



110
989
THS

THE VALIDATION OF THE MICHIGAN STATE M-SCALES
WITH COLLEGE FRESHMEN

Thesis for the Degree of Ph. D.
MICHIGAN STATE UNIVERSITY
Mary L. Hayden
1963

THESIS

LIBRARY
Michigan State
University

This is to certify that the
thesis entitled

THE VALIDATION OF THE MICHIGAN STATE M-SCALES
WITH COLLEGE FRESHMEN

presented by

Mary L. Hayden

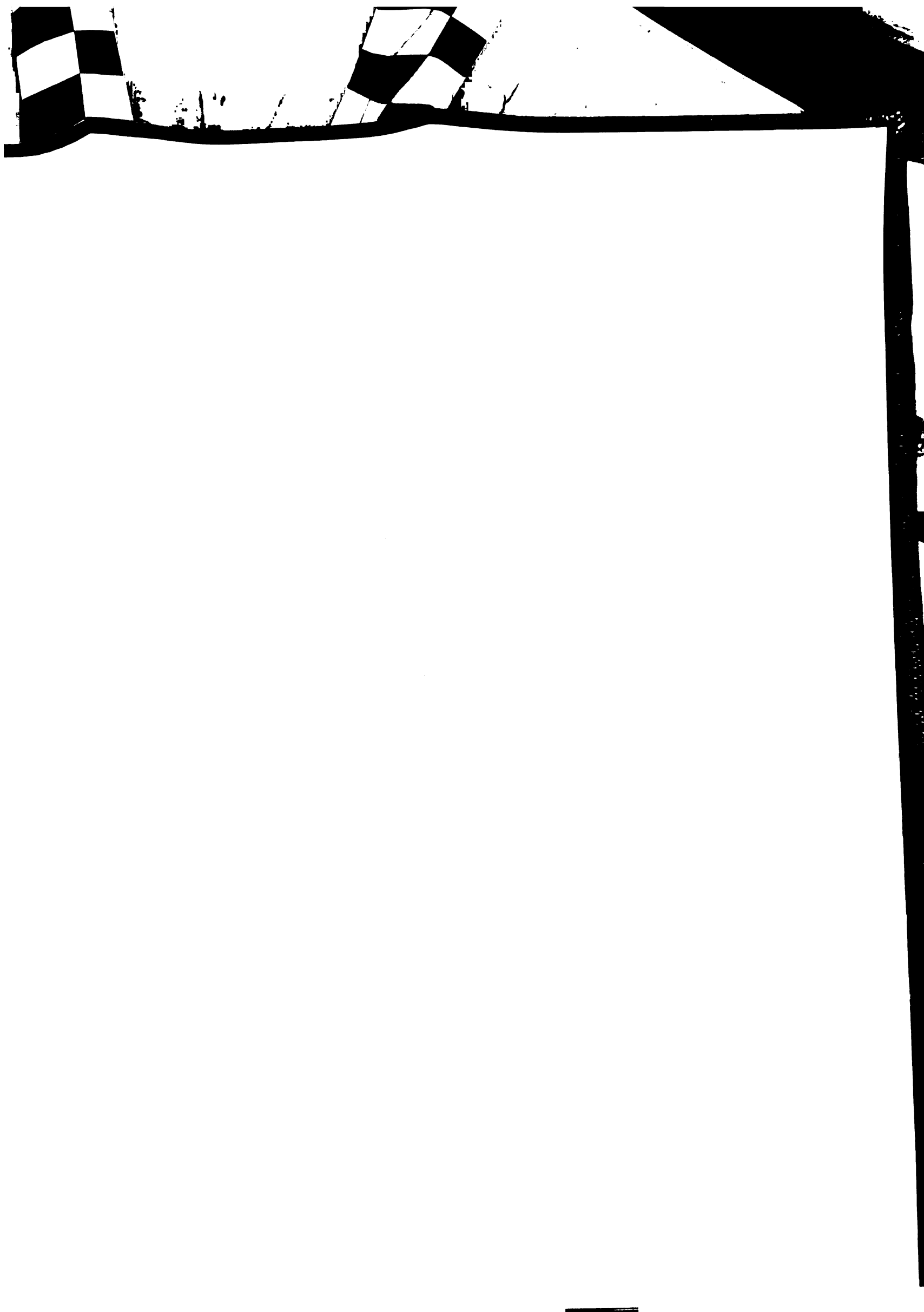
has been accepted towards fulfillment
of the requirements for

Ph. D. degree in Education

William W. Gaughan
Major professor

Date August 8, 1963







ABSTRACT

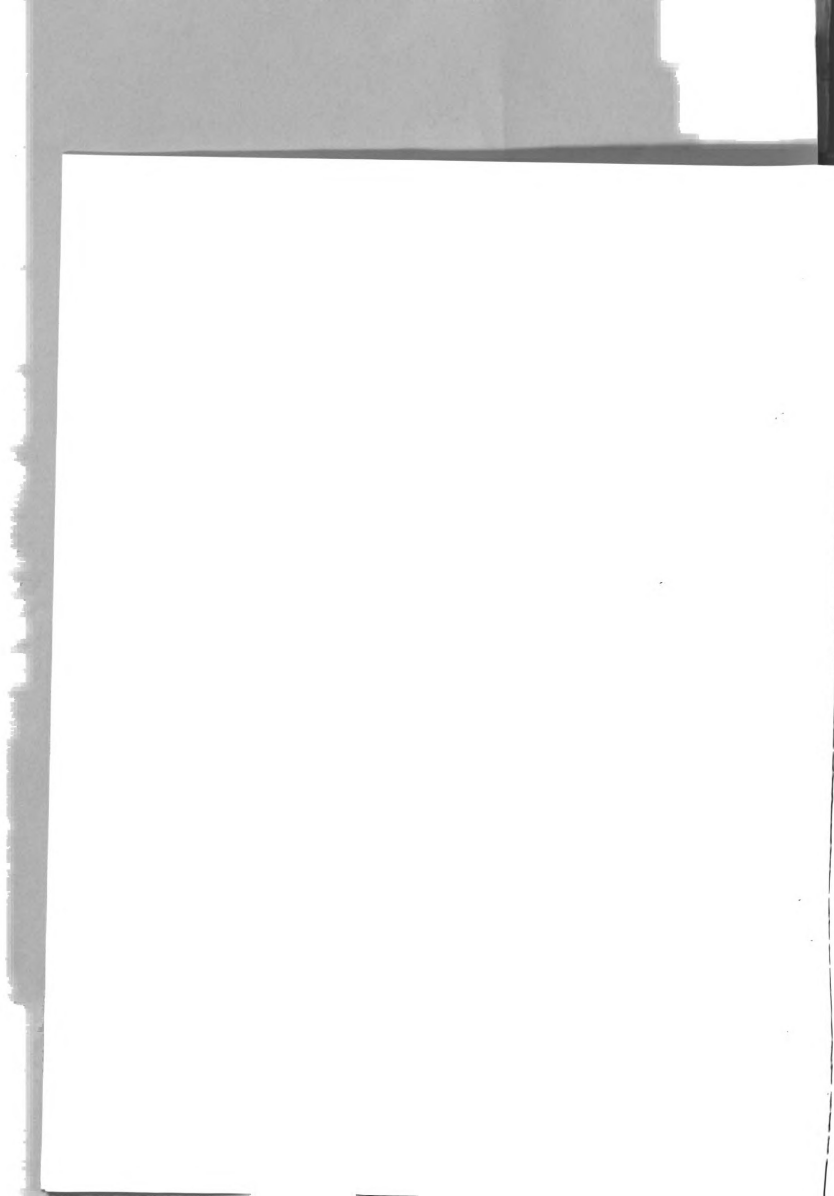
THE VALIDATION OF THE MICHIGAN STATE M-SCALES WITH COLLEGE FRESHMEN

by Mary L. Hayden

This study was concerned with (1) the predictive efficiency of an objective measure of academic motivation (M-Scales, Form C) when applied to a general college population, and (2) the improvement in the precision of prediction of academic achievement (GPA) attained by the addition of the M-Scales to an aptitude predictor (CQT-Total).

The sample, 330 males and 367 females, was selected from the total population of first-quarter freshmen at Michigan State University in 1962. An academic aptitude measure (CQT), academic motivational measure (M-Scales), and academic achievement measure (GPA) were obtained for each student.

The analyses were carried out independently for the male and the female samples and involved the following: (1) reliability estimates were calculated using Hoyt's analysis of variance technique; (2) Pearsonian correlations were computed to assess the relationship of the M-Scales to academic achievement; (3) multiple correlations



Mary L. Hayden

were computed to assess the improvement in prediction of GPA attained by the addition of the M-Scales to the CQT.

For the male sample, a significant, low-positive relationship was found between the GSCI, WRL, M-Total scores and the grade point criterion. There was no significant relationship between the male HTI scores and academic achievement. There was no significant relationship between the sub- and total M-Scales scores and academic achievement (GPA) for the female sample.

The "t" tests of significance from zero for the M-Scales beta weights in predicting GPA were not significant. Addition of the M-Scales scores to the CQT measure in a multiple regression equation did not result in an increase in precision of prediction of the grade point criterion.

It was concluded that at this stage of development the experimental M-Scales have little utility for college populations.

THE VALIDATION OF THE MICHIGAN STATE M-SCALES
WITH COLLEGE FRESHMEN

By

Mary L.^{W.} Hayden

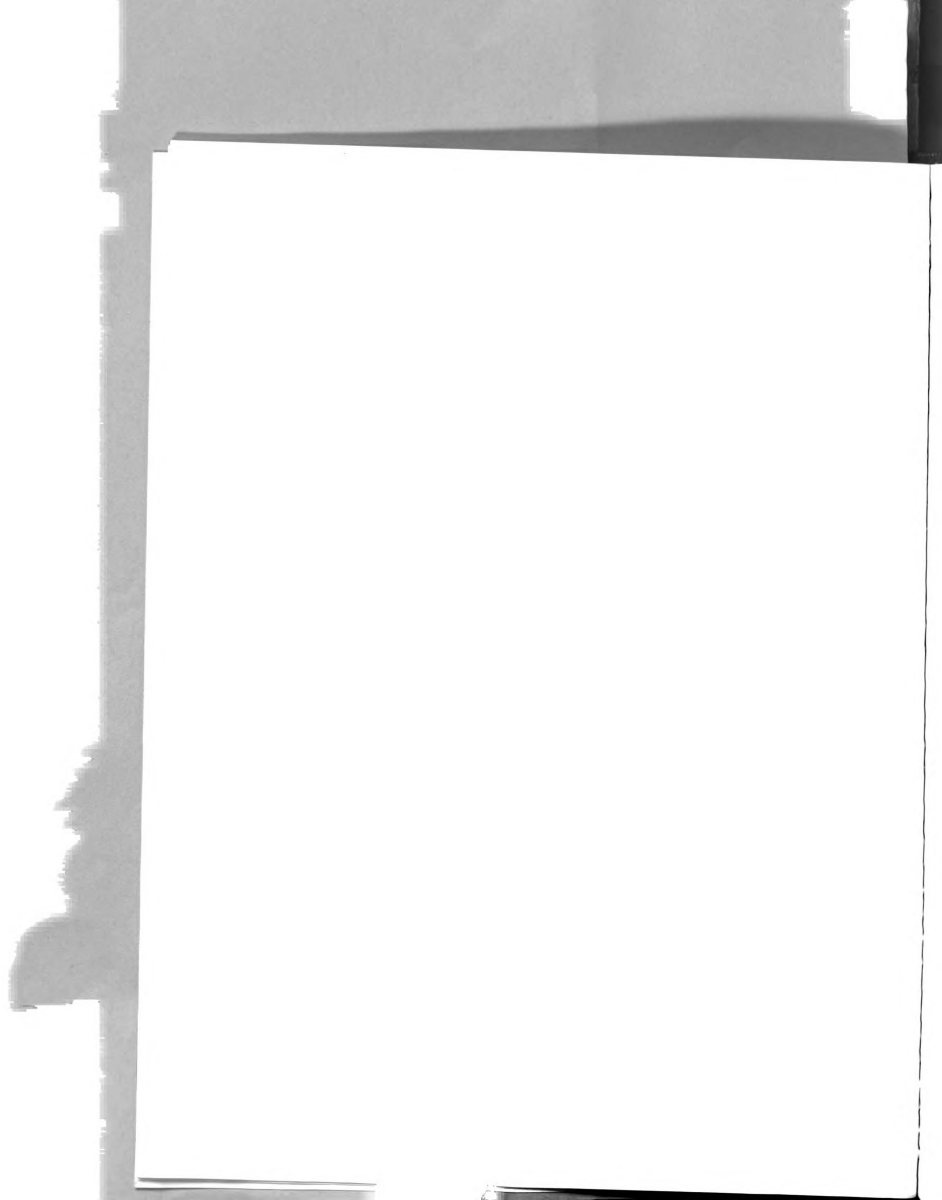
A THESIS

Submitted to
Michigan State University
in partial fulfillment of the requirements
for the degree of

DOCTOR OF PHILOSOPHY

College of Education

1963



G290916
7/8/64

ACKNOWLEDGMENT

The writer wishes to acknowledge the assistance of the following people, as well as others, who contributed to the progress of the dissertation.

To Dr. William W. Farquhar, committee chairman, for his continued interest and assistance in the completion of this dissertation.

To Dr. Bill L. Kell who contributed much to the progress of my doctoral program and professional preparation.

To Dr. Carl Gross and Dr. Bufford Stefflre for serving on the guidance committee.

To Dr. Arvo Juola of the Evaluation Services for making the subjects of the study available for research purposes.

To Margie Williams, James De Jong, and John Gordon for their assistance in the statistical analysis.

To my colleagues, Dorothy Frayer and Rod Hilsinger, for their assistance in the data collection.

And lastly, to the freshman students of Michigan State University, without whose cooperation this study would not have been possible.

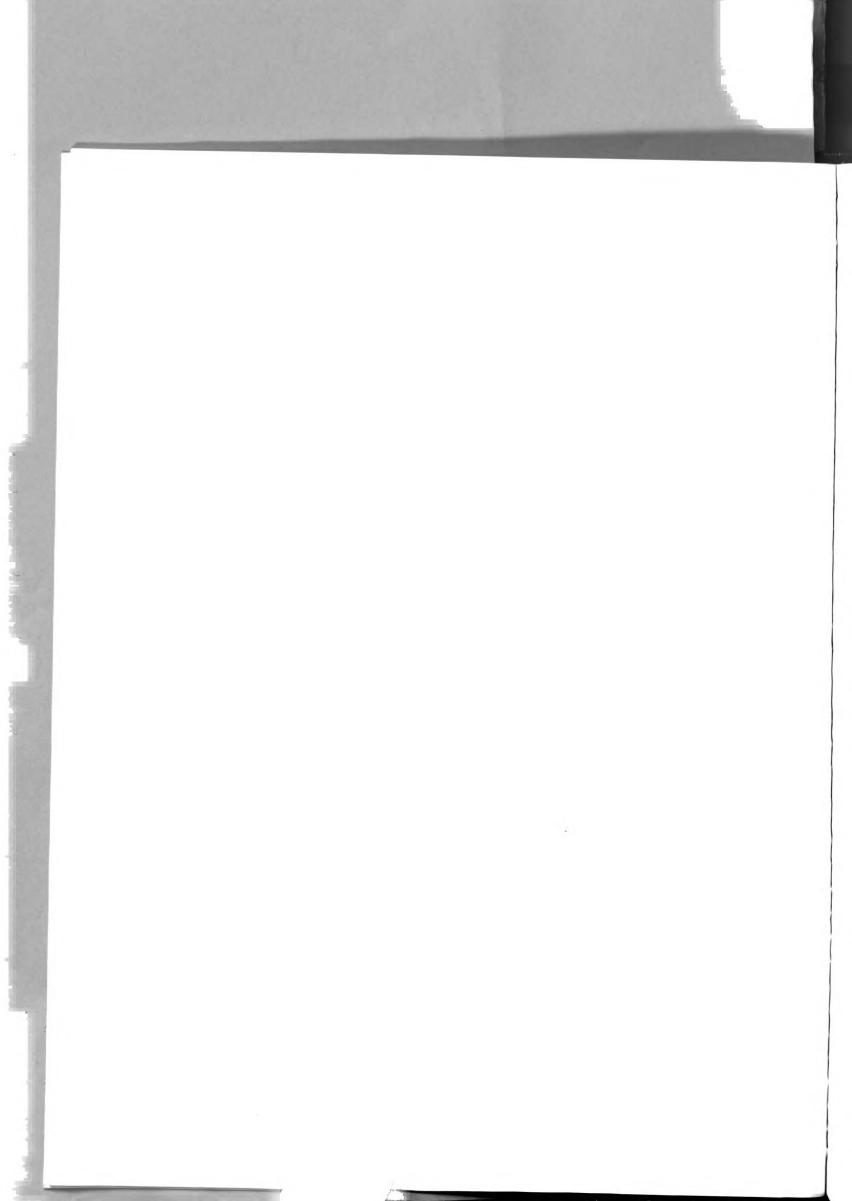
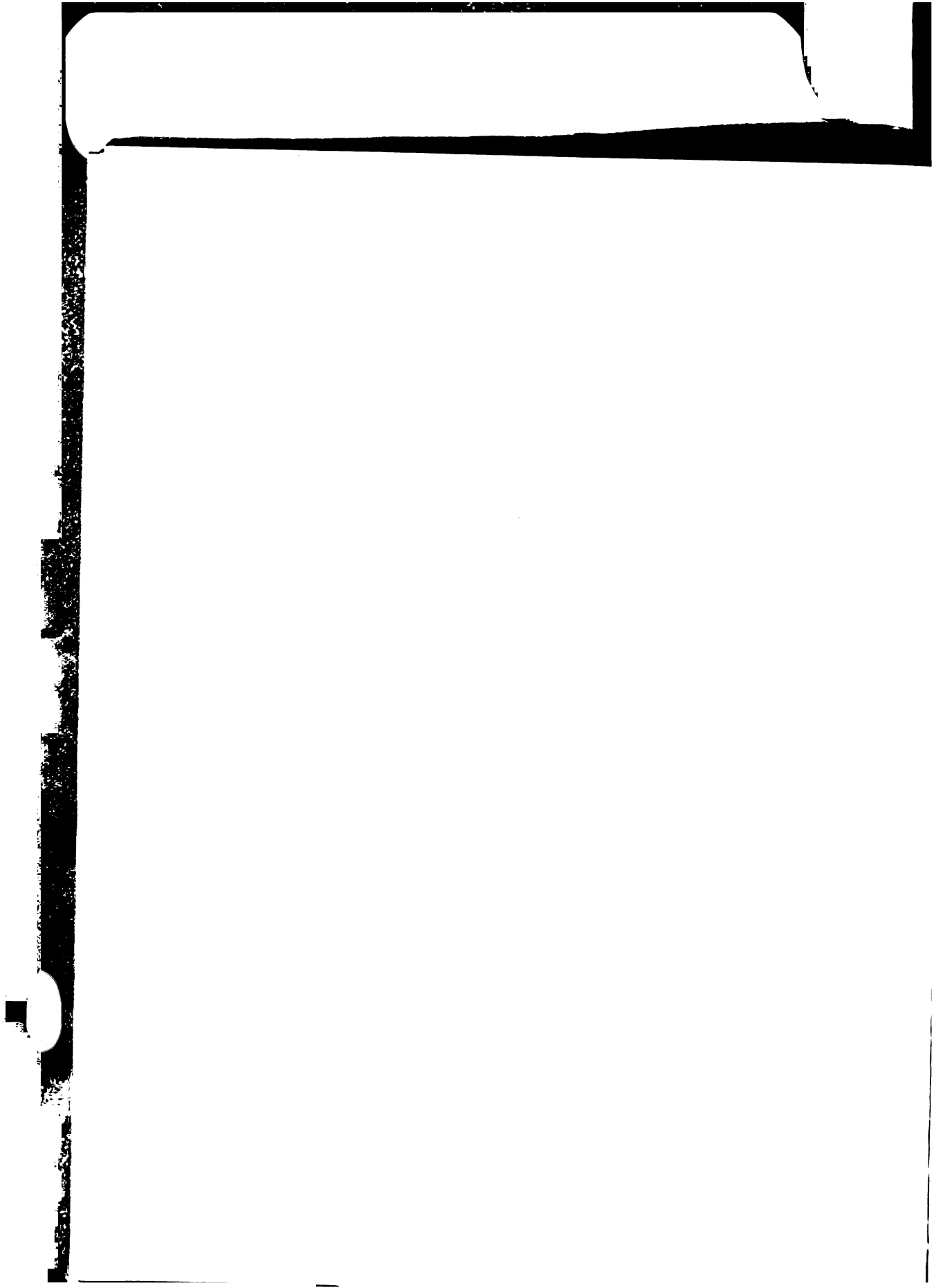




TABLE OF CONTENTS

	Page
ACKNOWLEDGMENTS.	11
LIST OF TABLES	v
LIST OF FIGURES.	vi
Chapter	
I. THE PROBLEM	1
The Statement of the Problem	1
Importance of the Problem	2
Rationale of the Study	4
The Research Hypotheses	6
Organization of the Study	6
II. REVIEW OF THE LITERATURE.	7
Special Curriculum Groups	7
Freshmen Students	12
Discrepant Achievers	14
Discussion of Selected Studies.	22
Summary	23
III. DESIGN AND METHODOLOGY	25
Population	25
Instrumentation.	26
Data Collection Procedures	32
Analysis Procedures	33
Null Hypotheses.	34
Summary	35
IV. ANALYSIS OF DATA	36
Reliability Analysis	36
Correlational Analysis	38
Multiple Correlation	42
Summary	54
V. SUMMARY, CONCLUSIONS, AND IMPLICATIONS	56
Conclusions	59
Discussion of Results.	60
Implications for Further Research.	63

Chapter	Page
BIBLIOGRAPHY	65
APPENDIX.	67



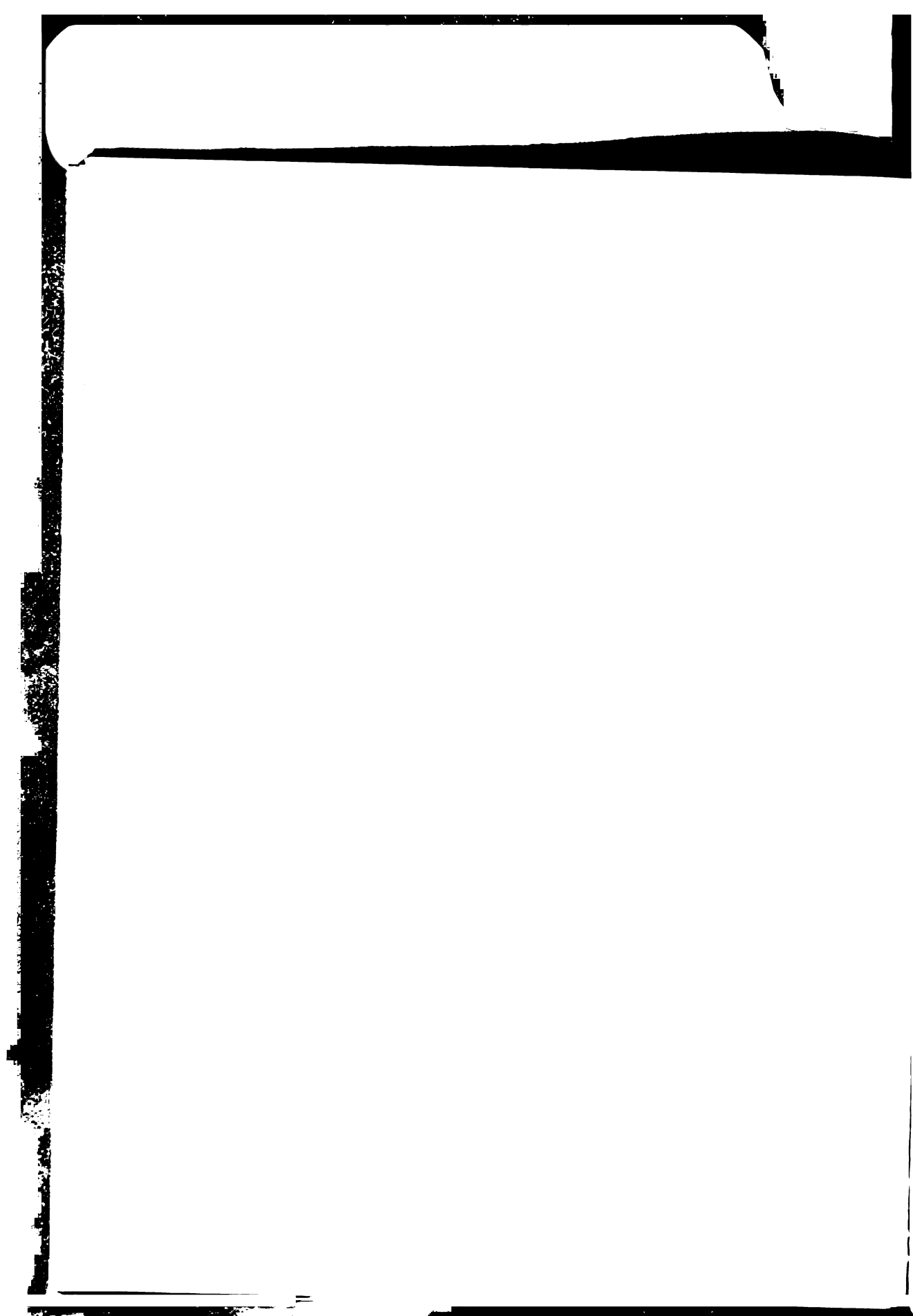
LIST OF TABLES

Table		Page
1.	Summary of Hoyt's Analysis of Variance Reliability Estimates for the M-Scales .	37
2.	Intercorrelations Among Achievement, Aptitude, and M-Scales	40
3.	Two Variable Estimates of Grade Point Average Achievement Criterion with Corresponding Beta Weights and Multiple Correlations.	44



LIST OF FIGURES

Figure		Page
1.	Distribution of GSCI Raw Scores for Males (N=50)	46
2.	Distribution of WRL Raw Scores for Males (N=50)	47
3.	Distribution of HTI Raw Scores for Males (N=50)	48
4.	Distribution of M-Total Scores for Males (N=50)	49
5.	Distribution of GSCI Raw Scores for Females (N=50)	50
6.	Distribution of WRL Raw Scores for Females (N=50)	51
7.	Distribution of HTI Raw Scores for Females (N=50)	52
8.	Distribution of M-Total Scores for Females (N=50)	53





CHAPTER I

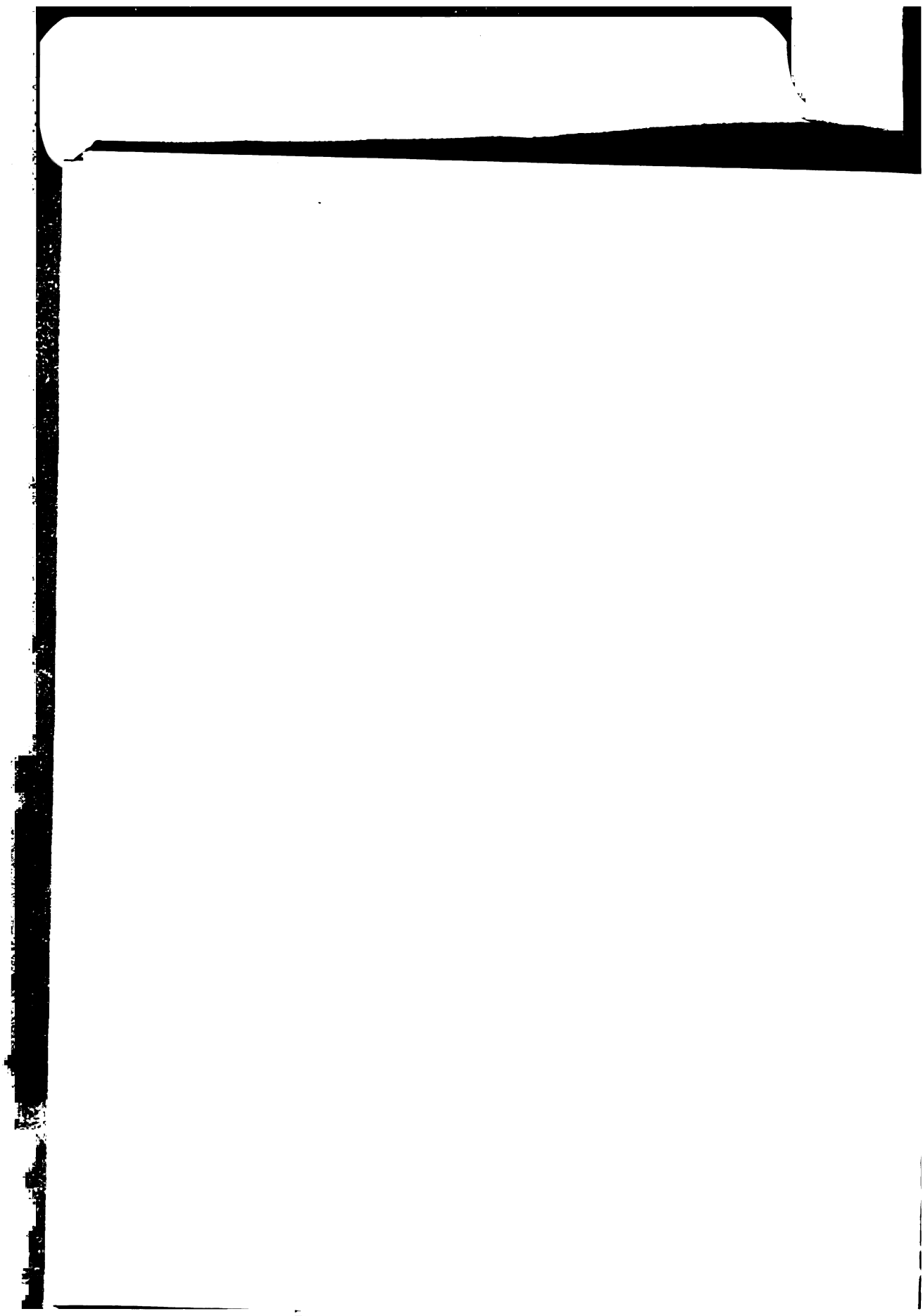
THE PROBLEM

During the past decade an increasing volume of educational research has been directed to the study of academic achievement of college students. Fishman and Pasanella list a total of 70 studies, published and unpublished, completed by 44 colleges which used both non-intellective and intellective characteristics as predictors of college achievement. These studies constitute 12 per cent of the total of 580 college admission-selection studies completed in the period 1949-1959.¹

The Statement of the Problem

While the major effort of such research has been focused upon the relationship of intellective characteristics to academic achievement, an increasing number of researchers have investigated the relationship of non-intellective characteristics to academic achievement. In contrast to research on the intellective characteristics of college students, research on

¹J. A. Fishman and A. K. Pasanella, "College Admission-Selection Studies," Rev. Educ. Research, 30 (1960), pp. 298-310.



the non-intellective characteristics has long been confronted with a number of methodological problems.

Perhaps most serious of the problems is the lack of theoretically-based objective instruments which have been constructed specifically for use in assessing the relationship of motivational factors to achievement in an academic setting. In the absence of such instrumentation, the practice has been to use objective and projective personality measures developed primarily for other purposes.

The Michigan State M-Scales, an objective research measure of academic motivation, was recently developed and published by Farquhar and associates.² The purpose of the present research is to determine the predictive validity of the Michigan State M-Scales, Form C, in the academic achievement of a college population. Sample items of the M-Scales may be found in the Appendix.

Importance of the Problem

College and university admissions personnel have traditionally used past achievement records and intel-

²W. W. Farquhar, A Comprehensive Study of the Motivational Factors Underlying Achievement of Eleventh Grade High School Students, Research Project No. 846 (8458), Supported by the U. S. Office of Education, in cooperation with Michigan State University, 1959.

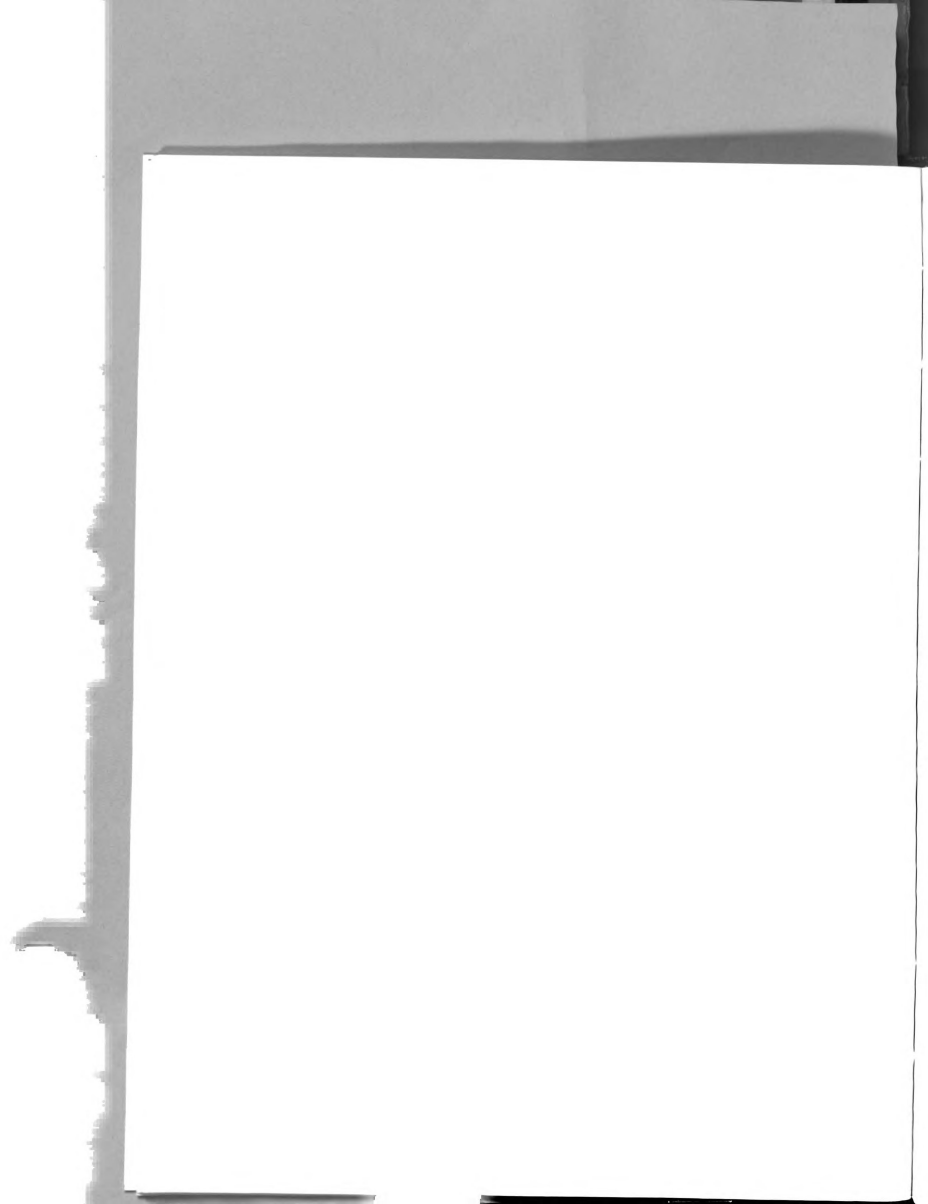


lective criteria in their selection procedures. In addition to their use as admissions criteria, these indices of achievement and aptitude are being more widely used in the educational guidance of students with the rapid influx of students coming from heterogeneous educational backgrounds.

Although considerable refinement of academic aptitude instrumentation has led to some improvement in the precision of prediction, a good part of the variance in achievement of college students is still unaccounted for. Borow agrees with other investigators that the greater part of the variance among college students in academic achievement is unexplained by the predictive indices in use. He concludes that a consequent and considerable margin for error exists in the selection process.³

The validity of the assumption that intellectual criteria (aptitude tests) alone are effective predictors of college achievement has been opened to question with the appearance of the conceptual framework of over- and under-achievement and the findings of studies focused upon college-level discrepant achievers. Non-intellectual characteristics, particularly that of

³H. Borow, "Current Problems in the Prediction of College Performance," J. Amer. Assoc. Coll. Registr., 22 (1946), pp. 14-26.



academic motivation, are receiving greater emphasis in empirical studies of academic achievement and being cited as determining variables in the academic achievement of college students.

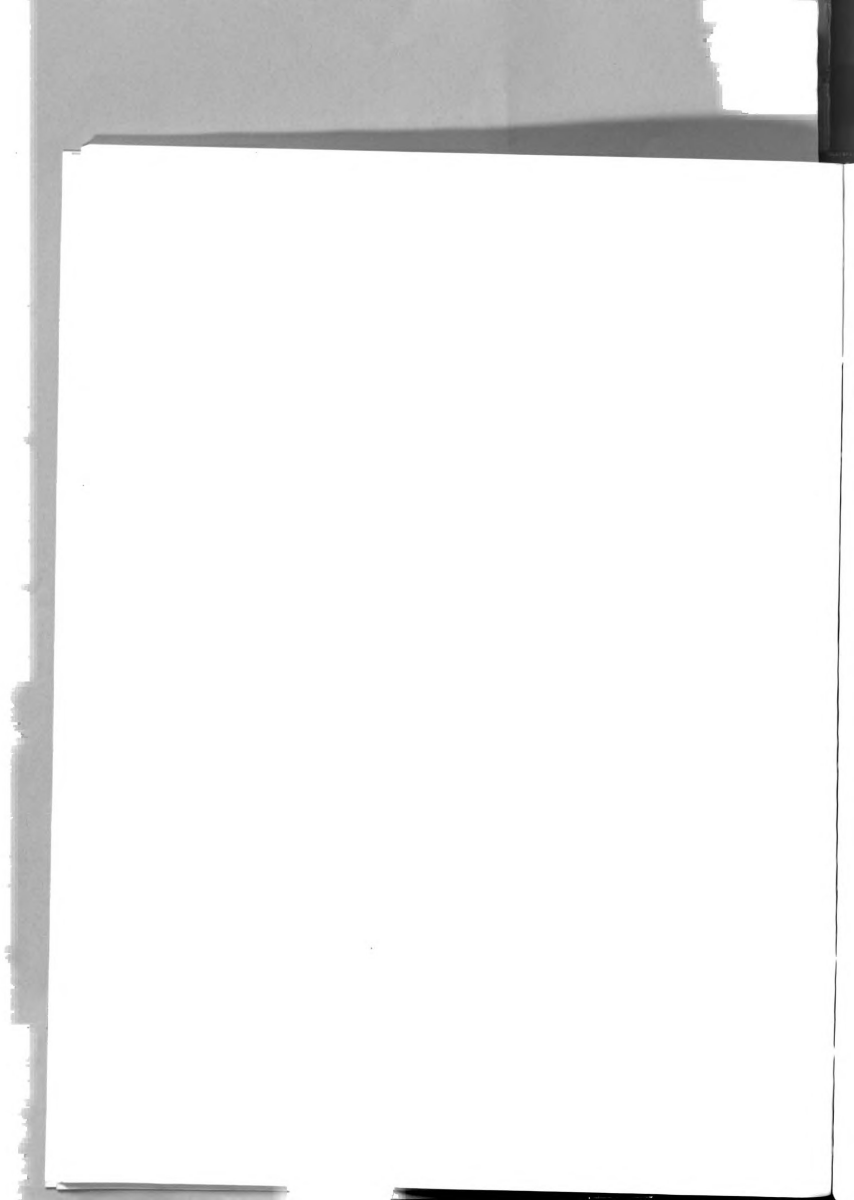
Attempts to reduce the unexplained variance in the prediction of academic achievement by means of academic motivation are directly dependent upon the availability of instruments which have validity for such purposes. The value of such an instrument would derive from increased precision in selection of students for college entrance and more efficient educational-vocational counseling practices.

Rationale of the Study

Farquhar and associates have defined academic motivation as "a combination of forces which initiate, direct, and sustain behavior toward a scholarly goal."⁴ Motivation is conceptualized as a variety of forces which can take the form of multi-factor causality.

The authors of the Michigan State M-Scales hypothesized that academic motivation is a personality complex or syndrom which consists of the following

⁴William 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. 9.



non-intellectual variables: (1) need for academic achievement, (2) self concept, (3) academic personalities factors.

Evidence that the above personality variables can be measured and objectively quantified has already been demonstrated in the research project centered upon the relationship of academic motivation to the academic achievement of eleventh grade students. The Michigan State M-Scales significantly discriminated between statistically defined (two-stage regression technique) discrepant achievers on such variables.⁵

For the purposes of the present study, academic motivation, a non-intellective factor, is being considered as having value in reducing the unexplained variance of achievement prediction at the college level. Academic motivation, as measured by the Michigan State M-Scales, has been demonstrated as having a positive relationship to academic achievement for special groups in a high school population. It is proposed in this study to determine the predictive validity of the M-Scales for a general population of college freshmen.

⁵Farquhar, A Comprehensive Study of The Motivational Factors underlying Achievement of Eleventh Grade High School Students. op. cit. (1959).



The Research Hypotheses

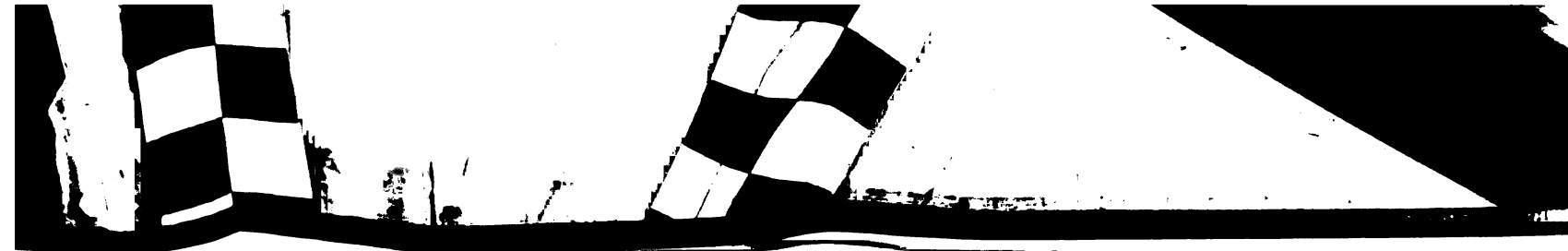
The research hypotheses to be tested in the study are:

- I. An objective assessment of academic motivation will have validity in estimating first quarter grade point averages for college freshmen.
- II. An objective assessment of academic motivation, when added to a measurement of academic aptitude, will increase the precision of estimating first quarter grade point averages for college freshmen.

Organization of the Study

The organization of the dissertation is as follows: In Chapter II a review of the research related to the investigation is presented together with a consideration of the limitations of such research. The general design of the study, including a description of the construction of the Michigan State M-Scales, sample selection, instrumentation, data collection procedures, and the techniques used in analyzing the data, is presented in Chapter III. The analysis of the data is presented in Chapter IV. The summary, conclusions, and implications for further research are presented in Chapter V.





CHAPTER II

REVIEW OF THE LITERATURE

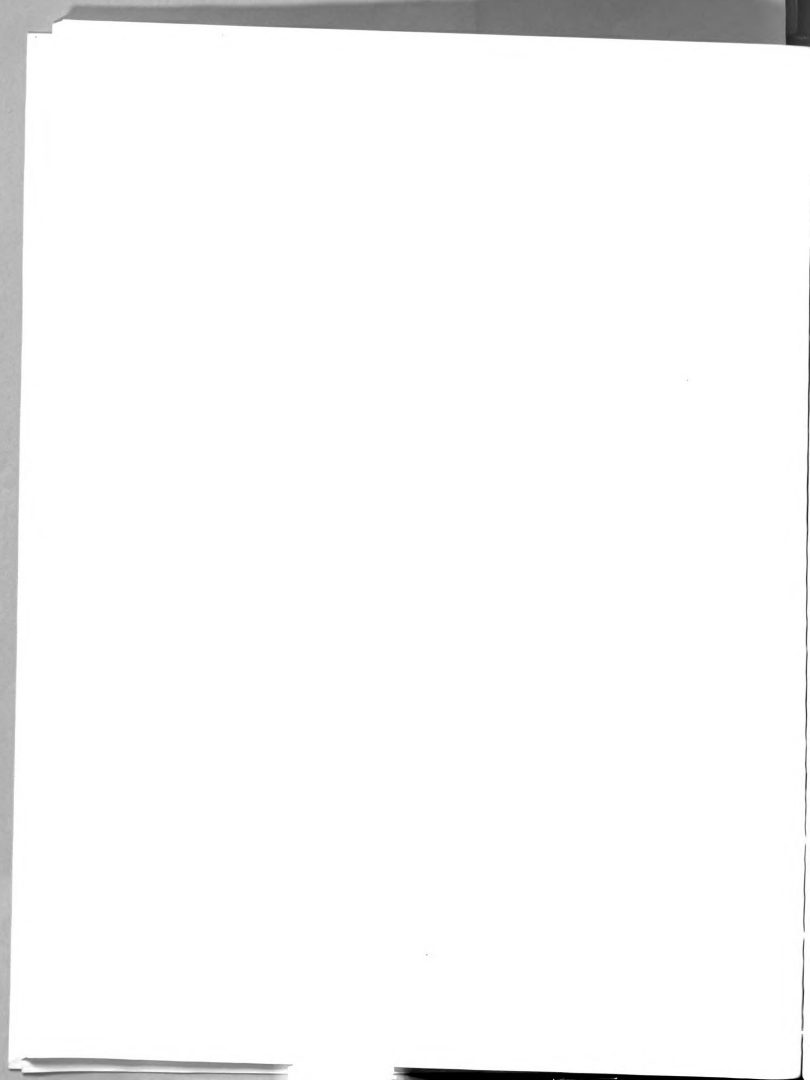
A review of the literature on the relationship of non-intellective variables and college achievement for the period 1952-1962 gives evidence of the variety of personality instruments used in this research area. The studies will be presented, according to the type of college population investigated, together with a discussion of the limitations of the studies.

Special Curriculum Groups

Klugh and Bendig (1955), Mitchell (1961), Weiss, Wertheimer, and Groesbeck (1959) investigated the relationship between non-intellective variables and academic achievement in special curriculum groups. A review of the three studies, including the investigator's statement of purpose, sample, design, and findings, is presented followed by a critical analysis.

Klugh and Bendig

Klugh and Bendig investigated the relationship of non-intellectual variables as measured by the Taylor Manifest Anxiety Scale and the Hr (Honor Point



Ratio) Scale of the California Personality Inventory to academic achievement.¹

Sample.--One hundred eighty-four men and women students enrolled in introductory psychology classes at the University of Pittsburgh during the fall semester of 1954-1955.

Design.--The Taylor Manifest Anxiety (TMA), Hr scale, and American Council on Education Psychological Examination (ACE) were administered to all subjects. Raw scores on the three tests were converted to stanines on the basis of previous group norms. Intercorrelations were computed between the variables and multiple correlations were calculated between the independent variables and GPA.

Findings.--A correlation of .29 (significant at .01 level) was obtained between ACE and Hr scores. A correlation of -.29 (significant at .01 level) was obtained between the Hr and TMA scores. The correlations of ACE and Hr scores with GPA were: ACE, .62, Hr, .32 (both significant at .01 level).

Comparisons of the single order and multiple correlations indicated that a combination of the ACE and Hr scales is a better predictor of GPA than ACE alone (significant at .05 level). Adding the Taylor

¹H. A. Klugh, and A. W. Bendig, "The Manifest Anxiety and ACE Scales and College Achievement," J. Consult. Psych., 19 (1955), p. 487.

Manifest Anxiety Scale to the ACE, Hr combination did significantly (.05 level) increase the multiple correlation with GPA.

Critical Analysis.--The author did not include an adequate description of the method of sampling selection used nor an adequate description of the sample (i.e., whether freshman, sophomore, junior, or senior status). The addition of the two personality measures (TMA and Hr Scales) to an aptitude predictor was reported as significantly increasing the prediction of GPA but the size of the resultant multiple correlation was not indicated. The criterion, GPA, was not adequately described.

Mitchell

Mitchell investigated the correlates of different measures of achievement motivation and conducted an analysis of the factorial dimensions of achievement motivation.²

Sample.--One hundred thirty-one female students in the teacher training curriculum at the University of Texas. All subjects were members of the investigator's sections in elementary educational psychology.

²J. V. Mitchell, "An Analysis of the Factorial Dimensions of the Achievement Motivation Construct," J. Educ. Psych., 52 (1961), pp. 179-187.

Design.--The grade point average for the semester in which the study was conducted and the scores on the American Council on Education Psychological Examination (ACE) were used to compute a discrepancy score which was used as the criterion variable for achievement motivation.

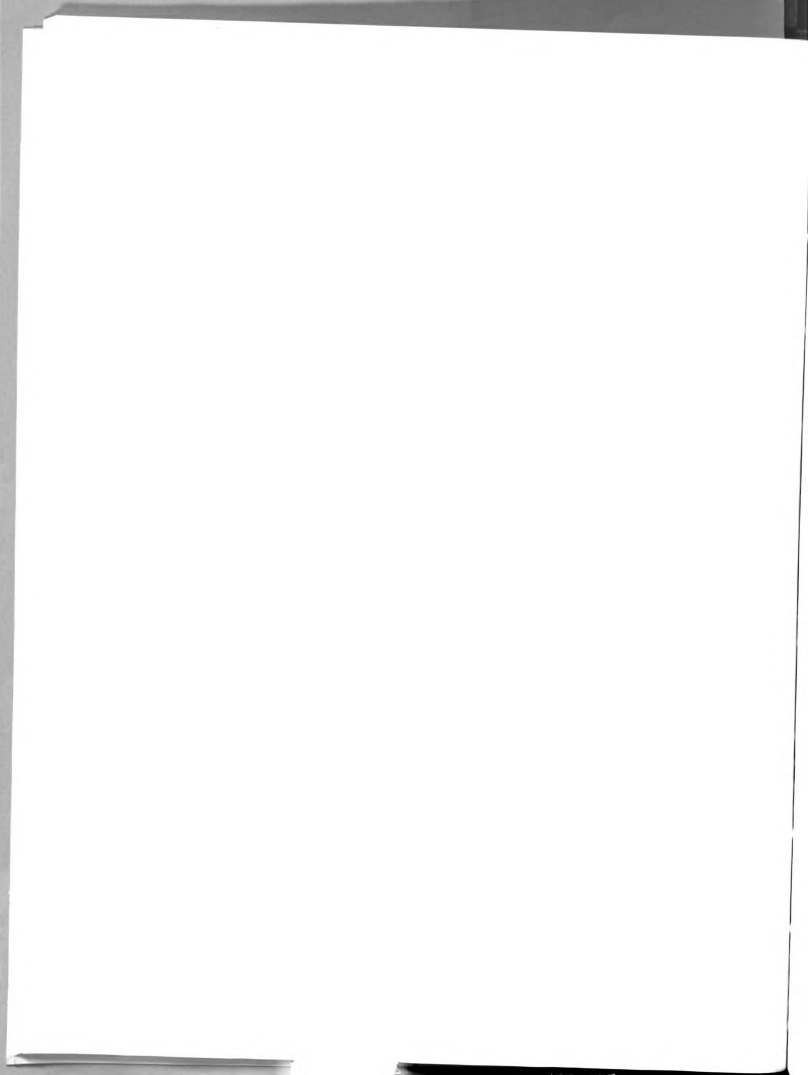
Several measures of achievement related attitudes, including the McClelland Test of Achievement Motivation (MTAM), were administered to all subjects. Intercorrelations were computed between the measures of achievement motivation, ACE, discrepancy score, and GPA.

Findings.--Scores on the MTAM correlated .18 (significant at .05 level) with the discrepancy score. A correlation of -.06 (non-significant) was obtained between MTAM scores and GPA. A negative correlation of -.23 (significant at .01 level) was obtained between the MTAM and ACE.

Critical Analysis.--The rationale for the choice of the criterion (discrepancy score) was not explicitly stated. The method of sampling selection used and the description of the sample was not adequate.

Weiss, Wertheimer, and Groesbeck

Weiss, Wertheimer, and Groesbeck investigated the relationship between n Achievement scores of the



Edwards Personal Preference Schedule (EPPS) and McClelland Picture Story (MPS) scores and academic achievement.³

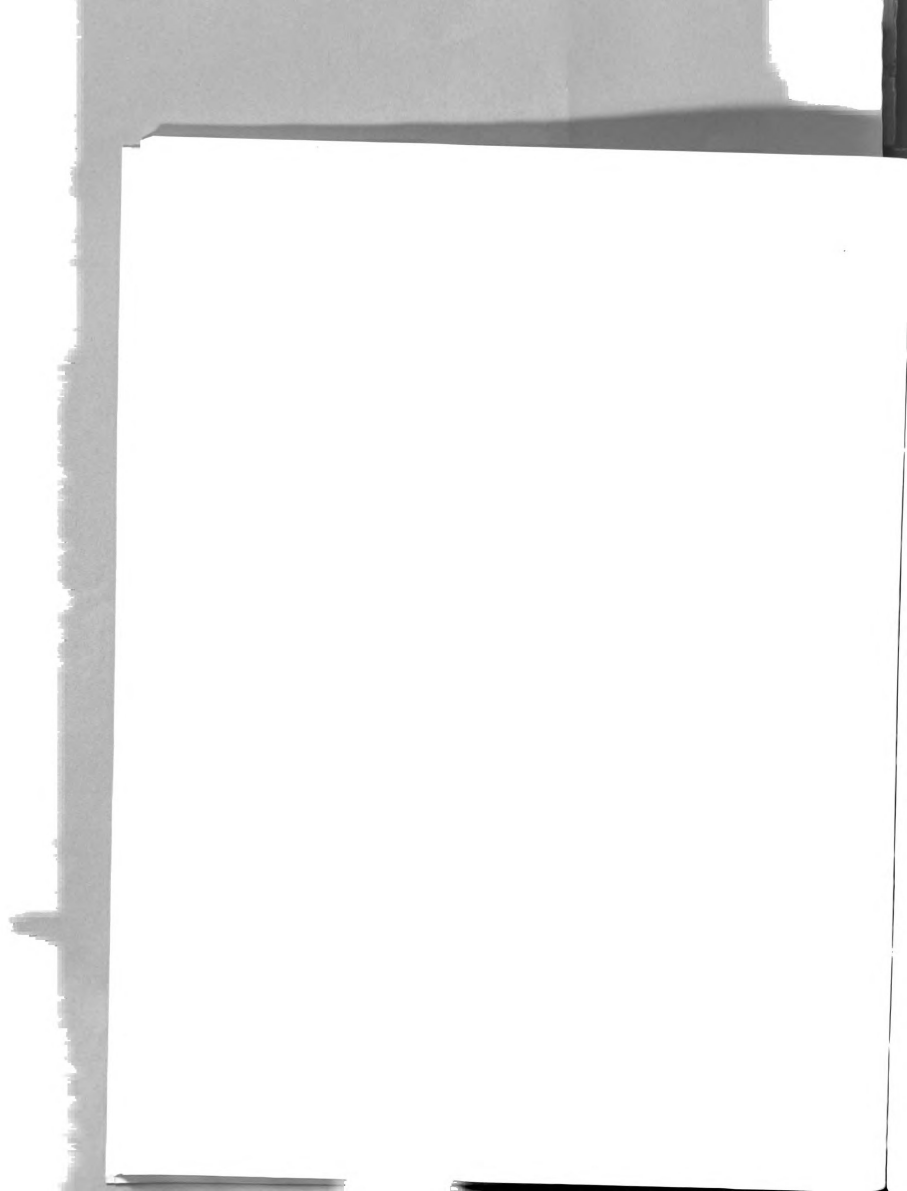
Sample.--Sixty male students at the University of Colorado. All subjects were in introductory psychology classes.

Design.--The two personality instruments (EPPS and MPS) were administered to all subjects. The criterion was the three semester cumulative grade point average for the freshman year. Intercorrelations were computed between the two personality tests and GPA.

Findings.--The correlation between Achievement scores of the EPPS and GPA was .42 (significant at .05 level). The correlation between MPS scores and GPA was .34 (significant at .05 level).

Critical Analysis.--Evidence of rater reliability on the scoring of the McClelland Test of Achievement Motivation protocols was not offered. On the basis of other evidence, the omission of a reliability estimate of scorer consistency considerably limits the conclu-

³P. Weiss, M. Wertheimer, B. Groesbeck, "Achievement, Academic Aptitude and College Grades," Educ. and Psych. Mst., 19 (1959), pp. 663-666.



sions of the study.⁴ Evidence of use of the consistency scale of the EPPS was not given.⁵

Freshmen Students

Published studies of research centered on the relationship of non-intellective variables to college achievement with a general college population are at a minimum. Frick's study (1955) represents the one published study in the area in the period 1952-1962.

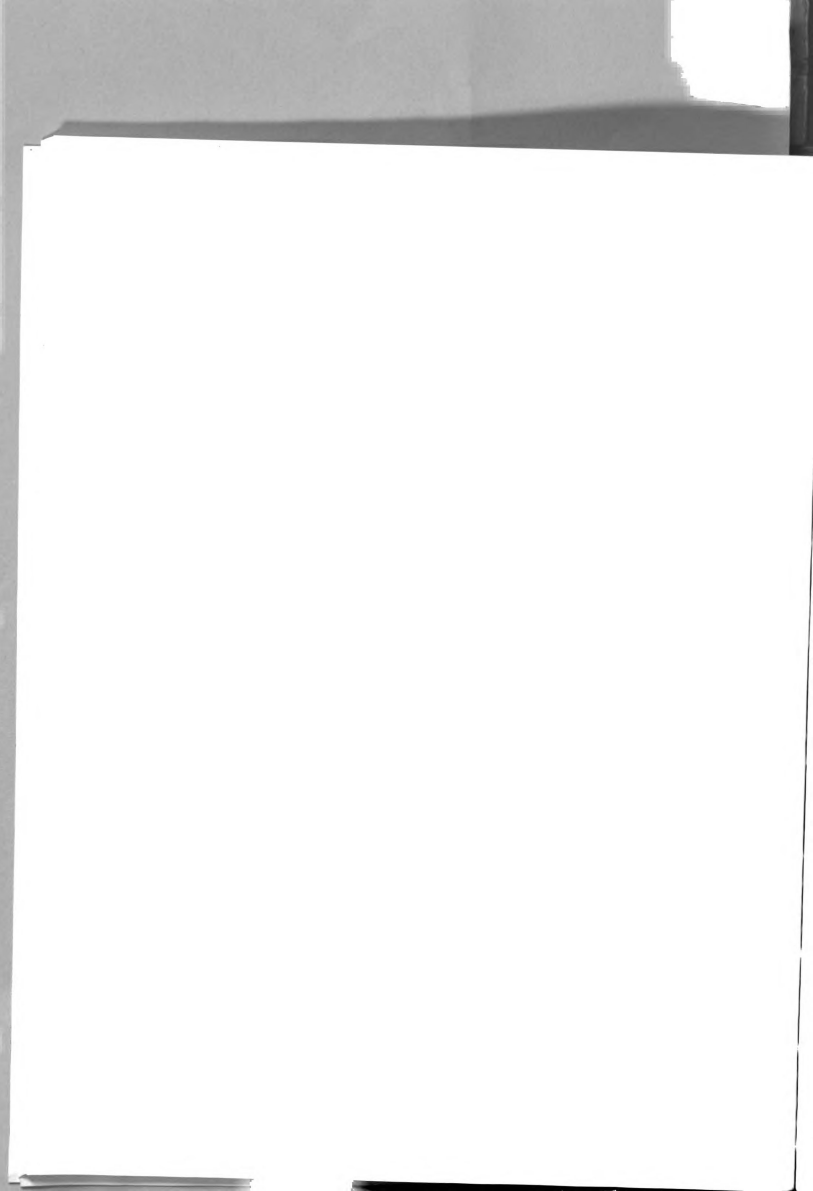
Frick

Frick investigated whether the addition of personality variables in a battery would improve prediction of grade point average of a relatively homogeneous population over that afforded by an aptitude test alone.⁶

⁴Farquhar and Krumboltz obtained a retest reliability of .26 after a 9 week interval for the McClelland Test of Achievement Motivation. "The low reliability would cast doubt on the stability as well as the possible validity of the instrument," see J. Krumboltz and W. W. Farquhar, "Reliability and Validity of the n-Achievement Test," J. Consult. Psych., 21 (1957), pp. 226-228.

⁵In the EPPS test manual, Edwards advises against using profiles which have Consistency scores lower than 9. See A. L. Edwards, Edwards Personal Preference Schedule Manual (New York: Psychological Corporation, 1959), p. 16.

⁶J. W. Frick, "Improving the Prediction of Academic Achievement by Use of the MMPI," J. Appl. Psych., 39 (1955), pp. 49-52.



Sample.--Two hundred sixty-seven women at the University of California, who had completed two semesters of the freshman year in 1951 and 1952. In order to be included in the sample, each subject's validating scales on the Minnesota Multiphasis Inventory (MMPI) had to be within acceptable limits for research purposes.

Design.--The two instruments (American Council on Education Psychological Examination (ACE) and MMPI) were administered to all subjects at the time of matriculation. Pearsonian coefficients of correlation were computed between the variables and first year GPA. A multiple regression model was used to determine the increase in prediction of GPA attained by addition of MMPI scales to a measure of aptitude (ACE).

Findings.--All scales of the MMPI were negatively correlated with ACE scores. The Paranoid (Pa) scale of the MMPI correlated .13 (significant at .05 level) with GPA. ACE scores correlated .48 (significant at .01 level) with GPA.

The coefficient of multiple correlation derived by combining the beta weights for all 8 scales (Hs, D, Hy, Pd, Pa, Pt, Sc, Ma) of the MMPI and the ACE was .64. The coefficient of determination when GPA is predicted from ACE scores alone was .23; the coefficient of multiple determination was equal to .41.



Critical Analysis.--The author used the MMPI scales on the basis that good personality adjustment, as indicated by the MMPI, would be reflected in grade point average. No research hypothesis is generated to indicate the expected findings. The criteria for indicating that the sample is a relatively homogeneous group are not explicitly stated, nor was the proportion of subjects eliminated from the sample because of low validating scores on the MMPI given. A test of significance for the beta weights of the ACE and MMPI was not included.

Discrepant Achievers

Gebhart and Hoyt (1958), Krug (1959), Merrill and Murphy (1959), and Morgan (1952) investigated personality differences between some combination of students defined as high, average, or low achievers.

Gebhart and Hoyt

Gebhart and Hoyt investigated some personality correlates of over- and under-achievement.⁷

Sample.--Two hundred and forty freshmen selected on the basis of predicted grade point average from the population of male freshmen enrolled in the Schools of

⁷G. G. Gebhart, and D. P. Hoyt, "Personality Needs of Under- and Over-Achieving Freshmen," J. Appl. Psych., 42 (1958), pp. 125-128.

Engineering and Architecture or Arts and Letters at Kansas State College in the fall of 1956-1957.

Each of the two school groups was subdivided into three ability levels on the basis of predicted GPA. The Pre-Engineering Ability Test was used in making the predictions for Ss in the College of Engineering and Architecture; the American Council on Education Psychological Examination (ACE) was used in making the predictions for Ss in the College of Arts and Letters.

A further subdivision of subjects was made into over- and under-achievers on the basis of achieved versus predicted grade point averages for the first semester. These procedures resulted in 12 groups (2 schools, 3 ability levels, 2 levels of achievement).

Design.--A factorial design was employed and an analysis of variance technique used on each of the 16 variables of the Edwards Personal Preference Schedule (EPPS). The personality instrument had been administered to all subjects at the time of matriculation. First semester grades were the criterion of achievement.

Findings.--Over-achievers scored significantly higher than under-achievers on the Achievement (.001 level), Order, Intraception, and Consistency scales (all at .05 level) of the EPPS. Under-achievers

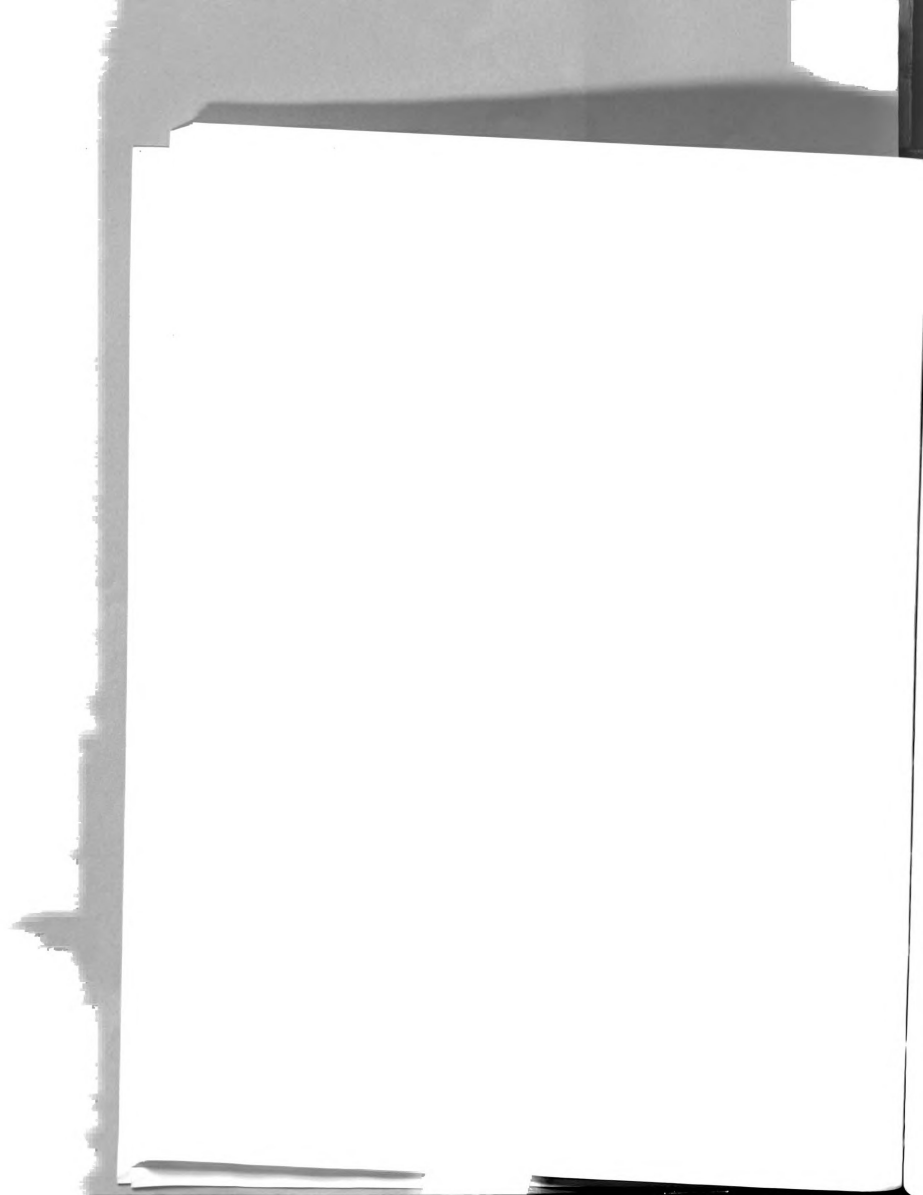
scored significantly higher than over-achievers on the Nurturance (.001 level), Affiliation (.05 level), and Change (.01 level) scales of the EPPS.

Critical Analysis.--The author did not explicitly indicate the empirical or theoretical rationale for comparing groups of discrepant achievers from two different schools within the college. A technical criticism derives from the use of different bases of prediction (i.e., Pre-Engineering Ability Test for Ss in the School of Engineering and Architecture and American Council on Education Psychological Examination for Ss in the School of Arts and Letters) for the two groups at the first semester level without including statistics on the first semester attrition rate due to changes of major. The inclusion of Ss in the Low Ability range with Consistency scores less than 9 (mean of the group on the Consistency scale was 10.3 with a standard deviation of 2.1) would appear questionable in light of Edwards' manual recommendations.⁸

Krug

Krug investigated the relationship between Edwards' Personal Preference Schedule scores and over-

⁸ In the EPPS test manual, Edwards advises against using profiles which have Consistency scores lower than 9. See Edwards, op. cit., p. 16.



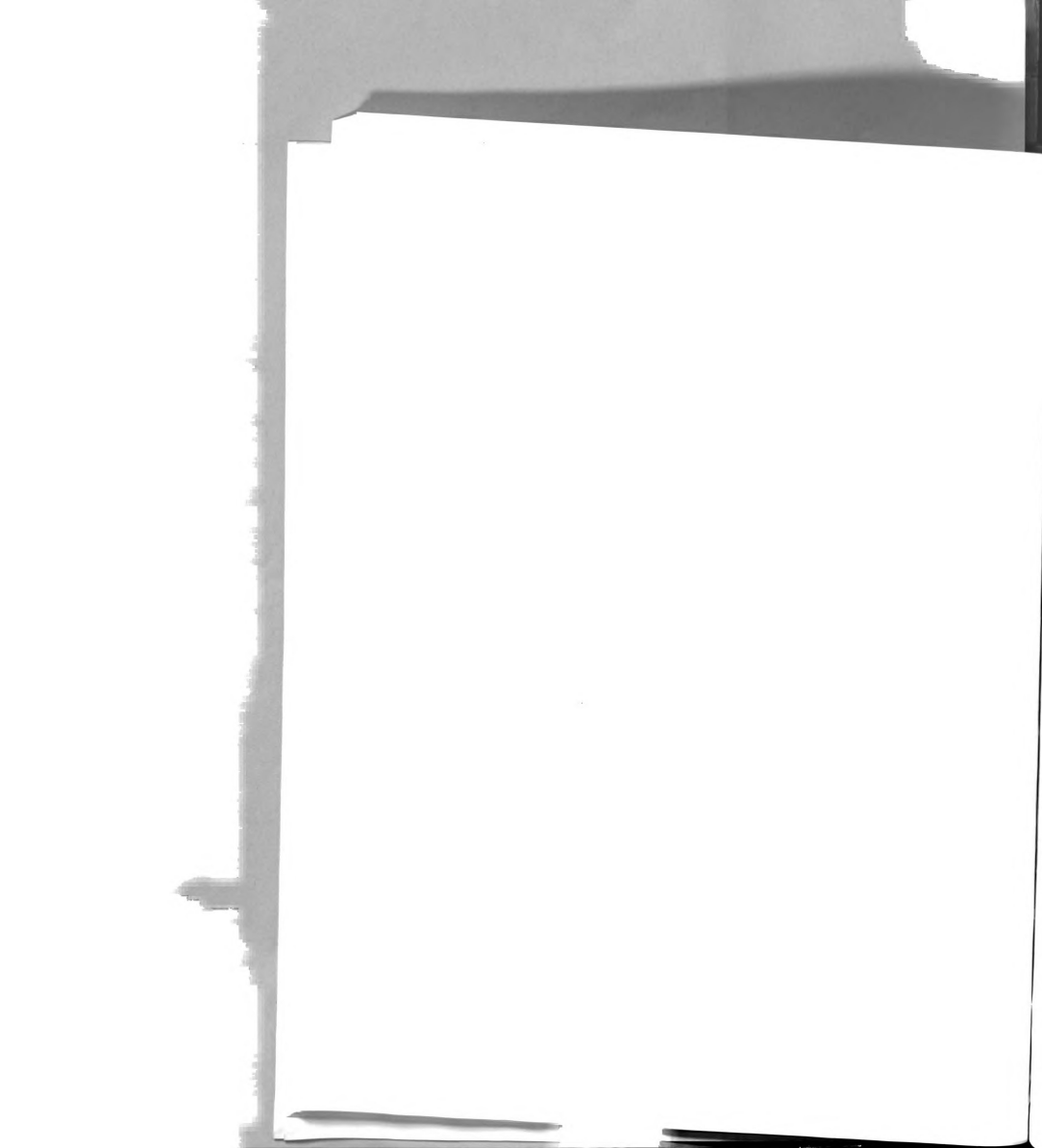
and under-achievement in engineering students at Carnegie Tech.⁹

Sample.--Two samples, each consisting of 120 Ss, were drawn from the population of 411 freshmen who entered the College of Engineering and Science in September, 1956. Two predictions of grade point average were made for each subject: (1) the performance-based prediction was made on the basis of achievement scores of the College Entrance Board Examinations and high school standings; (2) the aptitude-based prediction was made on the basis of Verbal and Math scores from the College Board Scholastic Aptitude Test.

A student was assigned to the over-achievement group if his first year grade point average was above the predicted GPA; to the underachievement group if the average was below that predicted. In each of the two samples there were 20 subjects at each of the 3 levels (high, normal, low) of expected performance for both over- and under-achievement groups.

Design.--A factorial design was used (2 prediction bases, 3 predicted achievement levels). An analysis of variance technique was used on each of the 15 scales of the EPPS.

⁹R. E. Krug, "Over- and Underachievement and the Edwards Personal Preference Schedule," J. Appl. Psych., 43 (1959), pp. 133-136.

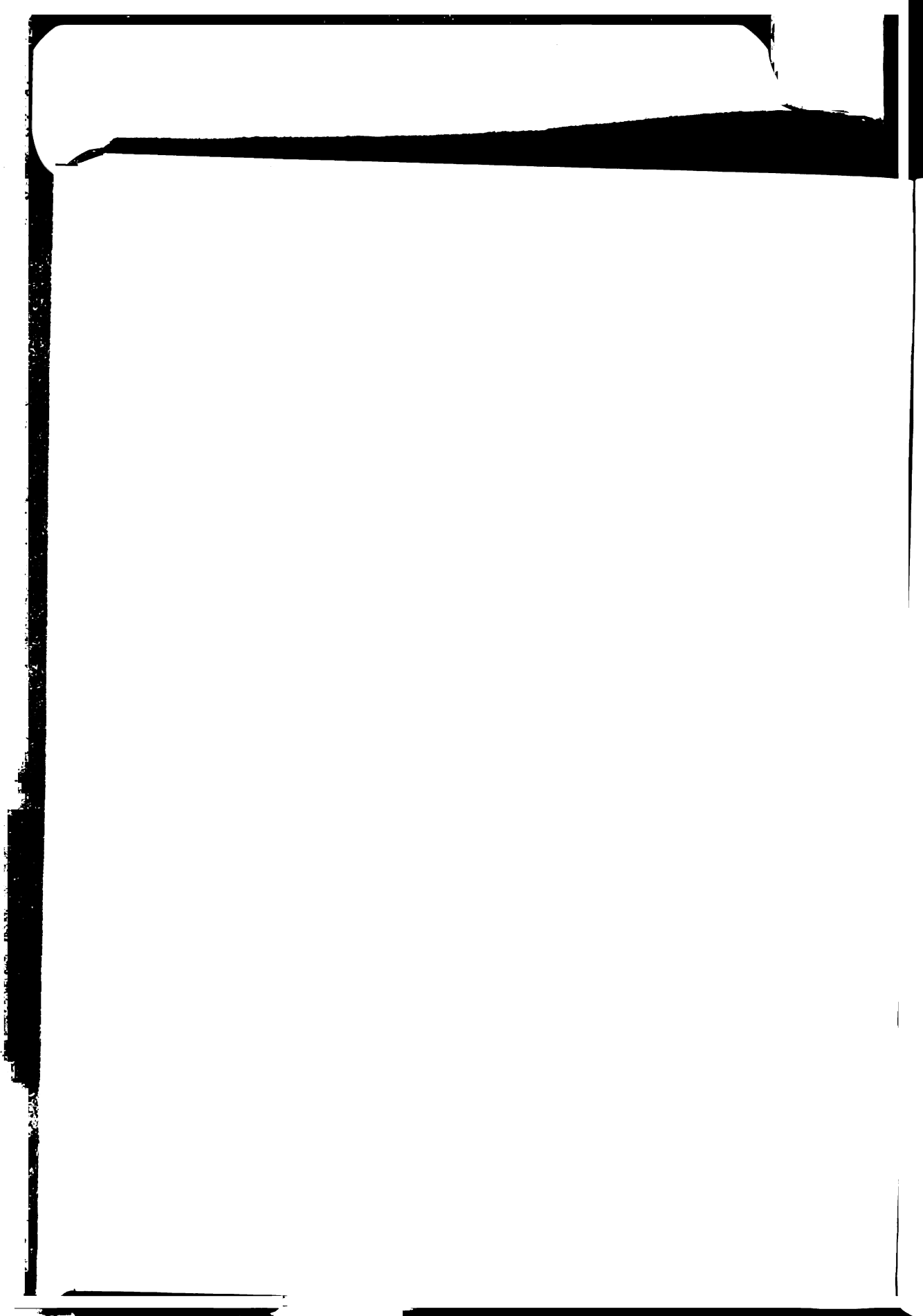


Findings.--In the aptitude-based sample, over-achievers scored significantly higher than under-achievers on the Achievement (.001 level), Order (.05 level), and Endurance (.01 level) scales of the EPPS. Under-achievers scored significantly higher than over-achievers on Affiliation (.01 level) and Heterosexuality (.05 level) scales of the EPPS.

In the performance-based sample, the null hypothesis of no difference between groups of over- and under-achievers on the scores of the EPPS was accepted for all scales except that of Achievement. The over-achievers scored significantly higher than under-achievers on the Achievement (.05) scale of the EPPS.

Critical Analysis.--The author did not report using a test of significance for the discrepancy between achieved and predicted GPA. In the discussion of results, significant interaction (between groups and levels) was reported for Deference, Succorance, and Endurance scales of the EPPS in the aptitude-based group but the level of significance was not indicated. Evidence of use of the consistency scale of the EPPS was not given.¹⁰

¹⁰Edwards, op. cit.



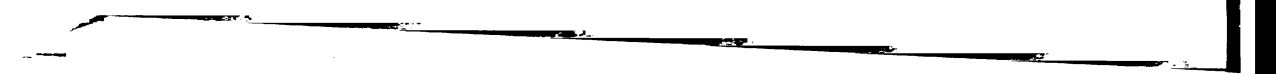
Merrill and Murphy

Merrill and Murphy investigated personality factors as measured by the Edwards Personal Preference Schedule (EPPS) which may discriminate between a group of college students with low predicted academic achievement who seem to be overachieving and a group of similar students who seem to be performing as predicted and thus are failing.¹¹

Sample.--The sample was selected from the population of 300 freshmen admitted to the University of Utah in the fall quarter, 1955-1956, whose predicted grade point average was 1.50 or below. A multiple correlation formula (Jex, 1949, University of Utah) which uses high school grades and achievement test scores was used in prediction of grade point average.

The over-achieving sample (N, 49) consisted of those students who had attained a grade point average of 2.00 or above after one quarter of college work. The achieving-as-expected sample (N, 52) consisted of those students who had attained a grade point average of 1.00 or below after one quarter of college work.

¹¹ R. M. Merrill, and D. T. Murphy, "Personality Factors and Academic Achievement in College," J. Couns. Psych., 6 (1959), pp. 207-210.



Design.--The Edwards Personal Preference Schedule (EPPS) had been administered to all subjects as part of a special course required for the population from which the samples were drawn. The mean scores of the 111Ss on the 15 scales of the EPPS were analyzed using the "t" test of significance of differences between means.

Findings.--The over-achieving sample scored significantly higher than the achieving-as expected sample on Dominance (.01 level), Deference (.05 level), and Endurance(.05 level) scales of the EPPS.

The achieving-as-expected sample scored significantly higher than the over-achieving sample on Autonomy (.01 level), Affiliation (.05 level), and Change (.05 level) scales of the EPPS.

Critical Analysis.--The author did not generate a research hypothesis which would indicate on which scales the two groups might differ even though it would appear that adequate theoretical base is available for directional decisions. The selection of the population from which the two samples were drawn in 1955-1956 on the basis of a prediction formula derived in 1949 would seem indefensible. Evidence of use of the consistency scales of the EPPS was not given.¹²

¹²Edwards, op. cit.



Morgan investigated the relationship between certain measured personality variables and the academic achievement of achieving and nonachieving college students of high ability.¹³

Sample.--One hundred and thirty-two male students from the College of Science, Literature, and the Arts at the University of Minnesota who had scored at 136 or above on the American Council of Education Psychological Examination (ACE). On the basis of first year grade point average, the sample was subdivided into three groups (high, middle, low). In order to obtain two clearly defined groups which could be characterized as achievers and non-achievers, only the achievers (high range, N= 40) and nonachievers (low range, N= 30) were considered in the study.

Design.--Comparisons of the scores of achievers and nonachievers were made on the Minnesota Multiphasis Personality Inventory (MMPI) and the Thematic Apperception Test (TAT). The mean scores of the 70 subjects were analyzed using "t" tests of significance.

Findings.--Achievers scored significantly higher than nonachievers on three of the special scales of the MMPI: (1) Dominance, (2) Social Responsibility,

¹³H. M. Morgan, "A Psychometric Comparison of Achieving and Nonachieving College Students of High Ability," J. Consult. Psych., 16 (1952), pp. 292-298.

(3) Intellectual Efficiency (all significant at .01 level). Achievers scored significantly higher than nonachievers on n, Achievement (.02 level) scores derived from TAT stories.

Critical Analysis.--A test of significance of the difference between means of achieved GPA for the two groups was not included. A reliability estimate of the scoring of the TAT protocols by the investigator was obtained by two independent judges rating a random sample of protocols.

Discussion of Selected Studies

Evidence that a relationship does exist between measured non-intellective characteristics and academic achievement of college students has been demonstrated in the review of research. The findings of the studies must be viewed within the framework of a number of limitations related to the design and instrumentation used.

The limitations in design include (a) use of non-random or poorly defined sampling methods, (b) lack of cross-validation groups, (c) lack of operational definitions of the non-intellective variables under investigation, (d) lack of reliability and validity estimates of the non-intellective instrumentation.



The major limitation of the instrumentation derives from the use of instruments with sound theoretical base but limited validity evidence, or evidence of predictive validity but little theoretical base. The choice of instruments is essentially between theory and a "shot-gun" approach. What is needed is a validated instrument which incorporates both theory-base and predictive validity. In the following design chapter, a measure is described which appears to have the requisite elements defined above.

Summary

A review of the research on the relationship of non-intellective variables and academic achievement has been presented. The majority of published studies have been conducted with two types of college population: (a) special curriculum groups, and (b) discrepant achievers. This factor limits generalization of the findings to a general college population.

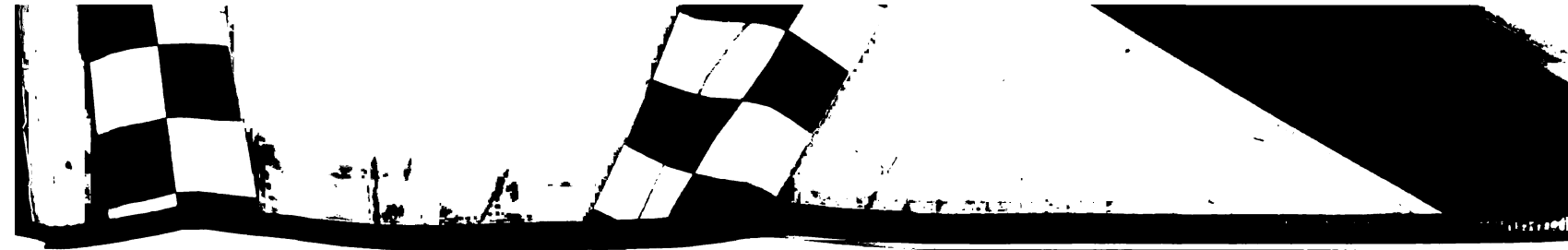
Gebhart and Hoyt, Krug, Merrill and Murphy in their study of low aptitude students found that dominance deference and endurance as measured by the Edwards Personal Preference Schedule, were the characteristics which differentiated between the achieving and the vailing low aptitude student.



Klugh and Bendig, in their study of a special curriculum group, demonstrated a positive relationship between the Hr scale of the California Personality Inventory and academic achievement. Mitchell found a negative relationship between n Achievement, as measured by the McClelland Test of Achievement Motivation, and academic achievement. Weiss, Wertheimer, and Groesbeck, using the Edwards Personal Preference Schedule, demonstrated a positive relationship between n Achievement and academic motivation.

No studies assessing the relationship between academic motivation and academic achievement in the general college population have been attempted to date. It was concluded that this factor derives from the non-availability of appropriate instrumentation.





CHAPTER III

DESIGN AND METHODOLOGY

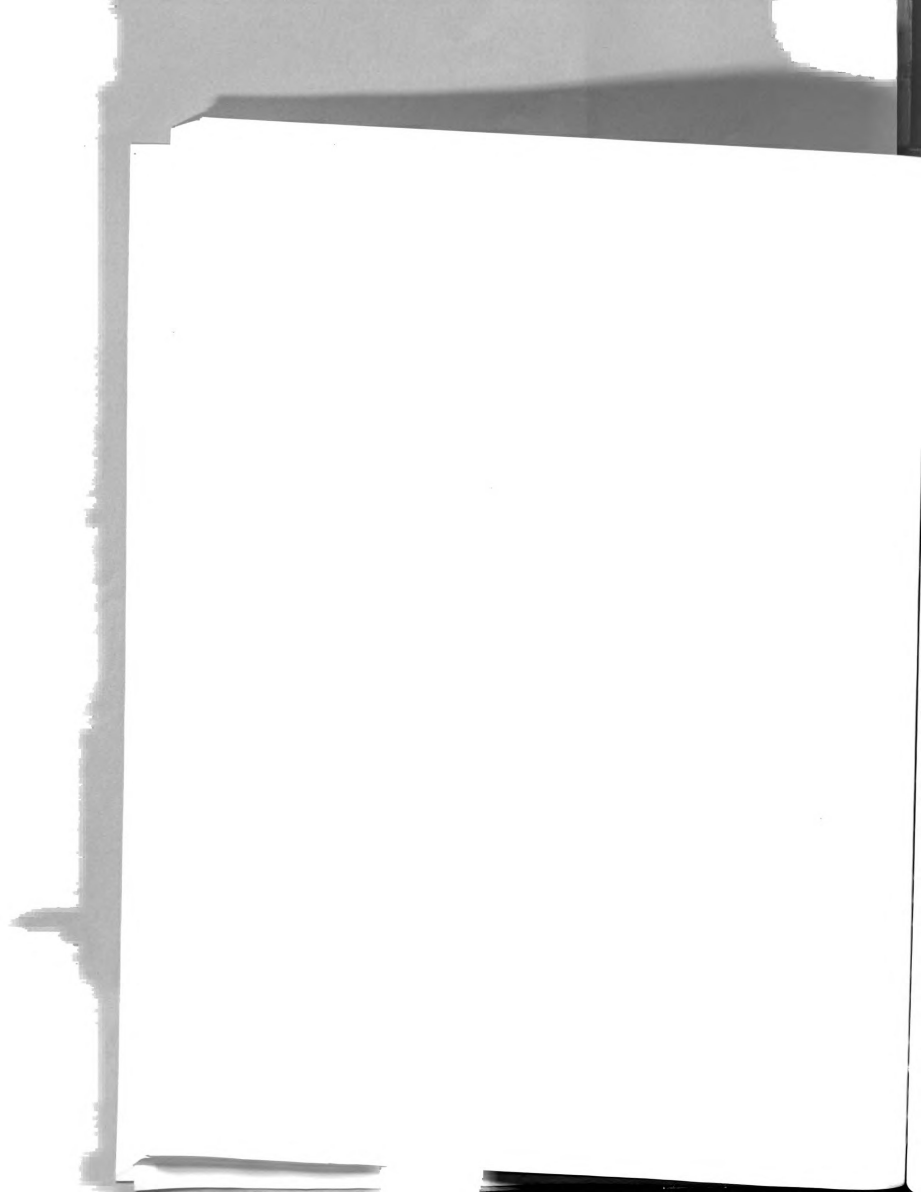
The design of the study is centered on the relationship among the following variables: achievement scores, motivational scores, and aptitude scores.

Population

The population consisted of 5075 first quarter freshmen at Michigan State University in the Fall term, 1962.

Definition of the Sample

The sample consisted of all entering freshmen who attended the first or second Orientation Clinics for Freshmen during the weeks of June 21st or June 27th, 1962. Those freshmen attending one of the two sessions were used due to their availability for testing purposes under the auspices of the Office of Evaluation Services of Michigan State University. For the purposes of the study, the two samples were dichotomized into sexes. The following two criteria were set for inclusion in the study: (1) completion of the motivational scales; (2) completion of the first quarter at Michigan State University.



Sample Size Attained

Four female and three male subjects failed to meet the first criterion; three female and five male subjects failed to meet the second criterion resulting in a loss of seven females and eight males. The number of subjects in the final samples consisted of 330 males and 367 females. The College Qualification Test mean for the male sample was 142.47 (s. d. 21.67); the female mean was 129.12 (s. d. 25.21). A comparison of the College Qualification means with a measure of central tendency (the median) for the freshman population indicated that the samples were representative of the general freshman population.

Instrumentation

A score for each individual was obtained on the following variables: (1) aptitude test score as measured by the College Qualification Test; (2) motivational scores as measured by the three sub-test scores and the total score of the Michigan State M-Scales; (3) achievement score as measured by first quarter composite grade point average.

College Qualification Test

For the purposes of the study, the Total Score of the CQT was used as the aptitude measure. The CQT is administered as part of a battery of aptitude tests during the Orientation Clinics. Published by the Psychological



Corporation, the CQT is a multi-purpose battery designed to serve colleges in their admission, placement, and guidance procedures. The CQT consists of the following subtests:

1. Verbal: A fifteen minute test of vocabulary, containing 50 synonyms and 25 antonyms questions.
2. Numerical: A thirty-five minute test containing 50 questions drawing on arithmetic, algebra, and geometry.
3. Information: A thirty 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 subtests are summed to yield the CQT Total score.

Michigan State M-Scales

For the purposes of the study, the Michigan State M-Scales were used as the objective motivational instrument. The M-Scales were developed by Farquhar and group as part of a comprehensive research project on the motivational factors related to academic achievement in eleventh grade students.¹ The M-Scales were designed to discriminate between high and low motivated students who were assumed to be discrepant in academic achievement.

¹Farquhar, Motivation Factors Related to Academic Achievement, op. cit. (1959)

The original form of the M-Scales consisted of four subtests. A revision of the scales for use with college freshmen consisted essentially of combining the selected items from one subtest (the Preferred Job Characteristics (PJCS) Scale) with another subtest (the Generalized Situational Choice Inventory (GSCI). The PJCS consisted of all possible combinations of eight items designed to measure high motivation with eight items designed to measure low motivation. Subsequent administration of these items indicated a low tolerance on the part of the adolescents for the repetition. The directions for administering the scale were identical to the GSCI and the theory base was also the same as that of the GSCI. Therefore, the most discriminating items of the PJCS were added to the GSCI.

The revised form of the M-Scales, Form C, consists of a total of 124 items for the males (GSCI=50 items, WRL=48 items, HTI=26 items), and a total of 109 items for the females (GSCI=36 items, WRL=48 items, HTI=25 items).

Generalized Situational Choice Inventory (GSCI)

In the development of the GSCI, the authors adapted and extended McClelland's hypotheses that N-achievement is composed of: (a) long-term involvement, (b) unique accomplishment, (c) competition with a standard of excellence. The constructs were polarized by postulating a continuum of achievement motivation with the low motivation of

N-achievement being opposite in composition from that advocated by McClelland and associates. Furthermore, the constructs were viewed as being related specifically to the academic setting.²

A two hundred item forced-choice inventory describing situations logically related to the extremes of the polar dimension theory was developed. One alternate of each dichotomized forced choice pair of items was related to the high academic motivation pole and the other to the low academic motivation pole. Students were instructed to choose the alternate which they would most prefer. Responses were scored either 0 or 1 with the high score in the direction of high motivation.

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

Word Rating List (WRL)

Following from the assumption that a student's self-concept is a functionally limiting and facilitating factor

²Farquhar, Motivation Factors Related to Academic Achievement, op. cit. (1963).

in academic achievement, a 119-item instrument was developed. The items were developed by extracting descriptive words and phrases from the self-concept literature and from a review of personality, motivational, and intellectual characteristics of students representing academic extremes.

Each student was asked to rate each of these concepts or words on a four-point scale (never, sometimes, usually, and always) as they thought their teachers would rate the words in describing him as a student. Forty-eight male and forty-eight female items, with thirty-five items in common, remained after cross validation.

Reliability estimates were obtained using Hoyt's analysis of variance technique. Reliability estimates ranged from .91 to .93 for males and from .88 to .93 for females. The correlation of the WRL with grade point criterion was .51 for males and .42 for females (significant .01 level).

Human Trait Inventory

Items which previous research (Altus, Gough, McQuary, and Truax) had found to differentiate between discrepant achievers were used to construct a 125-item personality inventory. Students were asked to rate each item on a four-point scale (never, sometimes, usually, always) as it applied to themselves. A high score indicated responding similar to over-achievers.

Twenty-six items remained after cross-validation for the males and twenty-five items for the females. The twenty-three most significantly discriminating items were selected for Hoyt's analysis of variance reliability estimates. For males the reliability coefficients ranged from .68 to .80 and from .71 to .76 for females. The correlation of the HTI with grade point criterion was .42 for males and .36 for females (significant at .01 level).

M-Scales Total

The four measures (GSCI, WRL, HTI, and PJCS) were combined into one instrument and labeled the Michigan State M-Scales. The Total scale contained 139 male and 136 female items. On a random sample of 240 students from the original 4200, reliability estimates based on Hoyt's analysis of variance technique were estimated to be .94 for males and .93 for females. Correlation of the total scale with the grade point criterion was .49 to .56 for males and .30 to .43 for females for validation and cross-validation samples respectively.

Grade Point Average (GPA)

The criterion of college achievement was the composite grade point average earned on the basis of grades for all courses taken in the first term. Grade points at Michigan State University are calculated on the following scale:
A=4 points, B=3 points, C=2 points, D=1 point, F=0 points.

The average grade point is computed by dividing total points earned by the total credits carried for the term.

Data Collection Procedures

Test Administration

The two instruments (CQT and Michigan State M-Scales) were administered to all subjects during their attendance at the Orientation Clinics for Freshmen. Although the M-Scales are not timed tests, the subjects were requested at the beginning of the testing session to complete the scales within a 75 minute period due to time limitations imposed by the Office of Evaluation Services.

Administration of the tests was done in large groups by proctors who were supplied with a copy of the test booklet. Subjects were instructed to read the instructions attached to the test booklet for each scale and to raise their hand if they should have questions. The responses were entered on IBM answer sheets for machine scoring.

Processing of the Data

The scores for each of the two instruments were obtained from the Testing Services. The composite grade point average was obtained from the Office of the Registrar at the end of the fall quarter. The scores for each of the six variables were punched on IBM cards for each subject as the preliminary step to analyzing the data.

Analysis Procedures

Three major types of analyses were conducted on the data: (1) estimates of Michigan State M-Scales reliability (sub- and total scales); (2) correlations of the motivational (M-Scales) and aptitude (CQT-Total) measures with grade point average; (3) multiple correlational analyses.

Reliability Analysis

Internal consistency reliability estimates were obtained for the three subtests (GSCI, WRL, HTI) and the total test of the M-Scales by Hoyt's analysis of variance method. A random sample of 50 males and 50 females was used in computing separate reliability estimates.

Correlational Analysis

The Pearson product-moment coefficient was used to estimate the correlations of the motivational and aptitude measures with the grade point criterion. Intercorrelations were calculated between the sub- and total scales of the M-Scales, CQT-Total, and GPA using the K16-M program on Michigan State University's MISTIC digital computer.

A multiple correlation was calculated between GPA and (1) GSCI and CQT, (2) WRL and CQT, (3) HTI and CQT, and (4) M-Scales Total and CQT. Multiple correlation enables an evaluation of the significance of adding the M-Scales to a multi-variate relationship. A test of the significance of the beta weights from zero in the regression equation was performed.

It was planned to use an "F" test for the statistical significance of additional variables in the multiple regression equation if the beta weight tests were found to be significantly different from zero.

Assumptions of Correlation Model

In deciding on the correlational model to use in a study, the important question is which type of correlation will yield the most accurate picture of the relationship.

DuBois states:

When all variates are based on the kinds of scales appropriate for computing correlations and when all regressions are linear, there should be no difference in conclusions whether correlational analysis or analysis of covariance is used. Under these conditions, the two approaches are merely different sides of the same coin. However, when the number of external variates is more than one or two, the use of the matrix format appears to afford greater ease in computation than the procedures described as analysis of covariance.³

For the purpose of this study, the assumption is made that the data is normal in distribution and has linearity.

Null Hypotheses

In the present design the relationships of the M-Scales to GPA and CQT-Total are formulated into the following:

H₀I There is no relationship between an objective measure of motivation (the M-Scales) and academic achievement (GPA).

³Phillip Du Bois, Multivariate Correlational Analysis (New York: Harper and Brothers, 1957) p. 159-160.

Sub hypothesis A--There is no relationship between the sub- and total scales of the M-Scales and the CQT-Total.

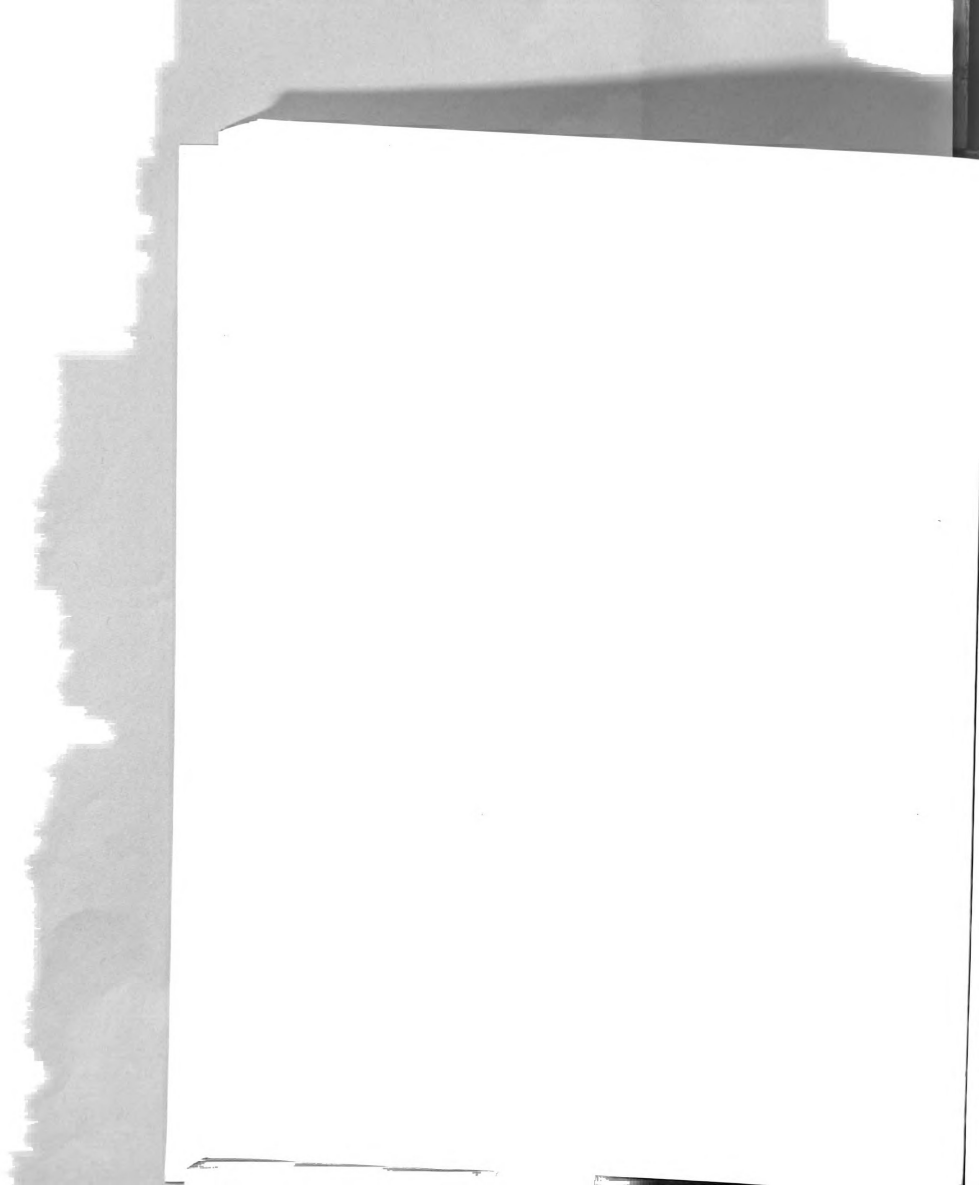
Sub Hypothesis B--There is no relationship among the three sub-scales of the M-Scales.

H₀ II There is no increase in the precision of prediction of academic achievement (GPA) attained by the addition of an objective measure of motivation (M-Scales) to an academic aptitude measure (CQT-Total).

The level of significance was set at the .05 level for the correlational analysis and at the .01 level for tests of significance of the beta weights.

Summary

Samples were drawn from the population of 5075 first quarter freshmen at Michigan State University in the Fall Term, 1962. For the purpose of the study, the samples were dichotomized into sexes. A design based on correlation was used to test the empirical relationship between academic motivation and academic achievement. Product-moment and multiple correlational analyses were conducted on the motivational, aptitude, and achievement variables. The design included calculating and testing the beta weights of the regression equations for the significance of adding variates to multiple prediction.



CHAPTER IV

ANALYSIS OF DATA

Three major types of analysis were conducted on the data: (1) estimates of test reliability of the M-Scales; (2) estimates of test validity of the M-Scales; (3) estimates of the increase in precision of prediction of GPA attained by the addition of the M-Scales to an aptitude predictor (CQT-Total).

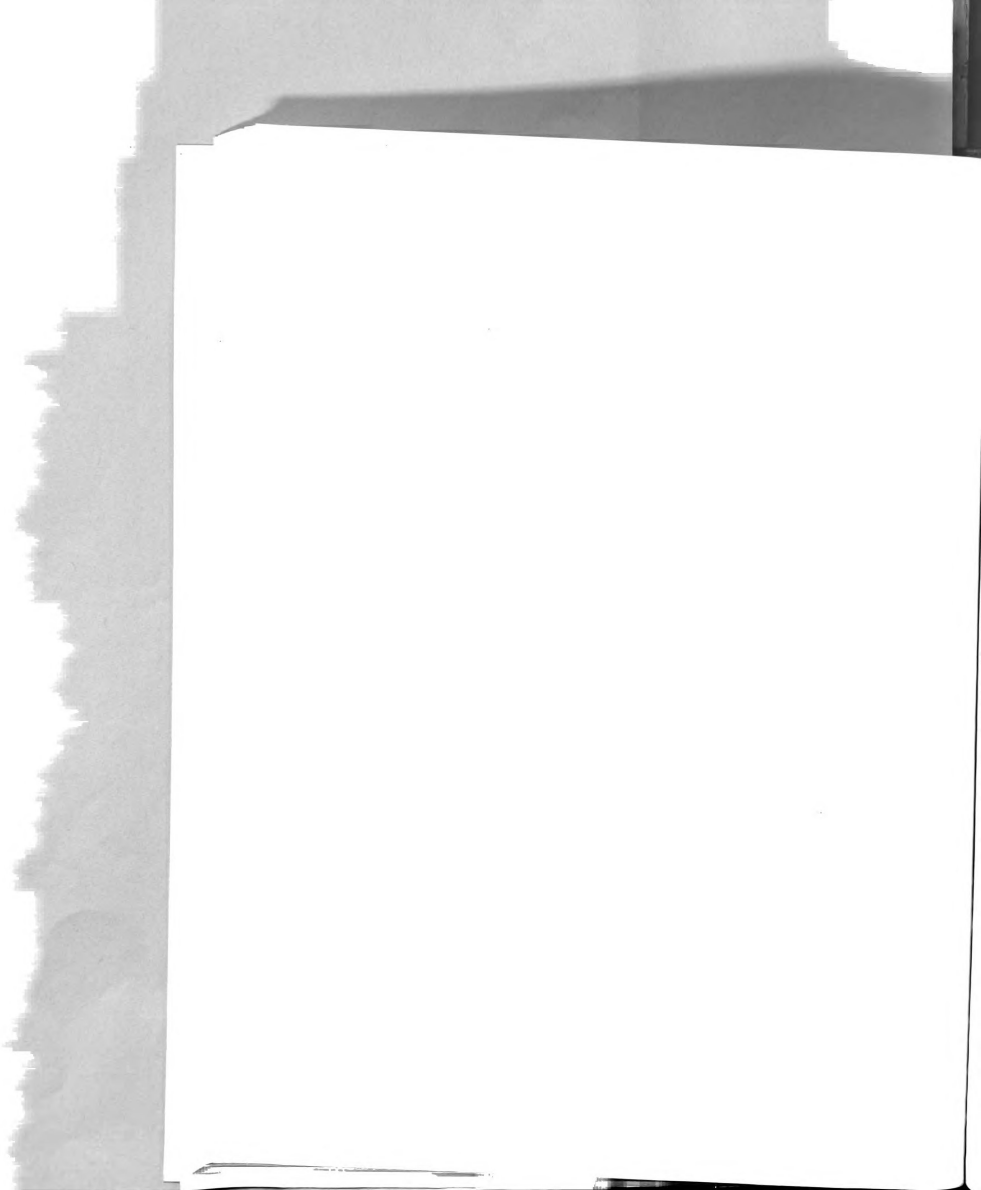
Reliability Analysis

Internal consistency reliability estimates were obtained by Hoyt's analysis of variance technique for the sub- and total scales of the M-Scales (see Table 1). Seperate reliability estimates were computed using a random sample (n=50) for the males and the females. The reliability coefficients for the males were .79 for the GSCI, .91 for WRL, and .59 for the HTI. The total-scales reliability coefficient for the males was .60. Reliability estimates for the females were .55 for the GSCI, .86 for the WRL, and .54 for the HTI. The total scales reliability estimate was .55 for the females.

With the exception of the WRL for both sexes and the GSCI for males, the reliability coefficients were not satisfactory.

TABLE 1
SUMMARY OF HOYT'S ANALYSIS OF VARIANCE
RELIABILITY ESTIMATES FOR THE M-SCALES

M-Scales	Males (N=50)	Females (N=50)
Generalized Situational Choice Inventory	.79	.55
Word Rating List	.91	.86
Human Trait Inventory	.59	.54
M-Scales Total	.60	.55



Correlational Analysis

The purpose of the correlational analysis was to determine the relation of the M-Scales to (1) the grade point average criterion, (2) an academic aptitude measure (CQT-Total), and to (3) determine the interrelationships of the three sub-scales of the M-Scales.

Correlation analysis was conducted testing the following general null hypothesis:

Null Hypothesis--There is no relationship between an objective measure of academic motivation (the M-Scales) and academic achievement (grade point average).

Two subsidiary hypotheses were constructed to assess (1) the relationship of the M-Scales to the CQT-Total and (2) the interrelationships of the three sub-scales of the M-Scales.

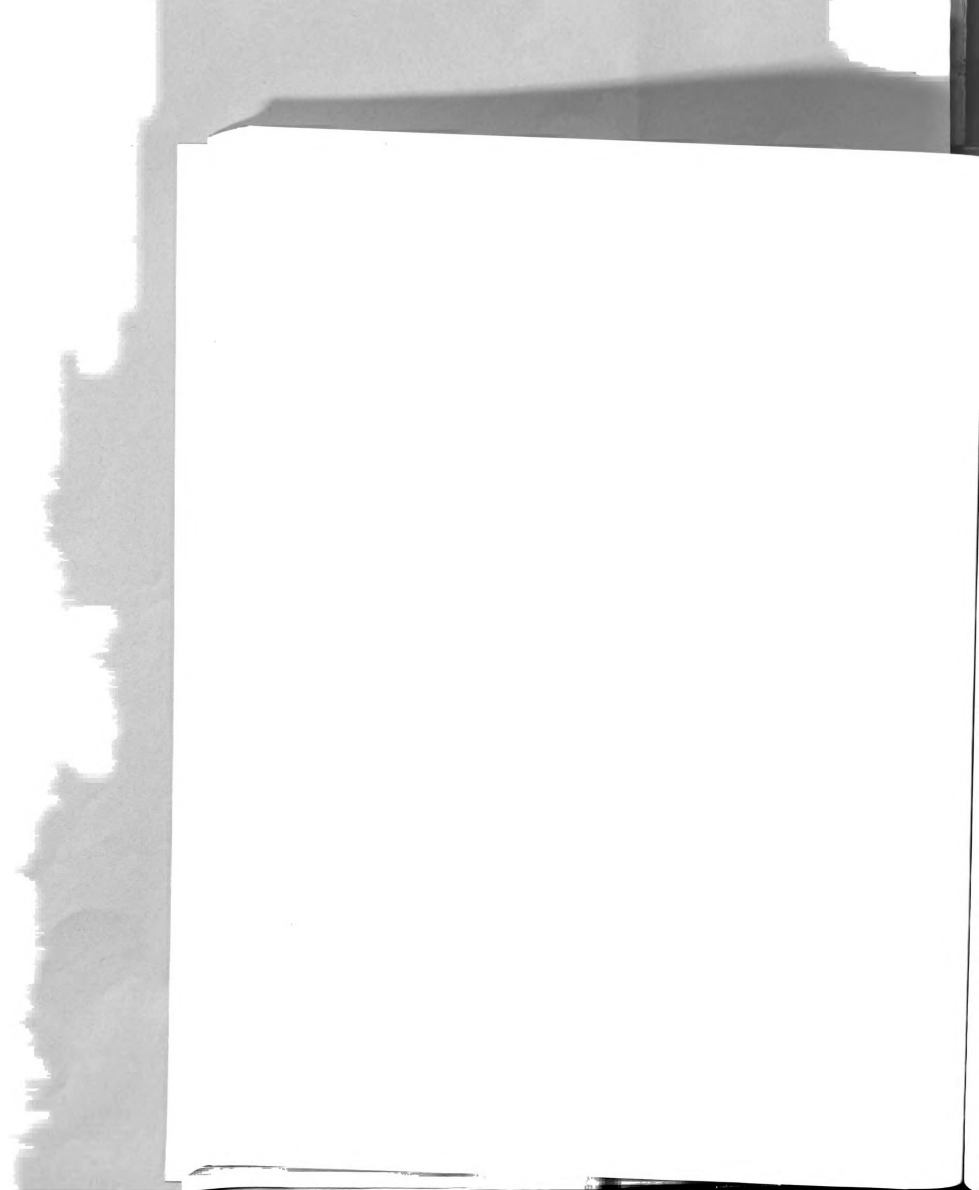
Sub Hypothesis A--There is no relationship between the sub- and total scales of the M-Scales and the CQT.

Sub Hypothesis B--There is no relationship among the three sub-scales of the M-Scales.

All analyses were done separately for each sex.

M-Scales Correlation Analysis

In Table 2 the sub- and total scales correlations with the grade point average criterion are presented for the



male and the female samples. The sub- scales intercorrelations and the sub- and total correlations with the CQT are presented in the lower right corner of Table 2.

M-Scales Correlation with Grade Point Average

An inspection of Table 2.1 indicates that the GSCI, the WRL, and the M-Total for males are related significantly with grade point average at the .05 level or greater. The criterion correlations for males ranged from .08 (HTI) to .19 (GSCI). The GSCI, WRL, HTI, and M-Total for females are not significantly related with grade point average. The criterion correlations ranged from -.01 for the M-Total to .04 for the WRL.

The level of significance was set at .05 for the validation of the sub- and total scales of the M-Scales for the general population. Correlations of three of the scales for the males (i. e., GSCI, WRL, and M-Total) were low-order, positive, and all significant at the .05 level or greater. Correlations of the sub- and total scales for the females were not significant.

Except for the three tests mentioned above for males (i. e., GSCI, WRL, and M-Total), the null hypothesis of no relationship between the M-Scales and grade point criterion was accepted for the general college population.

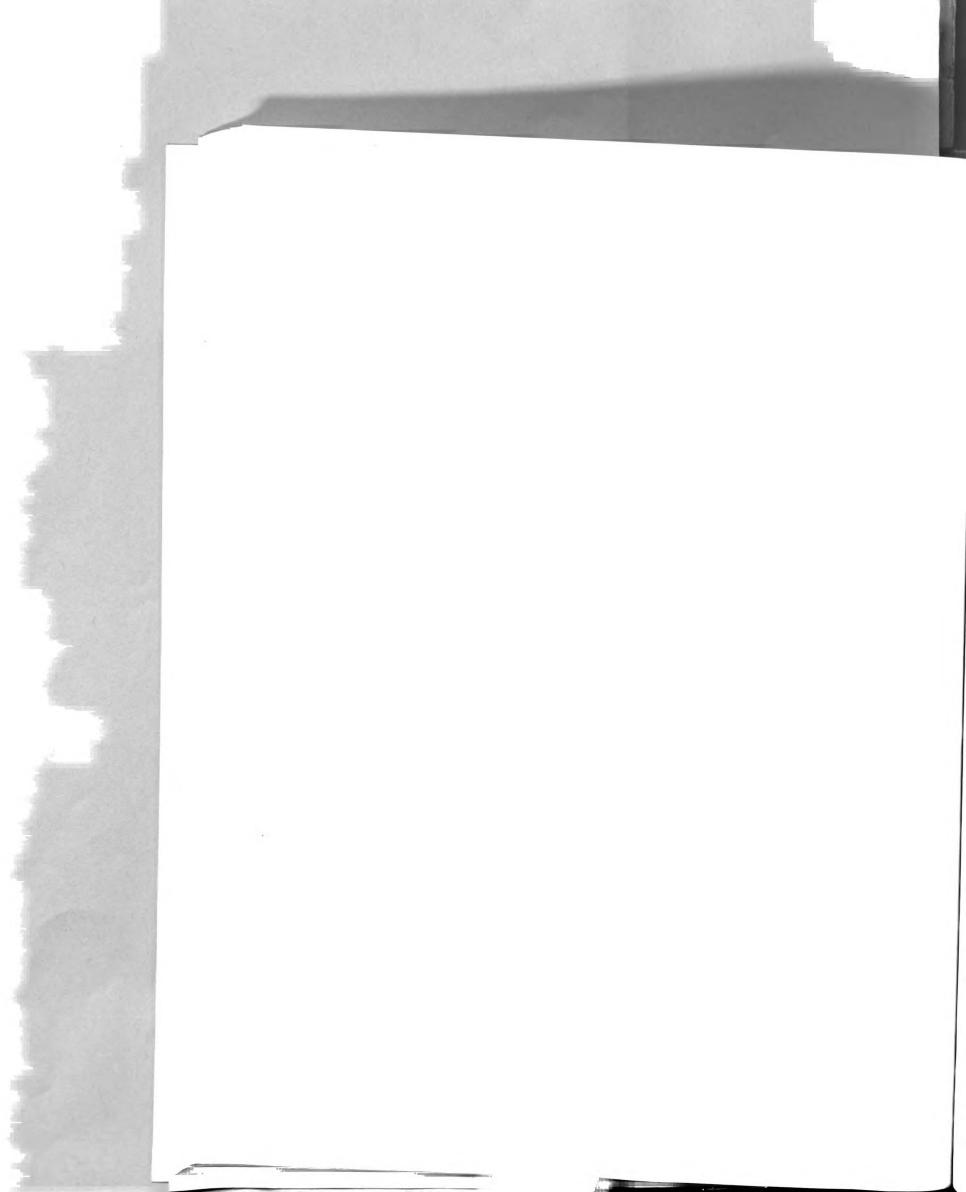


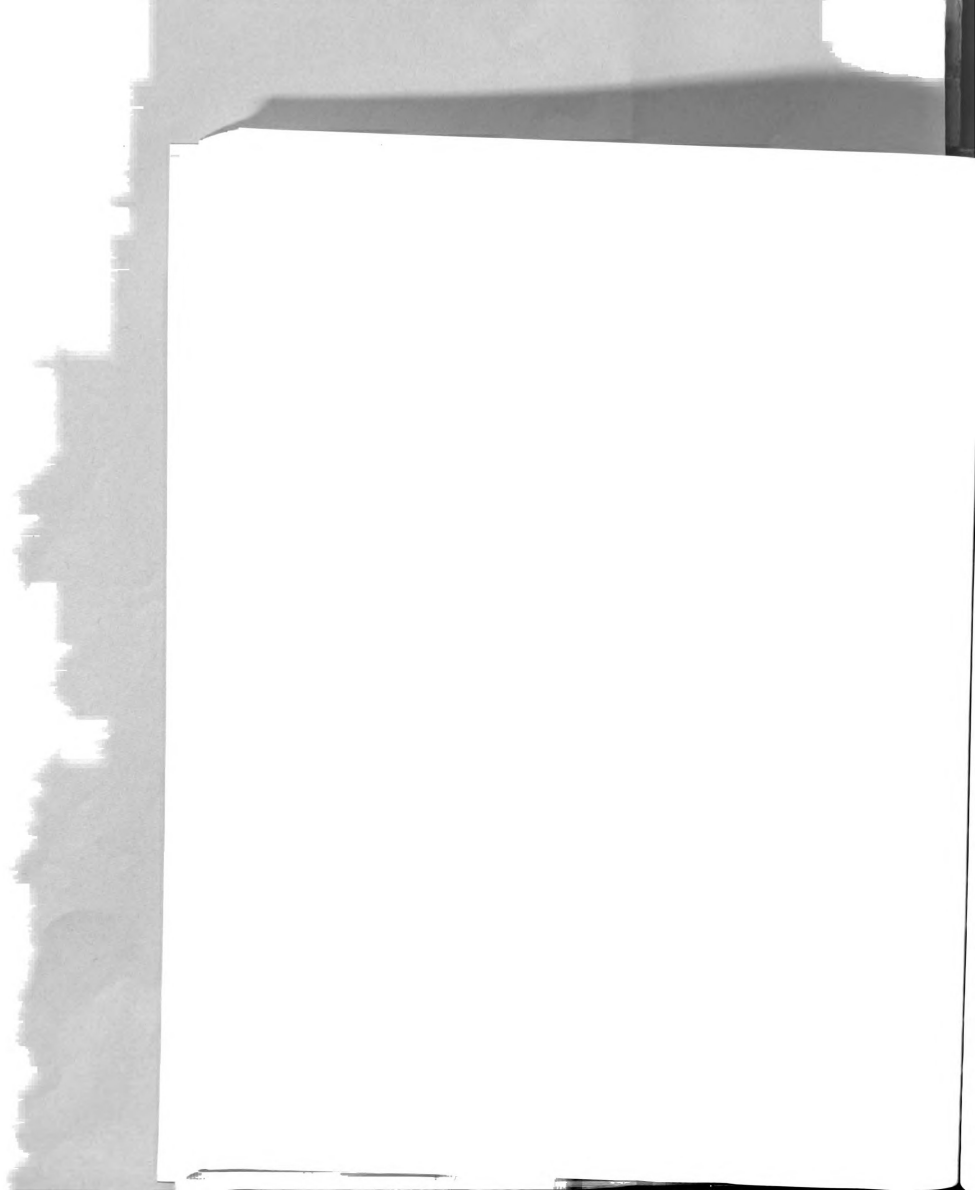
TABLE 2
INTERCORRELATIONS AMONG ACHIEVEMENT,
APTITUDE, AND M-SCALES

Measures	GPA	CQT-T	GSCI	WRL	HTI	M-T
Grade Point Average		.59**	.02	.04	.00	-.01
College Qualification Test Total	.48**		.10	.01	-.03	.00
Generalized Situational Choice Inventory	.19**	.24**		.24**	.37**	.60
Word Rating List	.14*	.14*	.37**		.50**	.77
Human Trait Inventory	.08	-.03	.34**	.52**		.76
M-Scales Total	.17**	.18**	.70	.88	.68	

*Significant at .05 level.

**Significant at .01 level.

Note: Dotted lines separate sub-scale intercorrelations in lower right corner. Correlations above diagonal are for females (n=367) and below the diagonal for males (n=330).



Correlations of CQT-Total with M-Scales and Grade Point Average

Inspection of Table 2 indicates that for males the GSCI ($r=.24$) and M-Total ($r=.18$) were significantly related with the CQT at the .01 level. The sub-scale correlations with CQT for males ranged from $-.03$ (HTI) to $.24$ (GSCI). The correlation of the CQT-Total with grade point criterion was $.48$ (significant at the .01 level).

Again referring to Table 2 the GSCI, WRL, HTI, and M-Total scores for females were not significantly related to the CQT. The correlations ranged from $-.03$ (HTI) to $.10$ (GSCI). The correlation of the CQT-Total scores with grade point criterion was $.59$ (significant at the .01 level).

The level of significance for assessing the relationship between the sub- and total M-Scales with the CQT was set at .05. Correlations of three of the scales for males (GSCI, WRL, and M-Total) with the CQT were significant at the .05 level or greater. Correlations of the sub- and total scales for females with the CQT were not significant.

The null hypothesis of no relationship between the M-Scales and academic aptitude was accepted for the general college population with the exception of the three male tests (i. e. GSCI, WRL, and M-Total).

M-Scale Intercorrelations

The sub-scale intercorrelations are also summarized in Table 2. Significant correlations were found at the

.01 level between all sub-scales for both the male and female samples. Correlation coefficients for the male sample ranged from .34 to .52. For the female sample the coefficients ranged from .24 to .50.

The level of significance for assessing the interrelation of the sub-scales was set at the .05 level. The null hypothesis of no relationship between the sub-scales of the M-Scales was rejected for the general college population.

Multiple Correlation

The purpose of the multiple correlation analysis was to determine the improvement in precision of prediction achieved by the addition of an objective measure of academic motivation (the M-Scales) to an academic aptitude measure (CQT-Total).

Multiple correlation analysis was conducted testing the following null hypothesis:

Null Hypothesis--There is no improvement in the precision of prediction of grade point average attained by the addition of the M-Scales to the CQT (Total).

Sub- and Total M-Scales Analysis

Each of the three sub-scales and the total M-Scales were added separately to the CQT Total in a regression estimation of the grade point criterion. The beta weights

of the resultant regression equations and the multiple correlation coefficients are presented in Table 3 for males and females. Regression analyses were conducted independently for each sex.

The heaviest weighting of the sub- scales for males was the GSCI (.1345), the weightings for the WRL (.0699) and the HTI (.0894) were approximately equal. The weighting for the M-Total for males was .8730. As would be anticipated, for all four equations, the heaviest weighting was for the CQT-Total.

The heaviest weighting of the sub- scales for females was the WRL (.0340). Weightings for the GSCI and the M-Total were -.0393 and -.7470 respectively. As expected, the heaviest weighting for all four equations was for the CQT.

Test of Significance of the Beta Weights

In testing any particular beta weight, three alternative findings can be hypothesized. (1) The beta weight does not contribute to estimating the criterion a condition which is reflected in non-significant t-test from zero. (2) The beta weight does contribute to the criterion estimation (t-beta significant) but not to an increase in precision (F test insignificant). (3) The beta contributes (t-beta significant) by increasing the precision (F-test significant).

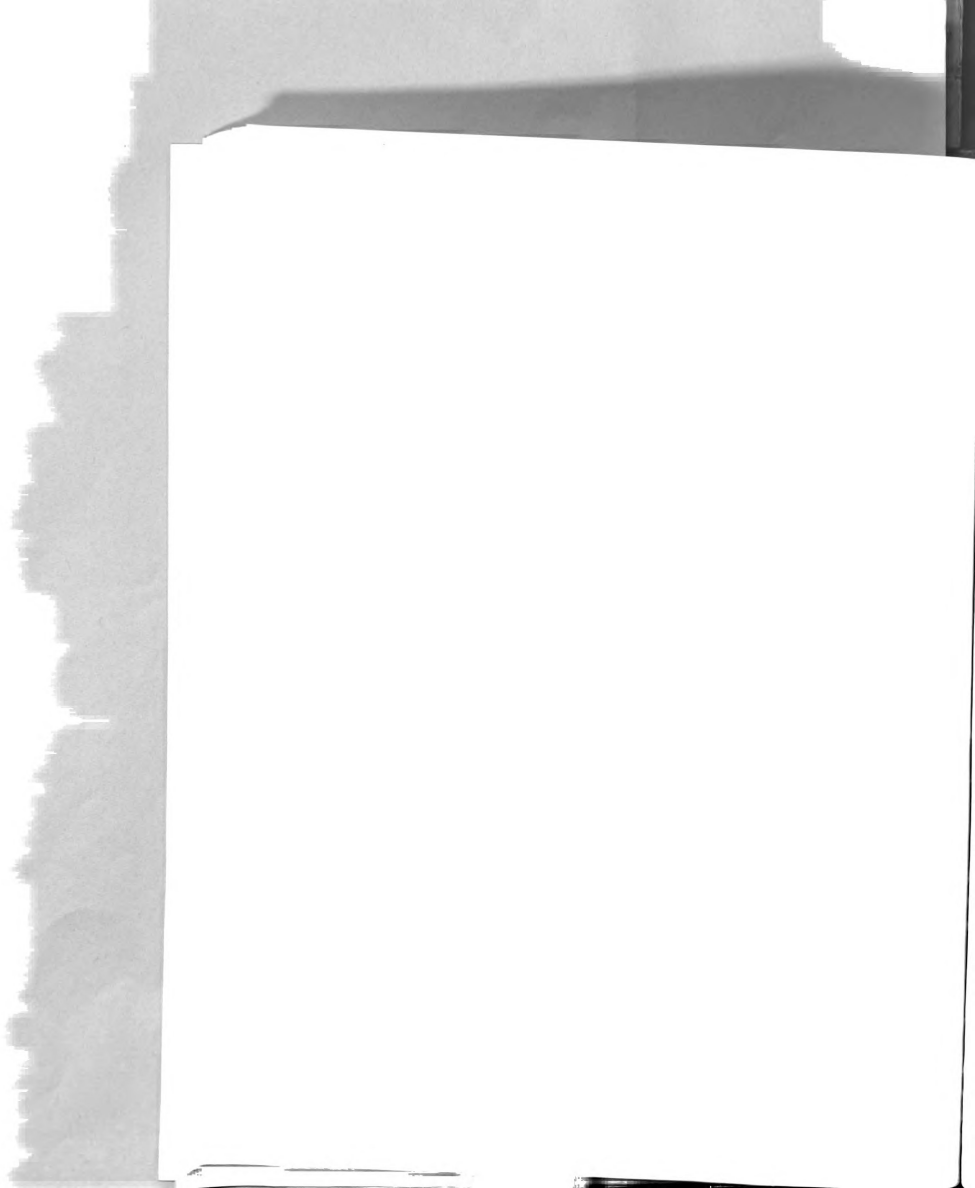


TABLE 3

TWO VARIABLE ESTIMATES OF GRADE POINT AVERAGE
ACHIEVEMENT CRITERION WITH CORRESPONDING BETA
WEIGHTS AND MULTIPLE CORRELATIONS

	Males (N=330)		Females (N=367)	
	Beta Weights	Multiple R	Beta Weights	Multiple R
GSCI ^a	.1345(GSCI) + 4.6176(CQT) **	.49	-.0393(GSCI) + 5.9603(CQT)**	.59
WRL	.0699(WRL) + 4.720(CQT) **	.49	.0340(WRL) + 5.9156(CQT)**	.59
HTI	.0894(HTI) + 4.840(CQT) **	.49	.0188(HTI) + 5.9259(CQT)**	.59
MT	.8730(MT) + 4.660(CQT) **	.49	-.7470(MT) + 5.9223(CQT)**	.59

^aGSCI = Generalized Situational Choice Inventory;

WRL = Word Rating List;

HTI = Human Trait Inventory;

MT = M-Scales Total;

CQT = College Qualification Test (Total).

**t-test for Beta Weights significant at .01 level.

The t-tests of significance of the beta weights of the three sub- and total M-Scales were all negative for the male and female samples (see Table 3). With these negative findings, the F test for significance of adding the M-Scales to the CQT in prediction of the grade point criterion was not carried out.

The t-tests of significance of the beta weights of the CQT were positive at the .01 level for both the male and female samples. The CQT significantly contributes to the estimation of grade point average.

The null hypothesis of no increase in the precision of prediction of GPA by addition of the M-Scales to the CQT was accepted for the general college population.

Further Exploration

In an attempt to trace further some of the possible sources of the consistently negative findings of this study, a random sample of 50 students for each sex was drawn from the total group to whom the M-Scales were administered. The frequency distribution of scores of these students on the sub- and total M-Scales together with the mean, standard deviation, the median, and the possible score are presented in Figures 1-8 for males and females.

All distributions for both sexes on the sub- and total scales are slightly negatively skewed. The distribution of scores on the HTI (male and female) was the most

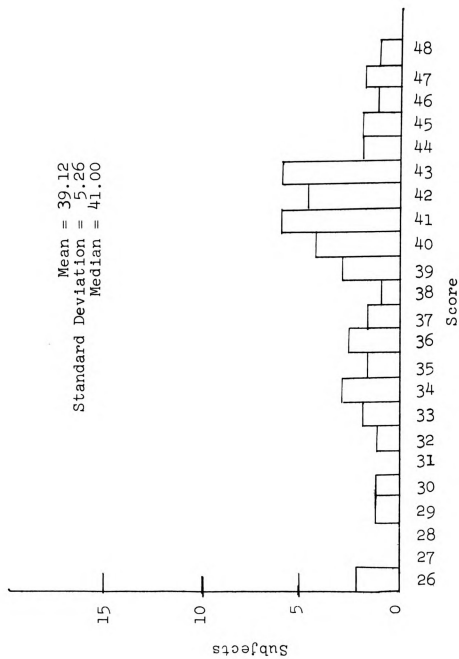


Fig. 1.--Distribution of GSCI Raw Scores for Males (N=50)
(Possible score = 50)

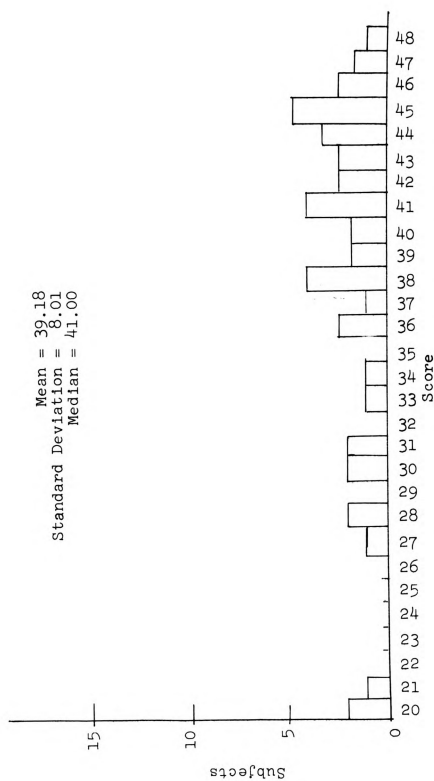


Fig. 2.--Distribution of WRL Raw Scores for Males (N=50)
(Possible Score = 48)

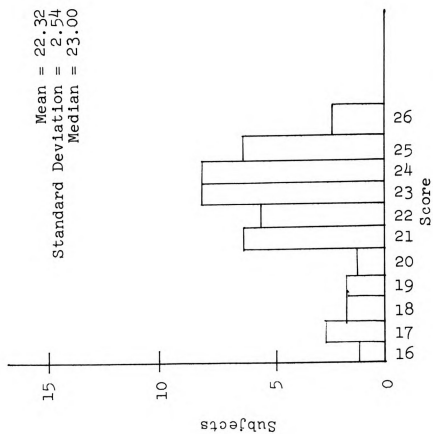
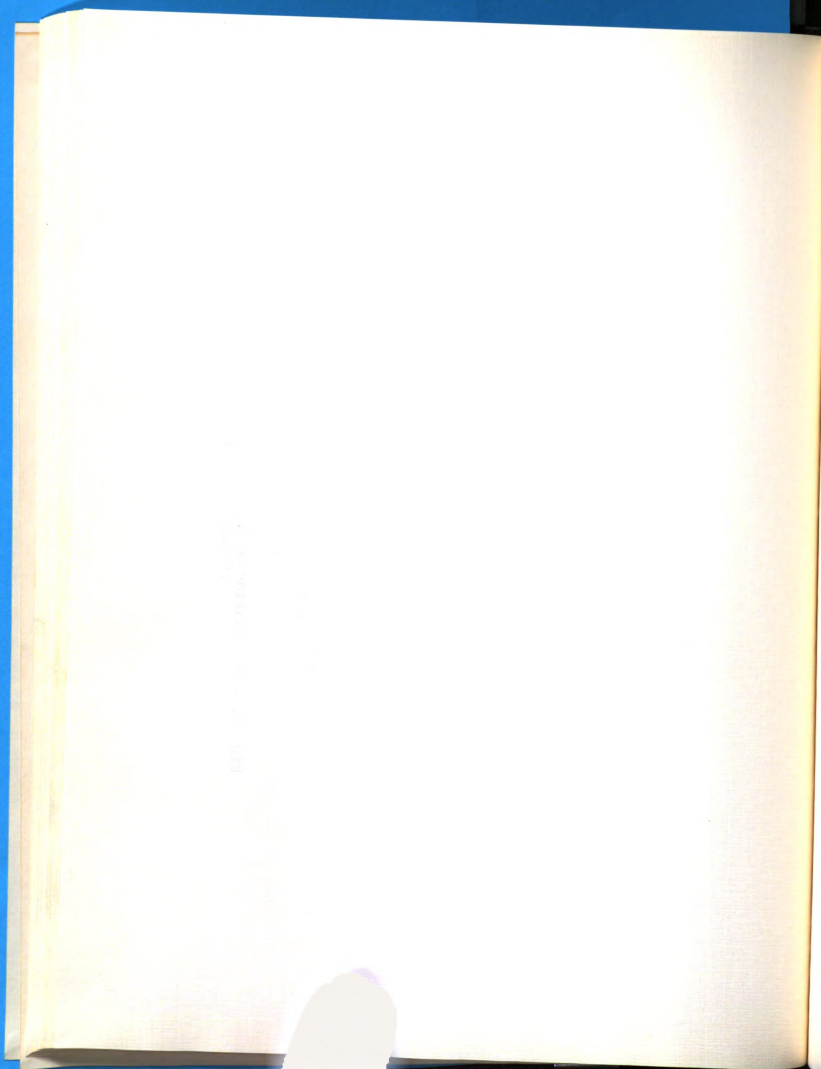


Fig. 3.--Distribution of HTI Raw Scores for Males (N=50)
(Possible Score = 26)



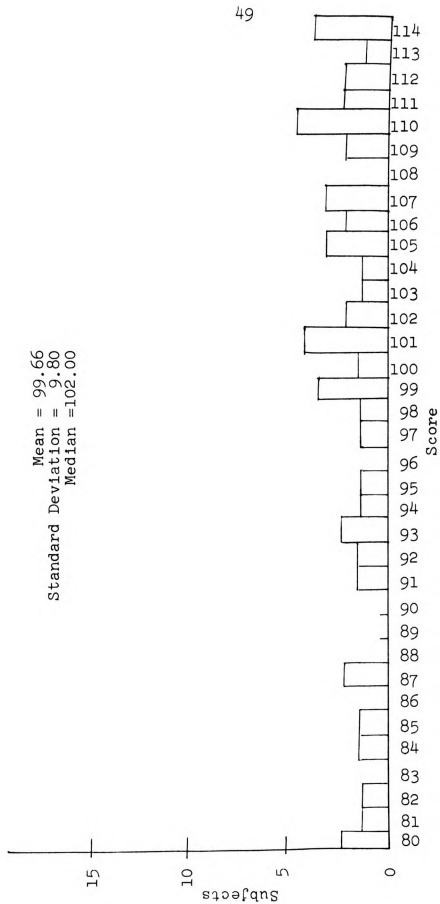


Fig. 4.--Distribution of M-Total Scores for Males (N = 50)
(Possible score = 124)

FIG. 2. Frequency of occurrence of the type of the

of the type of the

of the type of the

of the type of the

of the type of the

of the type of the

of the type of the

of the type of the

of the type of the

of the type of the

of the type of the

of the type of the

of the type of the

of the type of the

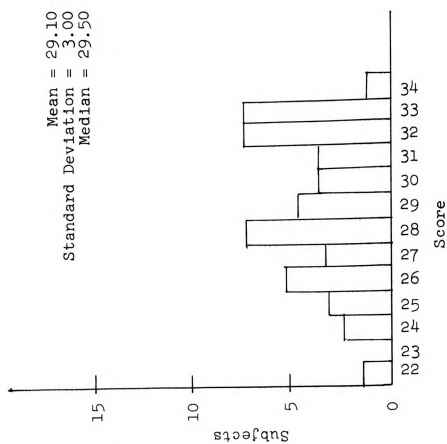


Fig. 5.--Distribution of GSCI Scores for Females (N=50)
(Possible score = 36)

Journal of
the
Royal
Society
of
Medicine
1907

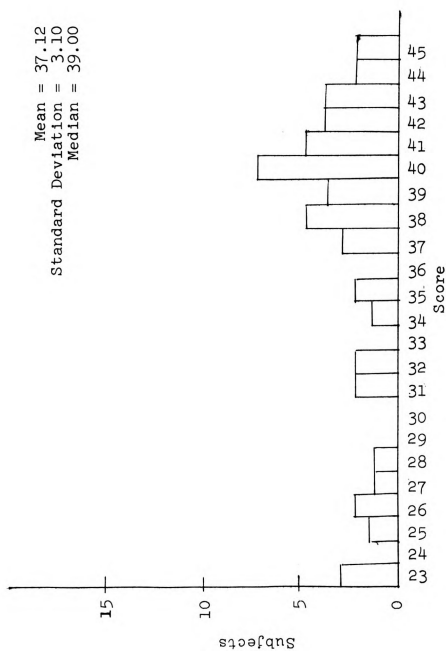


Fig. 6.--Distribution of WRL Scores for Females (N=50)
(Possible score = 48)

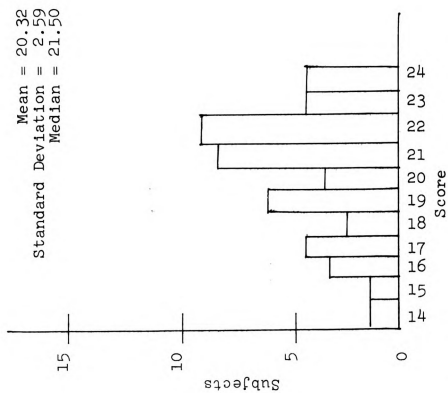


Fig. 7.--Distribution of HTI Scores for Females (N=50)
(Possible score = 52)

LTP: 1. 2. 3. 4. 5. 6. 7. 8. 9. 10. 11. 12. 13. 14. 15. 16. 17. 18. 19. 20. 21. 22. 23. 24. 25. 26. 27. 28. 29. 30. 31. 32. 33. 34. 35. 36. 37. 38. 39. 40. 41. 42. 43. 44. 45. 46. 47. 48. 49. 50. 51. 52. 53. 54. 55. 56. 57. 58. 59. 60. 61. 62. 63. 64. 65. 66. 67. 68. 69. 70. 71. 72. 73. 74. 75. 76. 77. 78. 79. 80. 81. 82. 83. 84. 85. 86. 87. 88. 89. 90. 91. 92. 93. 94. 95. 96. 97. 98. 99. 100.

100.00



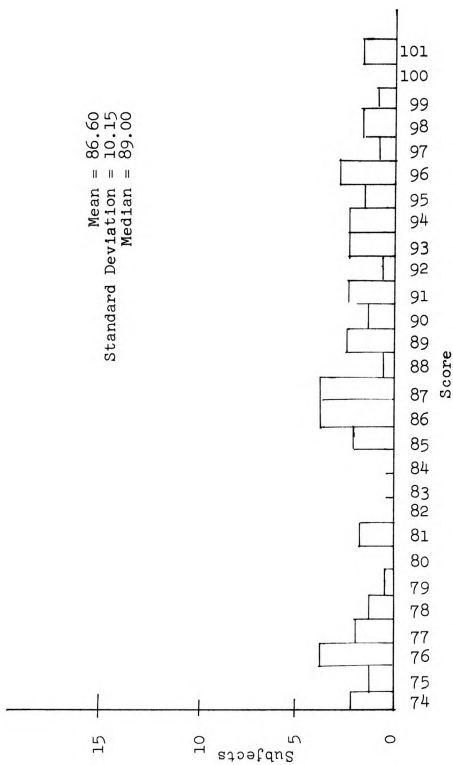


Fig. 8.--Distribution of M-Total Scores for Females (N=50)
(Possible score = 109)



negatively skewed as well as characterized by the greatest restriction of score range. The HTI is also the shortest of the three sub-scales.

The distributions did not depart sufficiently from normality to account for the low correlations between the M-Scales and the grade point criterion. Therefore, the correlations must be interpreted as an accurate reflection of the utility of the M-Scales for this college sample.

Summary

The reliability of the sub- and total tests of the M-Scales was estimated using Hoyt's analysis of variance technique on a random sample of males and females (N=50). The reliability coefficients for the males were .79 (GSCI), .91 (WRL), .59 (HTI), and .60 (total). The reliability coefficients for the females were .55 (GSCI), .86 (WRL), .54 (HTI), and .55 (total).

The validity of the sub- and total scales of the M-Scales was estimated by correlation and regression analyses independently for the male (N=330) and the female (N=367) samples. Two of the male sub-tests (GSCI and WRL) and the total M-Scales correlated significantly with the grade point criterion. All of the correlations of the male sub-scales were low-order and positive. All correlation coefficients were in the zero range for the female sample.

negative

results

of the

normal

and

the

very

and

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

the

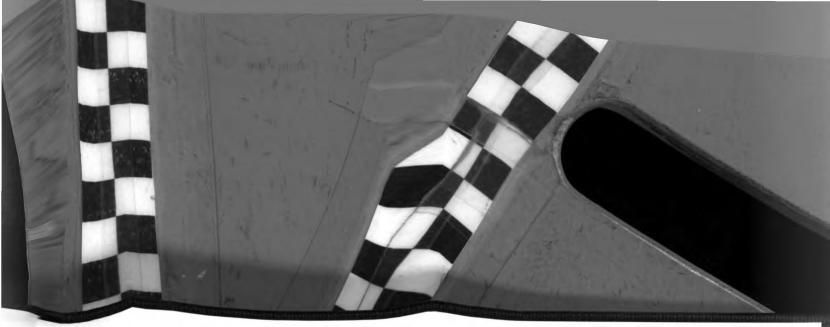
the

the

the

the

the



On the basis of the above findings, it has been demonstrated that there is no significant relationship between an objective measure of academic motivation (M-Scales) and academic achievement (GPA) for a general population of college freshmen.

As anticipated from the above findings, the regression analysis and the resultant multiple correlations and beta weights indicated that there is no improvement in precision of prediction of grade point average attained by the addition of the M-Scales to a measure of academic aptitude (CQT-Total).





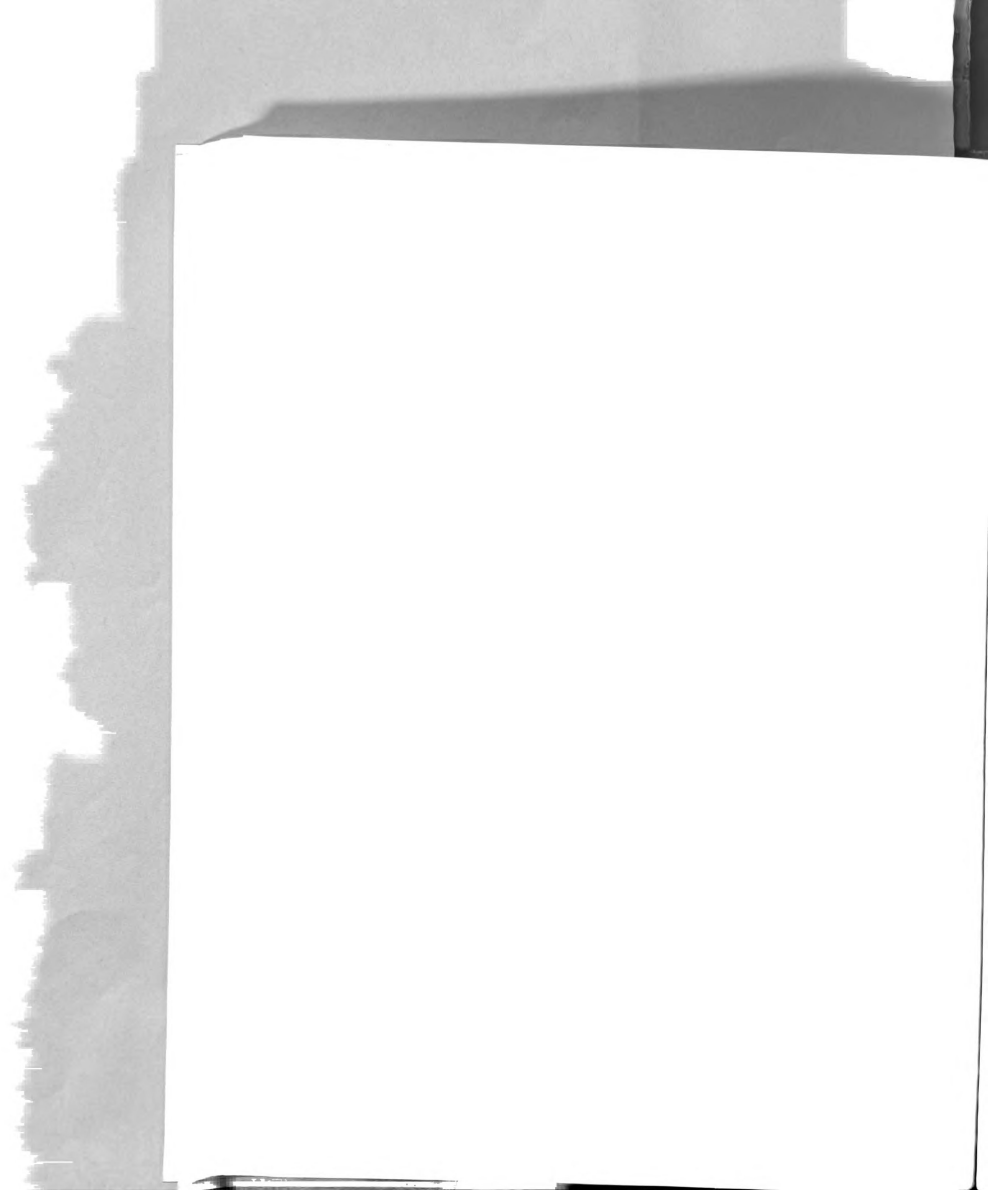
CHAPTER V

SUMMARY, CONCLUSIONS, AND IMPLICATIONS

The major problem of this study was to determine (1) whether an objective measure of academic motivation (the M-Scales) had a significant positive relationship to the academic achievement of first-quarter freshmen and (2) whether there was a significant increase in precision of prediction of academic achievement (GPA) attained by the addition of the M-Scales to an academic aptitude measure (CQT-Total).

For the purposes of the study, the sample was selected from the general population of first-quarter freshmen at Michigan State University and dichotomized into sexes. A comparison of the sample means of the CQT with a measure of central tendency (median) for the male and female freshmen population indicated that the samples were similar in academic aptitude to the general college population.

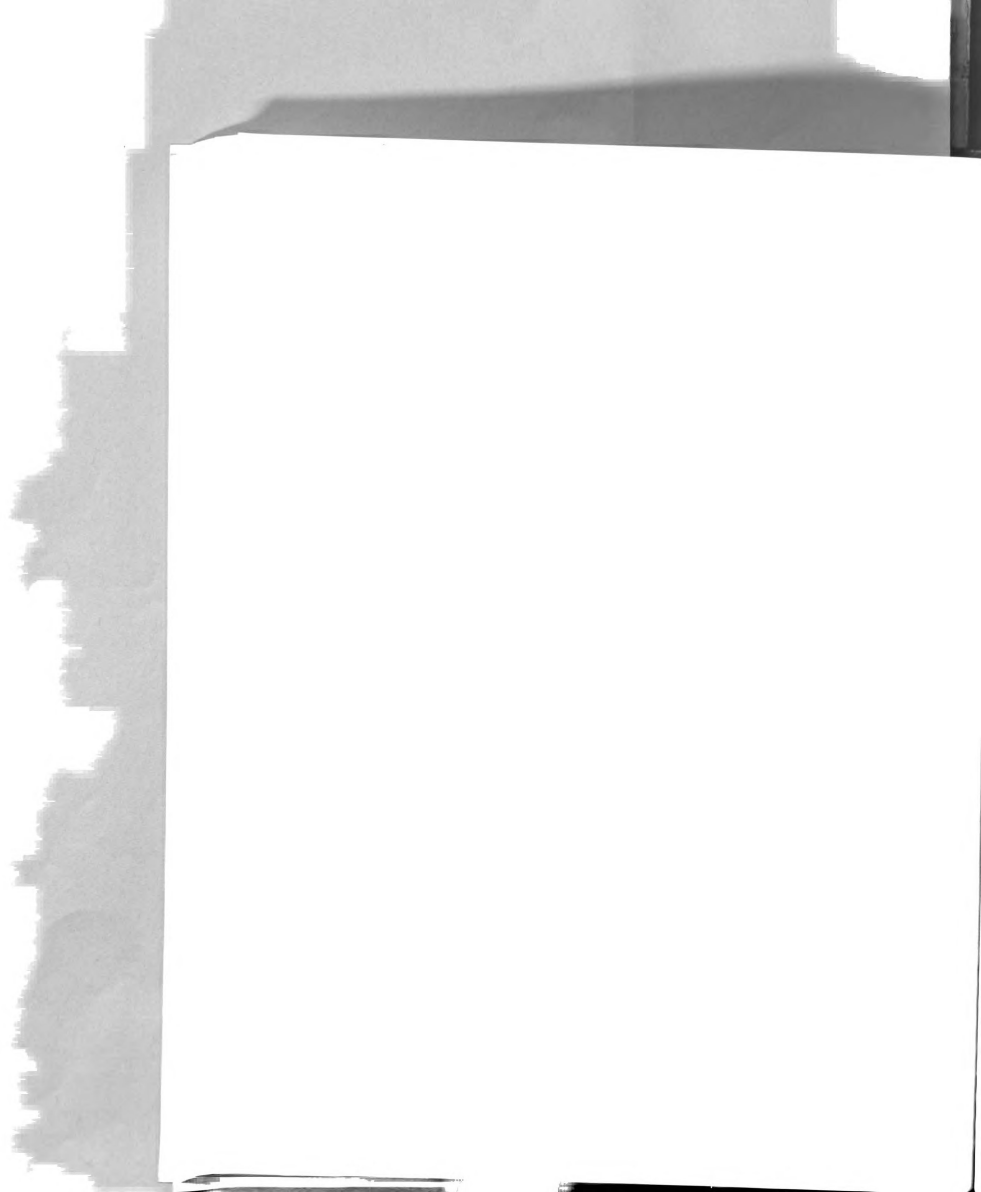
An academic aptitude measure (CQT-Total), academic motivational measure (M-Scales), and academic achievement (GPA) were obtained for each student. The analyses were carried out independently for the male and female sample



and involved the following: (1) reliability estimates were calculated using Hoyt's analysis of variance technique; (2) Pearsonian correlations were computed to assess the relationship of the M-Scales to academic achievement; (3) multiple correlations were calculated to assess the increase in precision of prediction of academic achievement attained by the addition of the M-Scales to the CQT. With the exception of the Hoyt's analysis of variance, all statistical analyses were performed on the total sample (males $N=330$, females, $N=367$) using the K16M program with Michigan State University's MISTIC digital computer.

Separate reliability estimates were computed using a random sample ($N=50$) for the males and the females. The reliability coefficients for the males ranged from .59 (HTI) to .91 (WRI). For the females, the range of reliability coefficients was from .54 (HTI) to .86 (WRL). With the exception of the WRL ($r=.91$) and the GSCI ($r=.79$) for males and the WRL ($r=.86$) for females, the reliability coefficients fell below a satisfactory level.

The frequency distributions of scores for both sexes on the sub--and total M-Scales were characterized by a slight negative skewness. The HTI, the least reliable of the sub-scales for both sexes, displayed the sharpest restriction in range of scores as well as the highest degree of negative skewness.



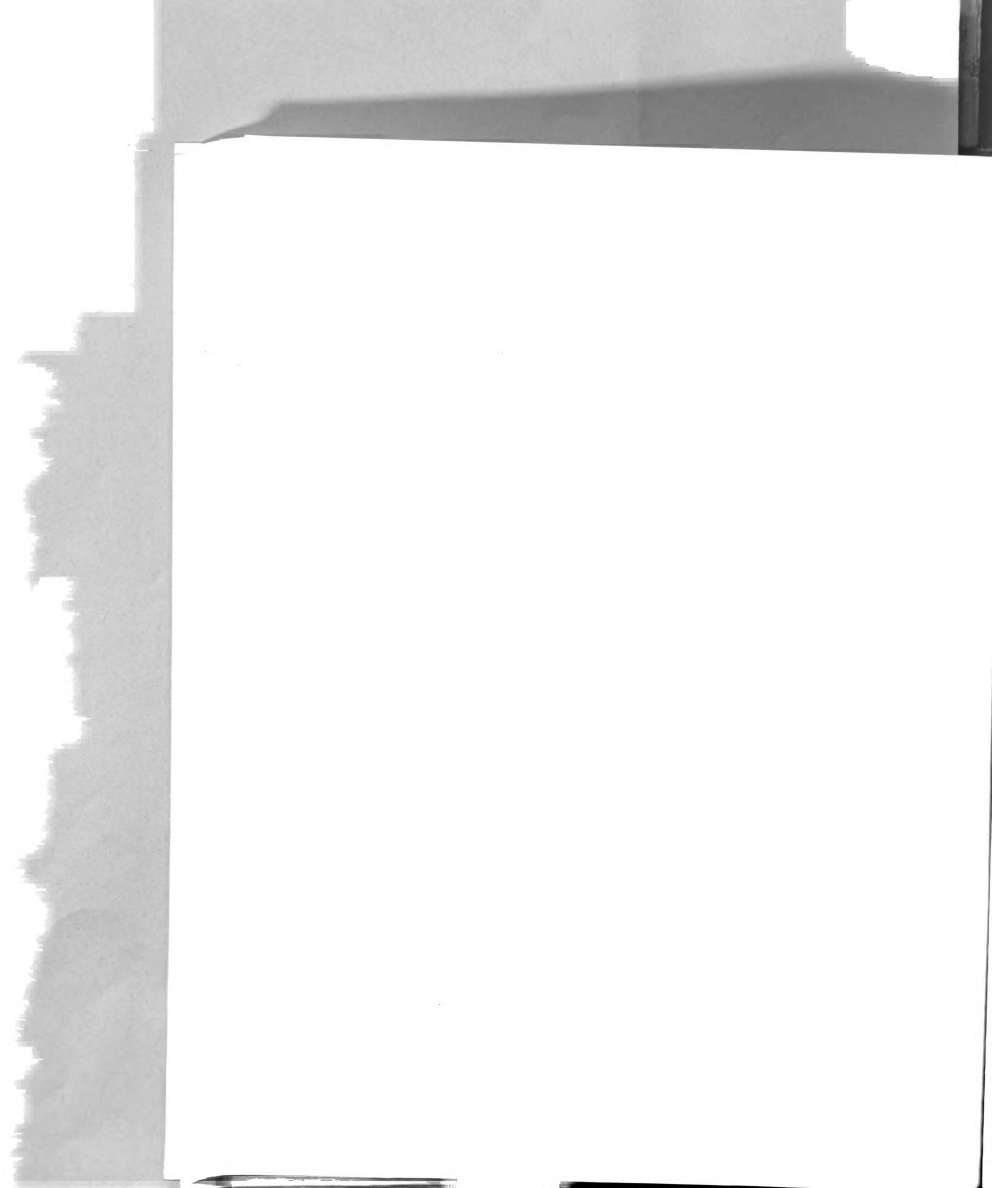
A significant, low-positive relationship was found between the male GSCI, WRL, M-Total scores and the grade point criterion. The correlation coefficients for males ranged from .08 (HTI) to .19 (GSCI). For the females, no significant relationship between M-Scales scores and the grade point criterion was demonstrated; all of the correlations were in the zero range.

Intercorrelations of the sub-scales were significant for both sexes ranging from .34 to .52 for the male sample and from .24 to .50 for the female sample. Correlations of the male GSCI ($r=.24$), WRL ($r=.14$), and M-Total ($r=.18$) scores were significantly related to the CQT scores. For the females, the correlations between the M-Scales sub- and total scores with the CQT scores were in the zero range.

The "t" tests of significance from zero for the M-Scales beta weights in predicting GPA were not significant. Addition of the M-Scales scores to the CQT measure in a multiple regression equation did not result in an increase in precision of prediction of the grade point criterion.

The null hypothesis of no relationship between the M-Scales scores and grade point criterion was accepted for the general college population with the exception of three male scales (i.e., GSCI, WRL, M-Total).

The null hypothesis of no relationship between the M-Scales and the CQT scores was accepted for the general college population with the exception of three male scales (i.e., GSCI, WRL, M-Total).



The null hypothesis of no interrelationship among the sub- M-Scales scores was rejected for the general college population. All correlations were significantly different from zero at the .01 level or higher.

The null hypothesis of no improvement in prediction of grade point average achieved by the addition of the M-Scales to the CQT was accepted for the general college population.

Conclusions

On the basis of these findings, it is concluded that for the obtained sample:

1. There is a significant, low-positive relationship between the GSCI, WRL, M-Total scores and academic achievement (GPA) for a male college population.
2. There is no significant relationship between the HTI scores and academic achievement (GPA) for a male college population.
3. There is no significant relationship between the sub- and total M-Scales scores and academic achievement (GPA) for a female college population.
4. There is a significant relationship between the GSCI, WRL, M-Total scores and academic aptitude (CQT) for a male college population.
5. There is no significant relationship between the HTI scores and academic aptitude (CQT) for a male college population.

6. There is no significant relationship between the sub- and total M-Scales scores and academic aptitude (CQT) for a female college population.
7. The correlation between the GPA and CQT scores for males (.49) and for females (.59) is not significantly increased by adding either the sub- or total M-Scales scores to the estimates.

Discussion of Results

Because the study was centered upon the validation of the M-Scales, the results of the study will be discussed from two aspects: (1) the reliability of the M-Scales, and (2) the relationship of the M-Scales to GPA.

With the exception of the WRL and the GSCI for males and the WRL for females, the reliability estimates were not satisfactory for either the male or the female samples. The distribution of scores on the WRL on which the possible scores for both sexes are similar ($n=48$) was comparable for both samples. An interesting finding was that the degree of negative skewness was higher for the females than for the males on the WRL.

The WRL purports to measure the student's self concept as a functionally limiting and facilitating factor in academic achievement. Despite the higher male academic aptitude (CQT mean=142.47, standard deviation=21.67), the females with a lower academic aptitude (CQT mean=129.12,



standard deviation 25.21) achieve at the same level as the males. The female mean GPA was 2.26 with a standard deviation of .73 compared to the male mean GPA of 2.17 with a standard deviation of .76. In light of the skewness evidence cited above, it would appear that the overall tendency of the self concept is in the direction of the higher achieving females grade point average.

The HTI was the least reliable of the sub-scales for both samples. The shortest of the sub-scales ($n=26$ for males, $n=25$ for females), the frequency distribution of scores on the HTI was the most negatively skewed for both sexes. A possible explanation for the high degree of skewness, as well as the restriction in the range of scores, may be the test-taking attitude of the college students comprising the samples. The test content of the HTI (items which attempt to assess the student's fantasy life, level of anxiety, and compulsivity) may have activated the defense mechanisms of these sophisticated subjects in the form of denial.

A consistent finding on all of the scales for both sexes which warrants discussion is the restricted range of scores. The frequency distribution of scores for a random sample ($N=50$) of males and females on the M-Scales (sub- and total may be found on pages 46-53 of Chapter IV).

A possible explanation for such restriction may be the response "sets" of a college population. In this context, "set" refers to the tendency of an individual to respond in such a manner as to give a "good" impression of himself.¹ The restriction of range of scores in the direction of "high" would tend to suggest that a response set was operating to depress the reliability estimates for the HTI and, conversely, the expanded range of scores found for the WRL tended to inflate the reliability estimate for both sexes.

A significant, low-positive relationship was demonstrated between the male GSCI scores and the male WRL scores and the grade point criterion. Although of low-order (GSCI, $r=.19$, WRL, $r=.14$), this finding might tend to substantiate the applicability of the theoretical basis of the two scales for a male college population.

The consistently non-significant, zero order relationship between all female scores on the M-Scales and the criterion implies that the dimensions of female academic motivation at the college level are not congruent with the male dimensions.

¹ Allen L. Edwards, "The Relationship Between the Judged Desirability of a Trait and the Probability That It Will be Endorsed," Journal of Applied Psychology, 37 (1953), pp. 90-93.

On the basis of the findings of this study, the utility of the M-Scales for decision making at the college level is extremely limited. In the Farquhar study (1963)² with eleventh grade students, the M-Scales did correctly classify those students who did or did not identify with the educational environment. However, with a college population a different emphasis in the theoretical foundation might be indicated with a resultant difference in item content. Particularly would this latter point be an important consideration for the females where it appears that the procedures employed with the Farquhar high school sample did not generalize to the college level.

Implications for Further Research

1. Construct a new objective measure of academic motivation for a college population using a methodology similar to that of the M-Scales construction but a different theoretical emphasis.
2. Conduct a longitudinal study to determine if the relationship between the M-Scales and GPA remains constant for the male and the female samples of this study.

²Farquhar, Motivation Factors Related to Academic Achievement (1963), op. cit.

3. Particularly conduct a study with the female sample of this study to determine if the relationship between the WRL and the GPA remains constant at the end of one year of college work.
4. Conduct a study with the male sample to determine if there is a relationship between scores on the GSCI and the WRL and the selected educational-vocational objective.
5. Investigate the self concept dimensions of the male and female college student as these dimensions are related to academic achievement.

1891

1892

1893

1894

1895

1896

1897

1898

1899

1900

1901

BIBLIOGRAPHY

Borow, H. "Current Problems in the Prediction of College Performance," J. Amer. Assoc. Coll. Registr., 22 (1946), 14-26.

Edwards, Allen L. Manual for the Edwards Personal Preference Schedule. New York: Psychological Corporation, 1959.

_____. "The Relationship Between the Judged Desirability of a Trait and the Probability That It Will Be Endorsed," Journal of Applied Psychology, 37 (1953), 90-93.

Farquhar, William W. A Comprehensive Study of the Motivational Factors Underlying Achievement of Eleventh Grade High School Students. Research Project No. 846(8458). Supported by the U. S. Office of Education, in cooperation with Michigan State University, 1959.

_____. Motivation Factors Related to Academic Achievement: Final Report of Cooperative Research Project No. 846, College of Education. East Lansing, Michigan: Michigan State University, 1963.

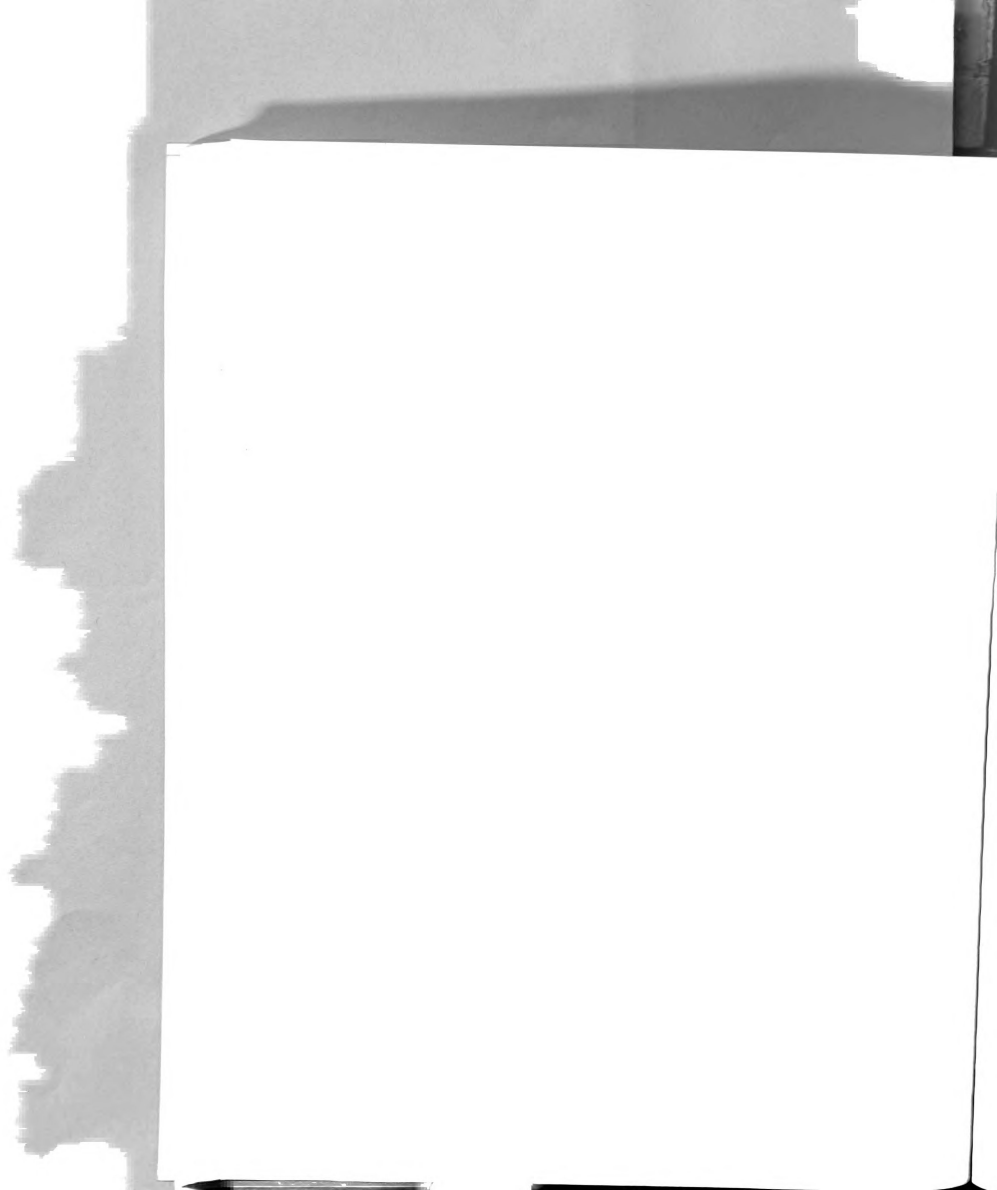
Fishman, Josuha and Pasanella Ann K. "College Admission-Selection Studies," Review of Educ. Research, 30 (1960), 298-306.

Frick, J. W. "Improving the Prediction of Academic Achievement by Use of the MMPI," Journal of Applied Psychology, 39 (1955), 49-52.

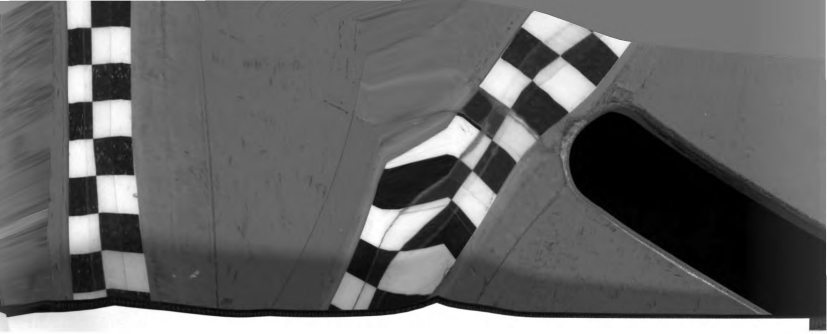
Gebhart, C. Gary and Hoyt, Donald P. "Personality Needs of Under- and Over-Achieving Freshmen," Journal of Applied Psychology, 42 (1958), 125-128.

Klugh, Henry E. and Bendig, A. W. "The Manifest Anxiety and ACE Scales and College Achievement," Journal of Consulting Psychology, 19 (1955), 487.

Krug, Robert E. "Over and Underachievement and the Edwards Personal Preference Schedule," Journal of Applied Psychology, 43 (1959), 133-136.



- Krumboltz, John D. and Farquhar, William W. "Reliability and Validity of the n Achievement Test," Journal of Consulting Psychology, 21 (1957), 226-228.
- Merrill, Reed M. and Murphy, Daniel T. "Personality Factors and Academic Achievement in College," Journal of Counseling Psychology, 6 (1959), 207-210.
- Mitchell, James V. Jr. "An Analysis of the Factorial Dimensions of the Achievement Motivation Construct," Journal of Educational Psychology, 52 (1961), 179-187.
- Morgan, Henry H. "A Psychometric Comparison of Achieving and Nonachieving College Students of High Ability," Journal of Consulting Psychology, 16 (1952), 292-298.
- Weiss, Peter, Wertheimer, Michael, and Groesbeck, Byron. "Achievement, Academic Aptitude, and College Grades," Educational and Psychological Measurement, 19 (1959), 663-666.



APPENDIX

SAMPLE ITEMS FROM THE
MICHIGAN STATE M-SCALES

GENERALIZED SITUATIONAL CHOICE INVENTORY

I would prefer to:

- 11 a) Develop a new product which may or may not be good,
or
b) Make a product as good as the best one available.
- 12 a) Receive money for my good grades, or
b) Be allowed to take any course I wanted because
of good grades.
- 13 a) Be successful in finishing a job, or
b) Finish a job.
- 14 a) Get excellent grades because I have a great deal
of ability or
b) Get average grades because I have average ability.
- 15 a) Be graded at the end of a course with the
possibility of making an "A", or
b) Get a "C" at the beginning of a course along
with everyone else.

WORD RATING LIST

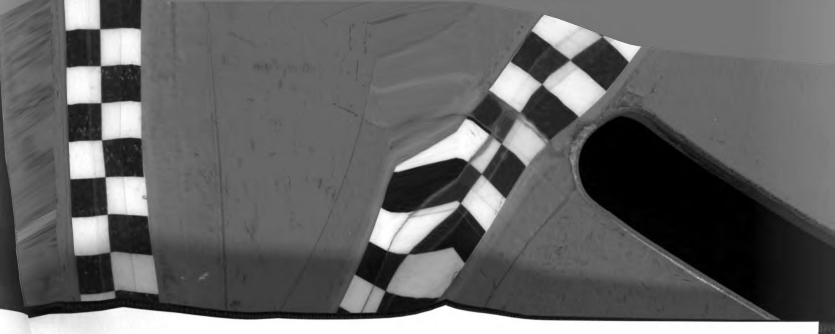
TEACHERS FEEL THAT I AM:

	Never	Sometimes	Usually	Always
84. studious	1	2	3	4
85. different	1	2	3	4
86. discontented	1	2	3	4
87. flighty	1	2	3	4
88. responsible	1	2	3	4
89. original	1	2	3	4
90. consistent	1	2	3	4
91. intelligent	1	2	3	4
92. distractible	1	2	3	4
93. in-the-know	1	2	3	4

HUMAN TRAIT INVENTORY

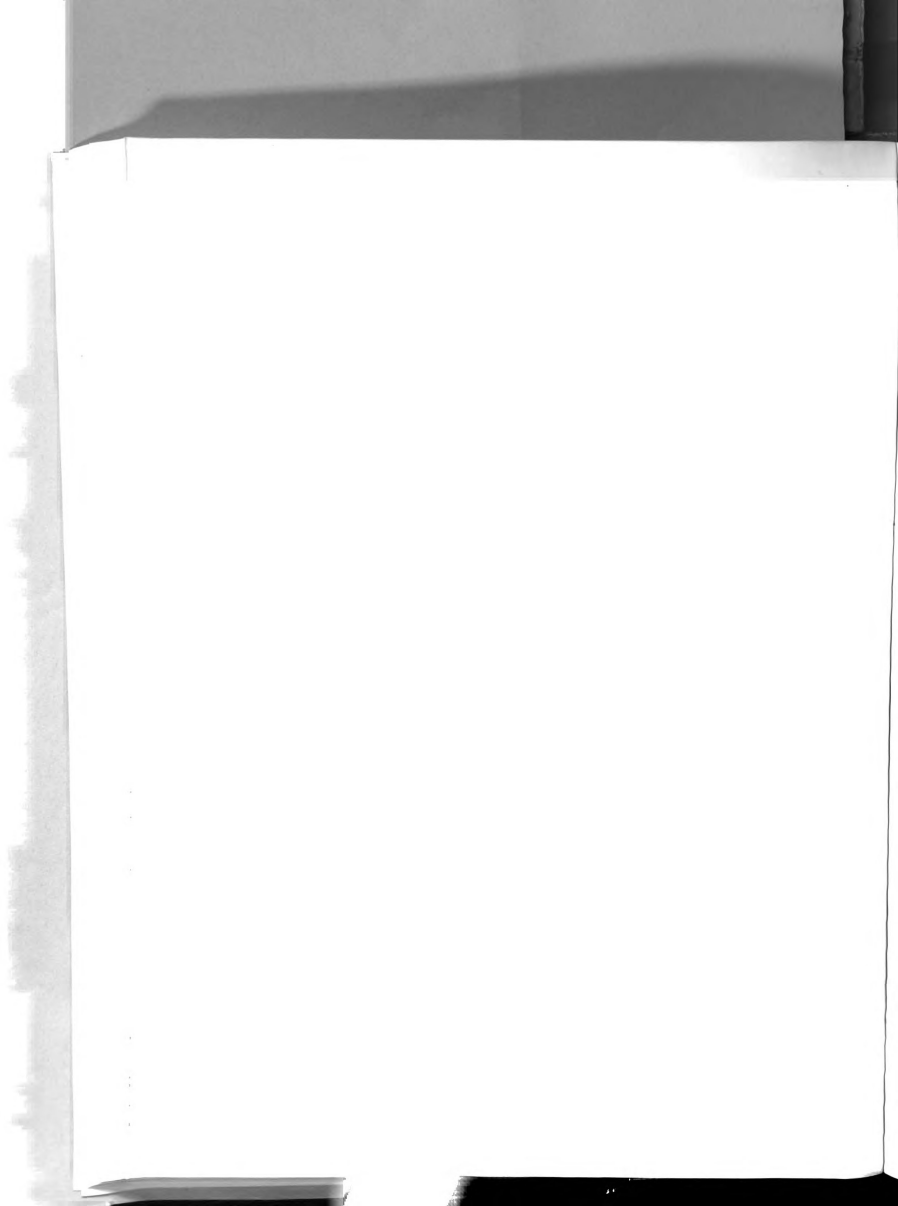
	Never	Sometimes	Usually	Always
134. I work things out by myself rather than have a friend show me how.	1	2	3	4
135. I have been quite independent and free from family rule.	1	2	3	4





- | | Never | Sometimes | Usually | Always |
|---|-------|-----------|---------|--------|
| | 1 | 2 | 3 | 4 |
| 135. When I have an opinion, I stand up for it. | | | | |
| 136. It is difficult for me to keep interested in most of my school subjects. | 1 | 2 | 3 | 4 |
| 137. I have difficulty working under strict rules and regulations. | | | | |





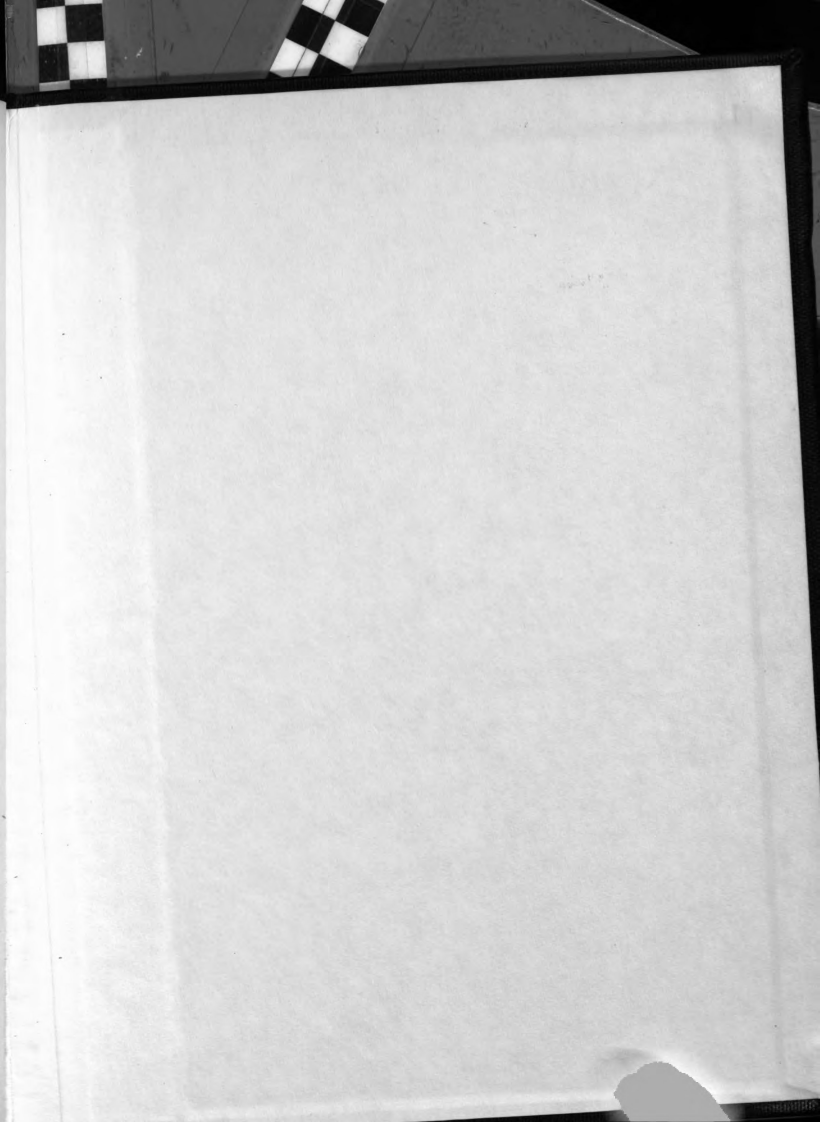
ROOM USE ONLY

JUL 29 1964

FEB 4 1965

MAR 2 1965

DEC 15 1965



MICHIGAN STATE UNIVERSITY LIBRARIES



3 1293 03085 0519