    2) Be known to my parents as a practical person

58. 1) Be a person of leisure, or
    2) Be a person of action

59. 1) Be allowed to take extra courses before or after school, or
    2) Just take courses offered during the school day

60. 1) Complete a job which I recognize as difficult, or
    2) Complete a job which other's recognize as difficult

I would prefer to:

61. 1) Receive money for good grades, or
    2) Have my picture in the paper for good grades

62. 1) Receive grades which are like everyone elses', or
    2) Receive grades that please my parents

63. 1) Do as well as most of my classmates, or
    2) Do better than most of my classmates

64. 1) Catch many fish everytime I go fishing, or
    2) Catch the biggest fish of the day

65. 1) Study hard enough just to get by, or
    2) Study hard enough to do very well

I would prefer to:

66. 1) Be known to my acquaintances of a friend of everyone, or
    2) Be known to my friends as a self-confident person

67. 1) Be considered as being strong but not very smart, or
    2) Be considered as being weak but smart

68. 1) Have someone show me the solution to a problem, or
    2) Take a long time to figure out a problem for myself

69. 1) Be the designer of a new type of airplane, or
    2) Be one of the first persons to ride in a new type of airplane

70. 1) Be known as a person with much ability, or
    2) Be known as a person with adequate ability

I would prefer to:

71. 1) Work at <u>many less important</u> jobs which I know I could finish, or
    2) Work at <u>one very important</u> job which may never be entirely finished in my life-time

72. 1) Work for a commission, or
    2) Work on a straight salary

73. 1) Be paid for how well I did a job, or
    2) Be paid the same amount no matter how I did the job

74. 1) Work rapidly just "skimming" along, or
    2) Work slowly with great thoroughness

75. 1) Start a model plane from scratch, or
    2) Assemble a model plane from a kit

I would prefer to:

76. 1) Make little or no progress on a difficult job and have to get help from others, or
    2) Work slowly and complete a difficult job alone

77. 1) Do a less recognized but complete job, or
    2) Do a recognized but incomplete job

78. 1) Have a <u>better</u> job than my father has, or
    2) Have a job <u>like</u> my father has

79. 1) Begin a task, or
    2) Complete a task

80. 1) Buy a thing of beauty, or
    2) Create something useful

I would prefer to:

81. 1) Have a great deal of money, or
    2) Be an expert in my favorite school subject

82. 1) Be criticized at school, or
    2) Be criticized at home

83. 1) Be paid for how fast I did a job, or
    2) Be paid for how well I did a job

84. 1) Have average ability and be liked by many people, or
    2) Have superior ability but not be liked by as many people

85. 1) Be a minor actor in a large theater production, or
    2) Play the lead in a small theater production

I would prefer to:

86. 1) Have everybody in the class get a "C" at the beginning of the course, or
    2) Be graded at the end of the course with the possibility of getting a higher or lower mark

87. 1) Read one long story, or
    2) Read a book of short stories

88. 1) Receive a grade on the basis of how much my teacher thinks I have learned, or
    2) Take a course from an instructor who only gives "C's"

89. 1) Go down in history as a person who settled a a country already discovered, or
    2) Go down in history as the discoverer of a new country

90. 1) Be known as a person with unusually good ideas, or
    2) Be known as a person who goes along with the crowd

I would prefer to:

91. 1) Be known as a person who doesn't let problems worry me, or
    2) Be known as a person who can solve problems well

92. 1) Influence people, or
    2) Help people

93. 1) Be graded on how much effort I put forth, or
    2) Be graded on how much I have learned

94. 1) Be an able person, or
    2) Be wealthy

95. 1) Be thought of as being shrewd, or
    2) Be thought of as being intelligent

I would prefer to:

96. 1) Be paid for the <u>amount</u> of work I did, or
    2) Be paid by the hour

97. 1) Be comfortable and get what I want now, or
    2) Be uncomfortable and get what I want in the future

98. 1) Make decisions, or
    2) Follow directions

99. 1) Work with a group on an ordinary project which other groups in the class are working on, or
    2) Work by myself on a different project

100. 1) Have my classmates know how I did on a test, or
     2) Be the only person who knows how I did on a test

I would prefer to:

101. 1) Work hard in everything I do, or
2) Work at things as they come along

102. 1) Have a hard job which pays well, or
2) Have an easier job which pays less

103. 1) Have a hard teacher who makes me work, or
2) Have an easier teacher who makes class interesting

104. 1) Study my assignments during study hall, or
2) Wait to study until the mood strikes me

105. 1) Wait to do an unpleasant task in hopes that I might not have to do it, or
2) Do an unpleasant task and get it over with

I would prefer to:

106. 1) Consider all the possible outcomes when faced with a choice, or
2) Make a decision and not worry about all the possible outcomes

107. 1) Be known for what I <u>could do</u>, or
2) Be known for what I <u>do</u>

108. 1) Win an argument with my friends, or
2) Win a school sponsored debate contest

109. 1) See my name as author of the Book-of-the-Month, or
2) Score the points that wins the game for my team

110. 1) Think of an idea that nobody has ever thought of, or
2) Set a world's speed record

I would prefer to:

111. 1) Peform well in class, or
2) Watch television

112. 1) Memorize someone else's poem, or
2) Create a poem of my own

113. 1) Make many friends, or
2) Complete a very difficult job

114. 1) Learn by defeating an inexperienced player, or
2) Learn by defeating an expert

115. 1) Date a lot of different people, or
2) Date one person steady

I would prefer to:

116. 1) Take a job in a new city, or
2) Take a job in my home town

117. 1) Be thought of as being smart, or
2) Be thought of as being practical

118. 1) Save enough money to buy something with cash, or
2) Buy something on credit and pay for it as I use it

119. 1) Do what I think is right, or
2) Do what others think is right

120. 1) Receive a grade on the basis of how well I did on my teacher's test, or
2) Receive a grade on the basis of how I compared with my classmates

I would prefer to:

121. 1) Feel confident about dealing with people, or
2) Feel confident about handling money

122. 1) Be known as a person who is able to do many things, or
2) Be known as an expert

123. 1) Read, or
2) Talk

124. 1) Investigate something, or
2) Join a club

125. 1) Work overtime to make more money, or
2) Get more schooling to make more money

I would prefer to:

126. 1) Take it easy and conserve my energy, or
2) Put forth my best effort all the time

127. 1) Take an unknown short-cut through the woods, or
2) Follow the route through the woods which is known but is longer

128. 1) Do things as other people would do them, or
2) Do things better than other people

129. 1) Inherit a great deal of money, or
2) Earn a great deal of money

130. 1) Watch my favorite television program, or
2) Plan for a vacation to be taken next year

I would prefer to:

131. 1) Wait ten years and receive fame throughout the nation, or
2) Receive fame in my community overnight

132. 1) Wait until I had finished college and make a better salary, or
2) Get a job right after high school and make a good salary

133. 1) Prepare a familiar food, or
2) Prepare a new food

134. 1) Work on a not-so-important project which I may finish, or
2) Work on an important project which I may never finish

135. 1) Play a game for the sake of playing it, or
2) Play a game in order to win

I would prefer to:

136. 1) Plan my life in advance, or
2) Live my life from day to day

137. 1) Have decisions made for me, or
2) Make my own decisions

138. 1) Take a long vacation at the end of the year, or
2) Take a short vacation once a month

139. 1) Accomplish a difficult task well, or
2) Accomplish a difficult task fast

140. 1) Be graded on the basis of the effort I put forth, or
2) Be graded on the basis of how well I got along with my classmates

I would prefer to:

141. 1) Study to go to college, or
2) Study to get out of high school

142. 1) Work on a short-term project, or
2) Work on a long-term project

143. 1) Be known as a good group member, or
2) Be known as a leader

144. 1) Live a life of leisure, or
2) Live a life of many new experiences

145. 1) Enjoy myself at a museum, or
2) Enjoy myself at a night-club

I would prefer to:

146. 1) Find out right away how I did on a test, or
2) Wait to find out how I did on a test

147. 1) Study, or
2) Do things with my friends

148. 1) Make progress on a task, or
2) Complete a task once begun

149. 1) Belong to a club, or
2) Organize a club

150. 1) Make my own decisions, or
2) Help others make their decisions

I would prefer to:

151. 1) Do my homework, or
2) Watch my favorite television program

152. 1) Have a great deal of influence over people, or
2) Have a great deal of ambition

153. 1) Be known as being patient in working with people, or
2) Be known as being patient in working with ideas and objects

154. 1) Develop a new and better way to study, or
2) Make many new and close friends

155. 1) Be thought of as having average intelligence and be wealthy, or
2) Be thought of as being quite intelligent and be poor

I would prefer to:

156. 1) Work hard and become rich, or
2) Take it easy and become smart

157. 1) Play a "tie" game with an expert, or
2) Win a game from an inexperienced player

158. 1) Receive proper credit for accomplishments, or
2) Be thought of by others as being "a lot of fun"

159. 1) Help my friends pass an examination and receive a "C" myself, or
2) Study alone and receive an "A" on the examination

160. 1) Stand up for my rights, or
2) Keep my thoughts to myself

I would prefer to:

161. 1) Carry out the plans of others, or
2) Create something of my own

162. 1) Paint one very large picture, or
2) Paint several small pictures

163. 1) Invent a new musical instrument, or
2) Play a musical instrument already invented

164. 1) Be able to say I had successfully completed a task, or
2) Be able to say I had attempted a difficult task

165. 1) Be known as a person who makes the classroom pleasant, or
2) Be known as a person who knows what he's talking about

I would prefer to:

166. 1) Be criticized at home and praised in school, or
2) Be criticized at school and praised at home

167. 1) Be known as being a "good guy" or a "good gal", or
2) Be known as a person who "does things well"

168. 1) Be a big frog in a little pond, or
2) Be a little frog in a big pond

169. 1) Do something which will cause your name to be in history books, or
2) Become a well-known popular singer

170. 1) Be very happy, or
2) Have lots of money

I would prefer to:

171. 1) Be known as a person who knows his own mind, or
2) Be known as a person who gets help in making decisions

172. 1) Be thought of as being like everyone else, or
2) Be thought of as being different

173. 1) Choose a familiar well liked food, or
2) Try a new food in a restaurant

174. 1) Write a novel or play, or
2) Read a novel or play

175. 1) Do something like everyone else, or
2) Do something outstanding

I would prefer to:

176. 1) Have an instructor who gave me an "A" and not care whether I learned anything or not, or
2) Have an instructor who gave me a "C" but made sure I learned something

177. 1) Read an interesting story, or
2) Take an examination to find out about myself

178. 1) Put together a new object, or
2) Develop new ideas

179. 1) Be demanding on myself to do good work, or
2) Be demanding on my friends so that they will do good work

180. 1) Accept what someone else says even though I don't agree, or
2) Argue for what I believe to be right

I would prefer to:

181. 1) Receive the only "A" in a class, or
2) Receive the same grades as most of the students in my class

182. 1) Receive an "A" on a test in which I missed several questions, or
2) Receive an "A" on a test and only miss one of the questions

183. 1) Study for an exam one night and know that I would receive an "A", or
2) Go to a party on this night a take a chance on a lower grade

184. 1) Be graded on the basis of how much effort I put forth, or
2) Be graded compared to my classmates

185. 1) Choose a friend because I could learn something from him or her, or
2) Choose a friend because I could have fun doing things with him or her

I would prefer to:

186. 1) Be responsible to somebody, or
2) Be given responsibility for doing something

187. 1) Date the smartest girl or boy in class, or
2) Date the girl or boy who is the most fun

188. 1) Do something like everyone else does, or
2) Do something which is different

189. 1) Do something that I have done before, or
2) Do something that I never have done before

190. 1) Work hard enough to be outstanding, or
2) Work hard enough to pass my courses

I would prefer to:

191. 1) Buy a set of encyclopedias for my children, or
2) Buy a bicycle for my children

192. 1) Discover a gold mine, or
2) Discover a new medicine

193. 1) Have one of my children win a beauty contest, or
2) Have one of my children win a college scholarship

194. 1) Get some new clothes, or
2) Get a year's subscription to the Book-of-the-Month Club

195. 1) Have a few "fine" clothes, or
2) Have many ordinary clothes

I would prefer to:

196. 1) Be the smartest person in the world, or
2) Be the happiest person in the world

197. 1) Play a game, or
2) Be the planner of a game to be played

198. 1) Be a boss, or
2) Be a worker

199. 1) Be an employer, or
2) Be an employee

200. 1) Learn by defeating an experienced player, or
2) Learn by losing to an expert