THE RELATIONSHIP BETWEEN NON-INTELLECTUAL VARIABLES
AND COLLEGE PERFORMANCE OF BLACK
COLLEGE FRESHMEN

DISSERTATION

Presented in Partial Fulfillment of the Requirements
for the Degree of Doctor of Philosophy in the
Graduate School of The Ohio State
University

By

Ernest Thomas Brooks, B.A., M.A.

* * * * *

The Ohio State University
1973

Reading Committee:

James V. Wigtil
Herman Peters
James B. Gunnell

Approved by

James V. Wigtil
Adviser
ACKNOWLEDGMENTS

Many persons contributed to the preparation and completion of this investigation. The author takes this opportunity to express his gratitude and appreciation.

To the freshmen, their instructors and administrators at the college who participated in the study, I extend my sincere thanks and appreciation.

I am deeply grateful to my major advisor, Dr. James V. Wigtill, for his guidance, encouragement and assistance throughout my graduate studies and in the development of this study.

Appreciation is extended to Dr. Herman J. Peters and Dr. James B. Gunnell who served on the Reading Committee and provided much helpful assistance. I wish to emphasize my heartfelt thanks to Dr. Gunnell for his contribution to this study as well as to my professional development.

My appreciation is extended to Mr. Ray Montoro and Dr. Madhukar Golhar, Programmers at the Instruction and Research Computer Center and Dr. Robert Wherry and his assistant for their help in processing of the data. A special thanks go to Dr. Benno Fricke, author of the Opinion Attitude and Interest Survey (OAIS), for his
consultation and assistance and Mr. Lawrence Jones, Associate Director of the University Testing Center, for the use of the OAIS booklets. A deeply felt appreciation is extended to Mrs. Gloria Coss and Mrs. Rosanna Perdue for their skillful typing.

I will be forever grateful to my Grandmother, the late Mrs. Elizabeth Paster, and my sister, Gen, who gave me this opportunity years ago. Last but not least, to my wife, Patricia and my sons--Ernest and Chris--go my sincere thanks for their understanding, encouragement and patience. For they made this experience all the more meaningful and worthwhile.
VITA

February 19, 1942...... Born - Jackson, Tennessee

1960.................. Graduated, Merry High School, Jackson, Tennessee

1964.................. B.A., Lane College, Jackson, Tennessee, Major: History

1964-1965............. Elementary Teacher, Sikeston Public Schools, Sikeston, Missouri

1965-1968............. Teacher, MDTA Program, Sikeston Public Schools, Sikeston, Missouri

1968-1969............. Counselor, Sikeston Senior High School, Sikeston, Missouri M.A., Murray State University, Murray, Kentucky, Major: Counselor Education

1969-1970............. Ed.S., Murray State University, Murray, Kentucky, Major: Counselor Education

1970-1971............. Assistant Professor, Department of Counselor Education, Murray State University, Murray, Kentucky

1971-1972............. Graduate Administrative Associate, University College, Ohio State University, Columbus, Ohio

1972-1973............. Fellow, Academic Year Institute, Ohio State University, Columbus, Ohio

FIELDS OF STUDY

Major Field: Counselor Education

Studies in Counselor Education. Professors James V. Wigtil and Herman Peters
Studies in Counseling Psychology. Professor Bruce Walsh

Studies in College Student Personnel. Professor Roosevelt Johnson
TABLE OF CONTENTS

ACKNOWLEDGMENTS.................................................. ii
VITA................................................................. iii
LIST OF TABLES..................................................... v

Chapter

I. INTRODUCTION TO THE PROBLEM.................... 1

Statement of the Problem
Significance of the Study
Definition of Terms
Objectives of the Study
The Hypotheses
Limitations of the Study
Organization of the Remainder of the Study

II. REVIEW OF THE LITERATURE....................... 11

Prediction Studies Employing Intellectual Variables
Prediction Studies with Samples of Black Students Using Intellectual Variables
Prediction Studies Employing Non-Intellectual Variables
Prediction Studies Based on Samples of Black Students Using Non-intellectual Variables
Studies Utilizing the OAIS
Summary

III. RESEARCH METHODS............................... 74

The Design
The Setting
Subjects in the Study
Description of the Instruments
American College Test (ACT)
Data Collection and Processing Procedures
Data Analysis Procedures
IV. FINDINGS OF THE STUDY.......................... 93

Summary

V. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS.......................... 124

Objectives of the Study
The Design
The Setting
Subjects in the Study
Description of the Instruments
Data Collection and Processing
Procedures
Findings
Conclusions
Recommendations

APPENDIX............................................. 135

BIBLIOGRAPHY........................................ 140
<table>
<thead>
<tr>
<th>Table</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Predictor-Criterion Combinations</td>
<td>16</td>
</tr>
<tr>
<td>2. Types of Non-Intellective Predictors Employed</td>
<td>36</td>
</tr>
<tr>
<td>3. Listing of Personality Variables Associated with Academic Performance in Multivariate Studies</td>
<td>40</td>
</tr>
<tr>
<td>4. Classification of Personality Variables Associated with Academic Performance in Multivariate Studies</td>
<td>41</td>
</tr>
<tr>
<td>5. Alignment of Findings From Single Variable Studies with Dimensions Summarizing Multivariate Studies</td>
<td>43</td>
</tr>
<tr>
<td>6. Average Intercorrelation of Personality, Aptitude, and Achievement Variables for Twenty Samples at Thirteen Institutions</td>
<td>56</td>
</tr>
<tr>
<td>7. Percentage of Gain in Variance Accounted for in R by Addition of ACH P to HSA, SAT-V, and SAT-M</td>
<td>58</td>
</tr>
<tr>
<td>8. Means and Standard Deviations of The OAIS for Freshmen Males, Females, and The Total Group at a Black College, 1972</td>
<td>96</td>
</tr>
<tr>
<td>9. Means and Standard Deviations of ACT, High School Average, and First Semester Grade-Point Average for Freshmen Males, Females, and The Total Group at a Black College, 1972</td>
<td>97</td>
</tr>
<tr>
<td>10. Prediction of First Semester Grade-Point Average From the OAIS for The Total Group (N=152)</td>
<td>98</td>
</tr>
</tbody>
</table>
11. Prediction of Grade-Point Average for The Males From The OAIS (N=65)..........101

12. Prediction of Grade-Point Average for The Females From The OAIS (N=87)..........103

13. Summary of Selection of OAIS Variables, Contributing Most to the Prediction For Males, Females, and Total Group...........107

14. Summary of Multiple Correlations and Standard Errors of Estimate Employing the OAIS Scales as Predictors............108

15. Prediction of Grade-Point Average for the Total Group from the OAIS, High School Average and ACT (N=152)........110

16. Prediction of Grade-Point Average for Males from the OAIS, High School Average and ACT (N=65).......................113

17. Prediction of Grade-Point Average for Females from the OAIS, High School Average, and ACT (N=87).....................116

18. Summary of the Order in which variables Were Selected to Maximize Prediction for Males, Females, and the Total Group......119

19. Summary of Multiple Correlations and Standard Errors of Estimate Using the OAIS, ACT, and High School Average as Predictors.................................121

20. Zero-Order Correlations of the OAIS, High School Average, and ACT with Grade-Point Average by Sex and for Total Group.......122
CHAPTER I

INTRODUCTION TO THE PROBLEM

For Black college students, accessibility to and success at the collegiate-level is more than obtaining a "passport" for entry into the mainstream of American life. Rather, it is more fundamentally the acquisition of that competence which higher education is supposed to, and presumably designed to produce and develop. However, in countless instances, many Black students have been systematically denied this opportunity on the basis of intellectual measures such as standardized test performance and past cognitive performance.

For nearly a half century college careers have been made and re-made by the controversy over the relative efficiency of intellectual measures in predicting probably college performance and criteria for college admission. Yet, the most efficient of these measures accounts for only between 25 and 50 percent of the variation between ability and college performance. Therefore, a considerable proportion of the variation in college performance is affected by factors other than those measured by standardized tests of intellectual
functioning. Factors such as attitudes, motivation, interests, opinions, and personality characteristics are not assessed via conventional achievement and aptitude tests. Such factors would appear to be significant non-intellectual determinants of college performance. Lavin (1965) stresses that academic performance and its prediction involves more than intellectual variables. Other important variables include personality factors and social determinants.

There is a consensus among educators that student college performance is influenced by personal characteristics both intellectual and non-intellectual. Yonge (1965) argues for the use of non-intellectual variables as supplements to traditional predictors and advocates that:

... values, interests and attitudes of students not be disregarded in the educational process ... The intellectual climates provided by student attitudes and values must be understood and taken into account before institutional objectives can be realized.

Even though the prediction of academic performance of college freshmen has been the topic of considerable research for nearly a half century, research involving Black college students has been much less abundant and its quality is highly questionable.

Clark and Plotkin (1963) concluded in a study based on "alumni" classes of the National Scholarship and Fund for Negro students that:
... scholastic aptitude test scores are not clearly associated with college grades. It is suggested that college admission officers weigh test scores less, since they do not predict the college success of Negro students in the same way they do for whites...

Motivational factors are probably more important than test scores in demonstrated superiority of Negro students in completing college.

Statement of the Problem

This study investigated the relationship between non-intellectual factors measured by the Opinion Attitude and Interest Survey (OAIS) and first semester grade-point average of Black college freshmen. Secondly, it examined the utility of the OAIS scales as an independent predictor of first semester grade-point average. Thirdly, the study investigated the prediction of first semester grade-point average using the OAIS in conjunction with the American College Test (ACT) and high school average.

Significance of the Study

A study employing non-intellectual predictors of college performance will contribute invaluably to the field of college counseling and the assessment of students in general and Black students particularly. Further, a study of the utility and predictive validity of the OAIS of college performance of Black freshmen identifies an area of importance and merits investigation for the following reasons:
1. Quality research in this area is very limited with Black college students.

2. The crucial need for alternatives to the use of current standardized testing of Black students.

3. Non-intellectual variables will help to resolve the ever-present controversy regarding the predictive abilities and bias of standardized tests when applied to Black students.

4. The use of non-intellectual variables in college selection and placement will provide a more comprehensive assessment criteria for Black students who might otherwise be denied a higher educational opportunity solely on the basis of low test indices.

5. A repeated conclusion of many of the significant ability validation studies is that since predictive validity for Black students varies from institution to institution, each institution should initiate and continue predictive validity studies of ability tests as they relate to Black students. For example, in a
recent study conducted at 19 integrated colleges and universities, Temp (1971) assessed differential prediction of the Scholastic Aptitude Test (SAT) for Black and white students. This study led Davis and Temp (1971) to conclude that the validity of the SAT for predicting college grades varies from institution to institution. Temp (1971) goes on to say the following:

... this study has demonstrated the urgency that institutions using the SAT (and other ability tests and predictors) conduct validity analyses at their own institutions over the short and long haul.

6. The need to find predictor variables that are more valid than aptitude or achievement test scores alone, and variables when combined with aptitude scores will provide a more efficient prediction of college performance.

The results of this study hopefully will provide admission officers, counselors, and other personnel working with Black students: (1) data that are more valid for assessment purposes, (2) the use of non-intellectual variables that are potentially powerful predictors of college performance, and (3) the stimulus to continue the search for non-intellectual variables relevant to the prediction of college performance.
Definition of Terms

The terms listed below were defined in order to clarify and facilitate the reader's understanding of their meaning as they were used in this study. Other terms were defined as they appeared in the text.

Non-intellectual factors are characteristics of individuals expressed as interests, attitudes, values, opinions, aspirations, and motivations which are not specifically measured by the common scholastic aptitude, achievement, and intelligence tests or inventories (Fishman, 1962).

Non-intellectual predictors are personality and motivational tests and inventories, interest inventories, interviews and personal ratings, biographical information, and study habits inventories (Fishman, 1962).

Intellectual factors are characteristics of individuals expressed as intelligence, aptitude, ability, acquired knowledge, and skills measured by the common scholastic aptitude, achievement tests, and intelligence tests (Fishman, 1962).

Intellectual predictors are aptitude and intelligence test scores, achievement test scores, and high school average (Fishman, 1962).

Grade-point average is the academic average earned for a semester of course work. It is computed by dividing the student's quality points by the number of hours attempted.
The following scale per hour is used in computing quality points: A=4 quality points, B=3 quality points, C=2 quality points, D=1 quality point, and F=0 quality points.

High school average is the average of recent high school grades in English, mathematics, social studies, and natural science prior to the time the student writes the ACT. It is computed using a four-point scale (A=4, B=3, C=2, and D=1).

College performance is the cumulative grade-point average earned by a student at the end of the first semester of the freshman year.

Objectives of the Study

Four major objectives were formulated for the investigation of this study. The first objective was to ascertain if there is a relationship between the OAIS and first semester grade-point average for a group of Black male and female college freshmen. The second objective was to determine the predictive efficiency of the OAIS as an independent measure of college performance based on first semester grade-point average. Thirdly, another objective was to determine the predictive utility of the OAIS in conjunction with ACT scores and high school average in terms of first semester grade-point average. And lastly, the final objective was to examine the differential predictability of the OAIS
based on sex independently and in concert with the ACT and high school average.

The Hypotheses

The over-all null hypothesis that no relationship exists between college performance and non-intellectual factors, as measured by the OAIS, for college freshmen at a private Black college during the 1972-73 academic year was tested in this study. Testing of the over-all hypothesis was accomplished by formulating several sub-hypotheses. These sub-hypotheses were stated in statistically testable null form at the .05 level of significance.

The OAIS as an independent measure and in conjunction with ACT and high school average were perceived as the predictor variables and first semester grade-point average as the criterion variable with respect to the following sub-hypotheses:

1. There is no significant relationship between scores obtained on the OAIS and college performance based on first semester grade-point averages for the group of Black college freshmen.

2. There is no significant difference between the multiple correlation for Black male and female college freshmen
when OAIS is used as a predictor of first semester grade-point average.

3. The multiple correlation for the total group when the OAIS is used in concert with ACT and high school average as a predictor of first semester grade-point average will not be significantly different from zero.

4. The multiple correlation will not be significantly different for male and female college freshmen when the OAIS is used in conjunction with ACT and high school average in predicting first semester grade-point average.

**Limitations of the Study**

The reader of this study must be cognizant of and take into consideration its major limitations. Foremost, it included only 152 freshmen as subjects. Therefore, the validity of the generalizations of its findings is dependent upon the extent to which these subjects are representative of Black college freshmen. Equally important is that the findings of this study are valid only insofar as first semester grades are a true measure of each student's college achievement.

The measurement of non-intellectual factors and intellectual factors are limited by the inherent nature of
the standardized instruments employed in the study. Finally, the study does not exhaust the variables which may significantly relate to college performance.

Organization of the Remainder of the Study

An introduction of the study is presented in Chapter I. This chapter includes a statement of the problem, a discussion of the significance of the problem, definition of terms, the objectives and hypotheses of the study, and an enumeration of the limitations of this study.

A survey of related research and literature is presented in Chapter II. It is divided into five sub-areas relative to the problem under investigation.

Chapter III includes a description of the procedures, methodology, and instruments used in this study. The findings of the study are presented in Chapter IV.

Chapter V contains a summary of the study, a discussion of the implications of the study, and recommendations for future studies are also presented in this chapter.
CHAPTER II

REVIEW OF THE LITERATURE

This chapter covers a review of the literature that is relevant to the paramount concerns of this study, the use of non-intellectual variables for predicting academic achievement in college. Studies will be cited which relate to the problem under investigation.

The voluminous number of college prediction studies is indicative of the extensive research in this area of higher education. A wide variety of variables have been employed to ascertain the most efficient variables for predicting college performance. According to Middleton and Guthrie (1959):

Attempts to predict academic achievement have utilized three classes of variables: intelligence test scores, indices of previous achievement and measures of personality and other non-intellective factors.

These studies have been most commonly concerned with two aspects: (1) predicting college achievement as measured by first semester and/or first term grade-point average; and (2) samples of middle-class white college students.

For this study the review of related literature will 11
be grouped according to: (1) prediction studies employing intellectual variables, (2) prediction studies with samples of Black students using intellectual variables, (3) prediction studies employing non-intellectual variables, (4) prediction studies with samples of Black students employing non-intellectual variables, and (5) studies utilizing the OAIS.

**Prediction Studies Employing Intellectual Variables**

Durflinger (1943) summarized the results of more than seven hundred predictive studies. He concluded that intelligence tests were used in almost every attempt to predict college success and found the following median correlations between: (1) intelligence and college grades for studies before and after 1934 of .45 and .52 respectively, (2) high school grades and college grades of .54, and (3) high school achievement tests and college grades of .55. For multiple correlation coefficients Durflinger found that they rarely exceeded .80 regardless of the variable employed. The median multiple correlation coefficients were obtained when an intelligence test, an achievement test, and high school average were combined.

Cronbach (1949) reported multiple correlations of .60 to .70 between ability tests and college grades. Tyler (1956) stated that "the limit of predictive accuracy so far
achieved for any criterion is generally represented by a multiple correlation of about .60." Middleton and Guthrie (1959) noted that the use of two or more predictors of academic achievement in combination have produced multiple correlations as high as .70, however, most were in the .50's. Bloem and Peters (1961) reported that multiple correlations usually ranged from .55 to .65.

Garrett (1949) compiled a review of 194 investigations from 1920 to 1940 of all factors contributing to the prediction of academic success in college. Garrett concluded that the student's high school average continues to demonstrate the highest correlation with academic achievement in college. His summary of 32 studies of correlation between high school average and college grades ranged from .29 to .83 with a median of .56. One third of the studies used first semester grades as the criterion for entering freshmen. Rank in high school graduating class was used as a predictor in 29 studies, the correlation coefficients ranged from .18 to .72 with a median of .55.

Achievement tests such as the College Entrance Examination Board and Iowa High School Content Examination were rated second among predictive factors reported in educational literature. In a review of 24 studies in this area, the coefficient ranged from .23 to .85 with a median of .40. Third among predictive factors and the most popular one
studied was general intelligence and psychological tests. Ninety-four studies reviewed using either of these tests coefficients ranged from .17 to .67 with a median of .47. Ranking fourth and fifth as predictors in the literature were scores on general aptitude tests and special aptitude tests. The summary for 28 studies between scores on general aptitude tests and 15 studies between scores on special aptitude tests and the criterion produced median coefficients of .43 and .41 respectively.

Multiple correlation coefficients were computed in many of the studies to determine the extent to which a combination of predictive factors improved the correlation with the criterion over that produced by a single factor. Garrett found that studies using two-variables combination yield multiple R's ranging from .47 to .79 with a median multiple R of .58. His examination of studies employing three or more variables lead to the conclusion that a third variable adds little to a two-variable combination and adding a fourth improved the prediction very little.

Cosand (1953) summarized the findings of 35 studies which investigated single predictors of college academic performance. The median correlation coefficient for 17 studies of the relationship between high school grades and college performance was .53 with 50 percent of the studies between .48 to .60. Of all the various measures investigated
(A.E.C Quantitative-Linguistic, mental ability tests, SAT-V and M, and general achievement tests) high school grade-point average commanded first place as a predictor with high school rank second with coefficients ranging from .36 to .62. The median for 27 multiple correlation coefficients was reported as .65.

Fishman and Pasanella (1960) examined 580 admission-selection studies that were conducted during the 1950's. In admission-selection studies, it has become acceptable to designate predictors and criteria as dealing with either intellective characteristics (aptitude-achievement test scores or course grades) or non-intellective characteristics (personality and motivational and attitudinal measures) of individuals. The authors cited nine theoretically possible predictor-criterion combinations, since intellective, non-intellective, or both types of factors can be either predictor or criteria.

Of the nine possible predictor-criterion combinations as shown in Table 1, there were only three that occurred with any substantial frequency.

The most popular combination by far was the classical one in which only intellective predictors are aimed at intellective criteria (combination number one). The two next most utilized study designs were those that employed both intellective and non-intellective (combination number 7) or


<table>
<thead>
<tr>
<th>Number</th>
<th>Predictors</th>
<th>Criteria</th>
<th>Studies</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>only</td>
<td>only</td>
<td>Number</td>
</tr>
<tr>
<td>1</td>
<td>Intellective only</td>
<td>Intellective only</td>
<td>408</td>
</tr>
<tr>
<td>2</td>
<td>Intellective only</td>
<td>Non-intelective only</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>Intellective only</td>
<td>Both</td>
<td>2</td>
</tr>
<tr>
<td>4</td>
<td>Non-intelective only</td>
<td>Intellective only</td>
<td>64</td>
</tr>
<tr>
<td>5</td>
<td>Non-intelective only</td>
<td>Non-intelective only</td>
<td>17</td>
</tr>
<tr>
<td>6</td>
<td>Non-intelective only</td>
<td>Both</td>
<td>9</td>
</tr>
<tr>
<td>7</td>
<td>Both</td>
<td>Intellective only</td>
<td>70</td>
</tr>
<tr>
<td>8</td>
<td>Both</td>
<td>Non-intelective only</td>
<td>5</td>
</tr>
<tr>
<td>9</td>
<td>Both</td>
<td>Both</td>
<td>8</td>
</tr>
</tbody>
</table>

| Total  | 530               | 99%            |

aLess than 1 percent

Source: This table was taken from the article College Admission-Selection Studies by Fishman and Pasanella, 1960.
non-intellective predictors alone (combination number 4),
with intellective criteria only being employed in each
case (Fishman, 1959). These three combinations, numbers
1, 4, and 7 account for over 90 percent of all the studies.

An examination of studies using intellective pre-
dictors by Fishman and Pasanella (1960) yielded the following
analyses:

1. For 263 studies, the intellective predictor,
total high school average or rank in class
correlated roughly .50 with first-year
college grades, the intellective criteria.

2. Among the most commonly used aptitude tests
were (in decreasing order of incidence)
the Scholastic Aptitude Test (SAT), the
American Council on Education Psychological
Examination for College Freshmen (ACE), and
The Ohio State University Psychological
Examination (OSPE). Their correlations with
comprehensive intellective criteria averaged
.47.

3. The relationship between scores on the Cooperative English Test and Nelson-Denny Reading
Test and college freshmen grades of 62 studies
produced varying correlations between .13 and
.64, with a median correlation of .47.
4. The College Board English Composition test showed a median correlation of .36 with freshmen grade-point average in 19 studies.

5. Achievement tests (such as the Cooperative Tests in Social Studies or Natural Science, or the Iowa Tests) yielded results ranging from .03 to .74 in 84 predictions of freshmen grade-point average, with a median correlation of about .45.

6. In 216 multiple correlation studies which employed only intellective predictors, the correlations with freshmen grade-point average ranged from .37 to .83, with a median of .62.

7. The multiple correlations of an aptitude test plus the high school record with the college criterion ranged from .31 to .82. In 24 studies which did not utilize the College Board SAT the median was .64.

8. The College Board SAT multiple correlations extended from .34 to .82, with a median of .61, for 147 studies predicting freshman grade-point average.

9. In 21 studies which used an aptitude test and the high school record, the multiple correlation was increased anywhere from .00 to .23 beyond
the zero correlation based on high school average alone, with a median of .07.

10. The use of any one intellective predictor, or more than one, with high school record improved the prediction of freshman grade-point average in 181 studies by .00 to .38, with an average of .11.

Buros (1965) discussed 14 SAT studies which were reviewed in an Educational Testing Service Bulletin covering the period from August, 1959 to May, 1961. The validity coefficients reported for predicted success of male liberal arts students as measured by freshman average grades ranged from .16 to .61 with a median of .35 for the verbal scores, and from .15 to .53 with a median of .33 for the mathematic scores. A later review by Howell (1964) also showed that the SAT-Verbal score is a slightly better predictor of first-year college grades in general than the SAT-Mathematical scores. Howell found modest mean validity coefficients of .38 for SAT-Verbal scores and .36 for SAT-Mathematical scores for 271 groups of students in four-year and two-year colleges. In addition, he found higher mean validity coefficients for women than for men. Durflinger (1943) noted the necessity of differential prediction on the basis of sex, since that prediction equation for men usually predicted less accurately for women and vice versa. The correlation between
intelligence and grades were about .10 higher for women. Others found women to be more predictable academically than men (Abelson, 1952; Lewis, 1962; Seashore, 1962; Hills, 1964; and Stanley, 1967).

**Prediction Studies with Samples of Black Students Using Intellectual Variables**

The general overview has shown that research over the years has employed a large variety of variables in prediction studies. In this section a few specific studies using achievement or aptitude tests and high school average or rank as the predictor(s) and grade-point average as the criterion for Black college freshman students will be presented.

Roberts (1962) found that in a sample of 129 Fisk University freshmen, SAT-V scores had a correlation of .63 with freshmen grade-point average, and .68 with SAT-M scores. In 1964 Roberts reported correlation coefficient for freshmen in eight Black colleges with sample sizes ranging from 40 to 203 students. The median correlation with freshman grade-point average was .50 for SAT-V and .47 for SAT-M. These correlations are similar to those reported for other populations.

Hills (1964) summarized several of a series of statistical reports from the University System of Georgia which included 19 publicly-supported colleges, three of which are
four-year colleges attended solely by Blacks. These statistical reports were one of the first indications that a scholastic aptitude test such as the SAT-V and M, predict freshman grade-point average about as well within predominantly Black colleges as they do within predominantly non-Black colleges. Hills' contrast of the three predominantly Black four-year colleges with the Georgia Institute of Technology noted that:

... the mean SAT-V for males at these three predominantly Negro colleges was approximately 270, with an average standard deviation of approximately 45. The mean and standard deviation for Georgia Tech males were approximately 500 and 87 for SAT-V and 580 and 77 for SAT-M. Yet the average multiple correlation coefficient, R for males at the three predominantly Negro colleges is .57, while at Georgia Tech the average R for the five years is .56. Restriction in range on SAT scores and curtailed distribution (for the predominantly Negro colleges, where the tests were too difficult for many students) did not appreciably affect the multiple correlations.

Biaggio and Stanley (1964) subjected data reported by Hills and his associates for the four academic years 1959-60 through 1962-63 to a three-way analysis of variance and summarized their findings as follows:

By taking into account the fact that the scores of the Negroes on the SAT were very much restricted in range and applying a correction for this restriction, we found that the correlations of test scores with freshman grades were significantly higher for the Negroes than for the non-Negroes, at .05 level for SAT-Mathematical among males, and for SAT-Verbal among both males and females. However, when such restriction of range was not considered, it was found that non-Negro females could be predicted
significantly better than Negro females, and that there were no significant difference among males.

McKelpin (1965) investigated the predictive validity of SAT-V, SAT-M and high school grades at the predominantly Black North Carolina College and concluded that the predictive validities found were:

As high as those usually reported for college freshmen . . . A reasonable inference is that when first semester grades are the criterion, SAT scores give a fair appraisal of the developed ability of students entering predominantly Negro colleges.

Stanley and Porter (1967) found that SAT-V and SAT-M correlated rather well with freshman grades in the three essentially all-Black, co-educational, four-year, state colleges in Georgia over six academic years. The mean coefficients of correlation were not significantly lower for men in these colleges than for predominantly non-Black men in 15 other Georgia state colleges. Mean r's were somewhat lower for Black women than in 14 Georgia state colleges. The median multiple R for predicting freshman year grade-point averages within the predominantly Black colleges from the composite of SAT-V and SAT-M scores and average high school grades was .595 for men and .645 for women, varying from year to year from .55 to .69 for men and .56 to .70 for women. Further, the authors concluded that SAT-type test scores were about as correlationally valid for Blacks competing with Blacks and taught chiefly by Blacks as they were for non-Blacks
competing chiefly with non-Blacks and taught chiefly by non-Blacks.

Hills and Stanley (1970) investigated the predictability of college grades of Black students by using a test similar to the Scholastic Aptitude Test (SAT) but of less difficulty, namely the School and College Ability Tests (SCAT), level 4, grades 6-8. The high school averages, SAT and SCAT scores were obtained for 371 males and 626 females from three southern, predominantly Black, four-year public institutions. Correlation coefficients were computed separately for the SAT-V and SAT-M and the freshman grade-point average and also for the verbal and quantitative sections of the SCAT and the freshman grade-point averages. The investigators found in all of the 12 cases the correlation for the SCAT score was higher than for the corresponding SAT score, the r's differing as much as .05 vs. .34 and as little as .34 vs. .45. The mean multiple R based on SAT scores and high school grades was .59, while the mean multiple R based on SCAT scores and high school grades was .65. Finally, the investigators concluded that an easier test (SCAT) is more predictively valid for these students than was the more difficult one as the SAT.

Other investigators have reported similar findings when the American College Test (ACT) and other standardized achievement tests rather than the SAT was used as a predictor.
Punches (1965) found a correlation of .50 between the American College Test (ACT) composite standard score and the year-end grade-point average of 369 Black freshmen enrolled at Jackson State College. He concluded that the ACT composite scores was a reliable factor when used to predict first-year college success as a result of its positive correlation.

Boney (1966) reported that scores on several measures obtained for 109 Black boys and for 118 Black girls in the twelfth grade consistently yielded substantial correlations with high school grade-point average. The coefficient of multiple correlation produced for the boys is .800 and for the girls .824. Furthermore, the author concluded that Black students were as predictable as other groups.

Buszek (1968) investigated the predictive validity of the Otis Gamma Intelligence Test (Otis I.Q.), College Qualification Test (CQT-M, R and L), Scholastic Aptitude Test (SAT-V and M), and the California Achievement Test (CAT-R, M and L) for freshmen students at a Black college in Virginia. The following multiple coefficient correlations .569, .489, .542, .545, .558, .575, .580, .489, and .580 respectively were found between the test scores and cummulative grade-point average for 568 Black freshmen students. For male students the achievement score was more predictive and for female students the Otis I.Q. was more predictive.
The evidence seems to clearly indicate that achievement and/or aptitude test scores are equally associated with first semester college grades for Black and white students attending either Black or white institutions. However, the predictive validity of an achievement and/or aptitude test for Black students enrolled in predominantly Black or white institutions seems yet undetermined.

For instance, Clark and Plotkin (1963) studied a group of Black students who had applied for aid from the National Scholarship Service Fund for Negro Students (NSSFNS) in order to enter inter-racial colleges in the years 1952 and 1956. Clark and Plotkin suggest that perhaps the SAT was not a valid predictor of academic success for Black students. They found while the SAT did discriminate between those who completed college with a C-plus or lower average, it did not discriminate between those who completed college and those who did not. In sum, the actual performance of these Black students was significantly higher than what was indicated by the predictive indices of the SAT.

Green and Farquhar (1965) compared the School and Ability Test (SAT) and the Michigan State M Scale with high school grade-point average for 104 Black male, 129 Black female, 254 white male, and 261 white female eleventh grade students. The investigators found that there was essentially no relationship (-.00 correlation coefficient) between high
school grade-point average and scores on the SCAT for the
Black males, while the coefficient for white males was .62.
The correlation for Black females was significantly higher,
.25. The test of achievement motivation of M Scale cor-
related slightly higher with high school grades than the
SCAT-V, .36 for Black males and .64 for Black females.

Cleary (1968) investigated the regression of college
grades on the SAT for Black and white students in integrated
colleges in an attempt to replicate Clark and Plotkin's
study. The investigator compared SAT scores with freshmen
grades in three integrated colleges—two in the East and one
in the Southwest. In the two Eastern colleges, there was
no significant difference in the predictive validity of the
SAT for Black and white students. In one of the Southwestern
colleges, significant differences were found in predictive
validity—Black students' predicted grades were higher than
their actual grades. This demonstrated that a test bias
was operating for the sample studied at this college, but
it was a positive bias. Further, it was found that when
SAT scores were combined with high school grades or rank,
the degree of positive bias increases in predicting Black
students' grades. Cleary (1968) summed up her findings by
stating the following:

The colleges in this study do not represent
the full spectrum of colleges in the United States,
so general conclusions cannot be drawn. However,
in the three colleges studied, there was little
evidence that the Scholastic Aptitude Test is biased as a predictor of college grades.

Bower (1970) examined the predictability of grade-point average for 168 Black male and 237 Black female freshmen admitted under a Special Educational Opportunities Program (SEOP) and 2,938 males and 1,917 females who were regularly admitted freshmen at the University of Illinois. The investigator reported multiple correlations of grade-point average with the linear combination of high school percentile rank, SCAT-V and SCAT-M scores for SEOP male and female freshmen .30 and .29 respectively and the regularly admitted male and female .41 and .39 respectively. In addition, Bowers found that separate prediction equations were needed for maximum forecasting efficiency.

Cherdack (1970) investigated the correlation between scores and high school grades of disadvantaged/minority students. The study involved over 200 minority freshmen students, mostly Black and Mexican-Americans, enrolled in the Educational Opportunities Program (EOP) and in the College of Letters and Science (L and S) at the Los Angeles and Santa Barbara campuses of the University of California. Randomly selected control populations of over 600 L and S white freshmen were added for purposes of comparison.

His results showed that high school average was the best overall predictor of college grades for both minority and white freshmen. The two-year correlational patterns
for EOP students ranged from -.198 to .380; for L and S students -.059 to .322. SAT-V was a more consistent positive predictor for white than for minority students, but the findings were less consistent for SAT-M scores. Although statistically significant, the multiple R's showed that only slight increases occurred through combining variables to predict freshman grades. The criterion variance accounted for in this study remained below 25 percent for the major populations investigated. Minority and white female SAT-V correlations were generally higher than those of males. The predictor variables correlated poorly for the EOP group than for the other groups.

In contrast to Cleary's study cited previously, Borup (1971) found that ACT does have a built-in sex and ethnic bias. Borup compared the relationship between high school rank, ACT scores, and first semester grade-point average for 260 Mexican-American (MA) students and an equal number of Anglo-Americans (AA). While mean ACT composite scores (MA=17.48 and AA=20.40) and sub-scores were significantly higher for the Anglo-American group, no significant difference in first semester college grade-point average was found (MA=2.05 and AA=2.19). High school rank and college performance was similarly associated for Mexican-American and Anglo-American students.

Kallingal (1971) compared regression equations of
the sophomore year cumulative grade-point averages on five ability and achievement test scores for 225 Black students and 511 white students at Michigan State University. The multiple R for the Black sample was .51 and the white sample .53. The difference was not significant and the variance accounted for by the predictors was similar for both groups. However, an analysis of homogeneity of regressions for Black and white students revealed a significant difference.

Pfeifer and Sedlacek (1971) examined high school grades and both SAT-V and SAT-M as predictors of college grade-point averages for 178 white freshmen students (79 males and 99 females) and 126 Black freshmen students (64 males and 62 females) at the University of Maryland. The investigators found that very little difference in predictability existed when the predictors were combined in a multiple regression equation. All of the multiple R's were virtually identical, ranging between .61 and .67. In addition, when using the Predictive Index Weights (based on a large sample of the University's undergraduate student body using the same three predictors) instead of optimally derived weights resulted in virtually no reduction of the multiple R for either the Black or white female group or for the white male sample; .63, .66, and .63 respectively. However, the multiple R dropped from .61 to .46 in the Black male sample. Both Black samples were significantly over predicted when Predictive Index Weights were used to
predict Maryland grade-point average (MDGPA). Predictive weights predicted a mean 1.89 for Black males and 1.98 for Black females. Actual MDGPA means were 1.64 and 1.75 respectively. The investigators concluded that since both Black samples were overpredicted is evidence that the use of a predictive equation based on predominantly white samples does not give the most accurate prediction of Black student performance.

Sampel and Seymour (1971) evaluated the academic performance of 180 Black undergraduate students at the University of Missouri. The researchers' investigation of the relationship between predictors, SCAT and HSR, of academic success (GPA) in order to determine their predictive validity was as follows:

1. The correlation between SCAT and GPA for Black males, both freshmen (r=.09) and upperclassmen (r=.07), was low and not significant statistically. A comparable sample of white males, both freshmen (r=.44) and upperclassmen (r=.64), was significantly higher.

2. For females, both Black and white, freshmen (r=.50; r=.34) and upperclassmen (r=.38; r=.67), showed significant correlations between SCAT and GPA.
3. The total group correlations were significant for both Black (r=.38) and white (r=.49) students.

4. As were the results with SCAT, correlations between HSR and GPA for Black males, freshmen (r=.21) and upperclassmen (r=.00), did not reach significance at the .05 level, whereas those for Black females did (freshmen r=.41; upperclassmen r=.25).

5. For the total group correlations were significant for both Black (r=.39) and white (r=.57) students.

The researchers concluded that the data in this study suggest that for Black males some of our well-established predictors of academic success have little or no relevance.

Studies by Temp (1971) and Davis and Temp (1971) have helped to clarify and account for the contradictory results of the studies cited previously. Temp (1971) investigated the empirical differential prediction for Black and white students at 13 integrated institutions by comparison of regression planes. Eight of the institutions had 300 or more Blacks in undergraduate freshman status and five of the "innovative" institutions had a smaller number of Black students. In each institution an equal number of white students was drawn. For both samples, Scholastic Aptitude
Test scores (SAT-V and SAT-M), end of freshmen year status, and grade-point averages (GPA) were provided by the institutions. On the basis of the results, Temp (1971) concluded the following:

1. A single regression plane cannot be used to predict freshman grade-point average for both Blacks and whites in 10 of the 13 institutions studied. He further stated, it is likely on the basis of these data that a common prediction system is not practical and that a separate prediction should be developed for each sub-group.

2. If prediction of GPA from SAT scores is based upon regression equations suitable for majority students, then minority (Black) students as a group are predicted to about as well as (or better than) they actually do. In four colleges the predicted GPA is more than one-half of a standard deviation above the actual GPA, and in only three colleges is the GPA less than one-fifth of a standard deviation above the actual GPA.
3. The multiple regression (SAT-V, M) prediction for Blacks in 12 of the 13 institutions was lower in magnitude than for whites and was non-significant in six of the institutions studied. The author believes that his study demonstrated the urgency that institutions using the SAT (and other admission tests and predictors) must conduct validity analyses at their own institution over the short and long haul.

Davis and Temp (1971) conducted a relatively comprehensive study at 19 integrated institutions, although they do not represent a national sample of colleges and universities, but they do provide a basis for 19 case studies to add to the three previously reported by Cleary (1968). The correlation coefficients are based on samples of approximately 100 Black students and 100 white students in 11 of the colleges. In the remaining eight colleges, the samples varied considerably from 100. Temp and Davis found the relationships are not significant (or large enough to justify use of tests) for either groups in six of the remaining 18 institutions. The validity coefficients range for Black groups from $R = .06$ to $R = .65$, with median value of $R = .33$. The investigators' results of the analysis of covariance revealed that separate grade-prediction equations
for Blacks and for whites are justified—that is considering Blacks and whites separately improves the accuracy of the prediction substantially—in 13 of the 19 colleges.

At six of the 19 colleges, the validity of the SAT for predicting freshman average grades of Black and white students is the same in each college. To the contrary, at five other schools correlation coefficients between SAT scores and first semester grades, the relationships for Blacks are not significant while the same variables were significantly correlated for groups of white students at each college. As for the seven remaining institutions, Temp and Davis reported data showing that prediction equations based on the predominantly white standardization groups overpredicted the actual grades earned by Black students at each college.

Prediction Studies Employing Non-Intellectual Variables

Before the concern with non-intellective factors became wide-spread, a pattern of one or more intellective predictors in conjunction with an intellective criteria of college prediction and validity studies had already experienced much use as previously shown in Table 1 (Fishman and Pasanella, 1960).

The correlations between personality or trait tests and academic achievement, according to Durflinger's review (1943) ranged from -.19 to +.15. It was further suggested
that this may have occurred because very few studies attempting to predict college success included any type of personality measure. A review by Garrett (1949) of 63 studies employing tests of personality or character revealed that no consistent relationship between their scores and academic performance in college existed. For these 63 studies the range of coefficients were from -.30 to +.64, with a median coefficient of .09.

Fishman (1959) shows the types and popularity of non-intellective predictors used in studies of guidance and selection in Table 2.

Further, Fishman and Pasanella's (1960) general overview of non-intellective predictors employed in 29 percent of 280 studies reviewed reported the following correlations:

1. Personality tests such as Rorschach, Minnesota Multiphasic Personality Inventory, Manifest Anxiety Scale, and others with global intellective criteria ranged from .01 to .62, with a median correlation of .22 for 26 students.

2. Twenty-five studies utilizing study-habits, tests, and inventories correlated between .26 and .66 with college freshman grades, with a median correlation of .47.
TABLE 2

TYPES OF NON-INTELLECTIVE PREDICTORS EMPLOYED

<table>
<thead>
<tr>
<th></th>
<th>Studies(s)</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>One non-intellective predictor</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>20</td>
<td>26.67</td>
</tr>
<tr>
<td>2</td>
<td>7</td>
<td>9.33</td>
</tr>
<tr>
<td>3</td>
<td>5</td>
<td>6.66</td>
</tr>
<tr>
<td>4</td>
<td>16</td>
<td>21.33</td>
</tr>
<tr>
<td>5</td>
<td>9</td>
<td>12.00</td>
</tr>
<tr>
<td>6</td>
<td>1</td>
<td>1.33</td>
</tr>
<tr>
<td>(58)</td>
<td></td>
<td>(77.32)</td>
</tr>
<tr>
<td><strong>Two non-intellective predictors</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,2</td>
<td>4</td>
<td>5.33</td>
</tr>
<tr>
<td>1,3</td>
<td>4</td>
<td>5.33</td>
</tr>
<tr>
<td>1,4</td>
<td>1</td>
<td>1.33</td>
</tr>
<tr>
<td>1,5</td>
<td>1</td>
<td>1.33</td>
</tr>
<tr>
<td>2,3</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>2,4</td>
<td>1</td>
<td>1.33</td>
</tr>
<tr>
<td>3,4</td>
<td>1</td>
<td>1.33</td>
</tr>
<tr>
<td>(12)</td>
<td></td>
<td>(16.70)</td>
</tr>
<tr>
<td><strong>Three or more non-intellective predictors</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1,2,3</td>
<td>2</td>
<td>2.67</td>
</tr>
<tr>
<td>1,2,4</td>
<td>1</td>
<td>1.33</td>
</tr>
<tr>
<td>1,3,4</td>
<td>1</td>
<td>1.33</td>
</tr>
<tr>
<td>1,2,3,5</td>
<td>0</td>
<td>0.00</td>
</tr>
<tr>
<td>1,2,4,5</td>
<td>1</td>
<td>1.33</td>
</tr>
<tr>
<td>(5)</td>
<td></td>
<td>(6.67)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>75</td>
<td>100.00</td>
</tr>
<tr>
<td></td>
<td>Personality test (Rorschach, MMPI, SAT, etc.)</td>
<td>35</td>
</tr>
<tr>
<td>---</td>
<td>---------------------------------------------</td>
<td>----</td>
</tr>
<tr>
<td>2.</td>
<td>Interest inventories (Kuder, Strong)</td>
<td>16</td>
</tr>
<tr>
<td>3.</td>
<td>Interview and rating</td>
<td>14</td>
</tr>
<tr>
<td>4.</td>
<td>Biographical information</td>
<td>20</td>
</tr>
<tr>
<td>5.</td>
<td>Study habits inventories and reports</td>
<td>12</td>
</tr>
<tr>
<td>6.</td>
<td>Other</td>
<td>1</td>
</tr>
</tbody>
</table>

Source: This table was taken from the article "Non-Intellective Factors as Predictors, as Criteria, and Contingencies in Selection and Guidance of College Students: A Socio-Psychological Analysis" by Fishman, 1959.

3. Only 7 studies were reported using interest inventories of which yielded the lowest correlations, .05 to .26.

4. Correlations with college grades for biographical information ranged from .01 to .63, with a median of .13 for 23 studies.

5. In nine studies based on ratings or interviews zero-order correlations ranged from .26 to .77. The very high figure of .77 represented counselor predictions of first quarter grades.
6. The few studies reported which combined intellective and non-intellective predictors by means of multiple-correlation attributable to the non-intellective predictor was small.

According to Fishman (1959) relatively few prediction studies have employed non-intellectual variables. It appears from his analysis of this area of non-intellectual predictors that the proper role of such variables are contingent upon admission selection process and subsequent counseling of college students. Fishman found that when non-intellectual predictors have been added to the traditional intellectual predictors, comparatively little increase in the predictive-ness of academic performance has resulted.

On the other hand, Fishman and Pasanella (1960) in a more hopeful note seem to think that the coming decade will bring educational researchers closer to a realization of the true potential in the non-intellective-predictor area. In addition, whatever potential may exist will be recognized by means of prior development of a solid theoretical foundation rather than by a shotgun "trying out" of instruments constructed for other purposes.

Stein (1963) examined the role of personality factors in the prediction of college success by reviewing a sample of the literature from 1950-60. Among other things, he reported: "A cursory examination of this sample of literature indicated that it was characterized by much diversity."
Lavin (1965) examined single-variable and multivariate studies utilizing personality factors as predictors. He concluded that in the summary of findings of single-variables studies that the relation between personality variables and achievement is still so tentative that it cannot be used confidently for practical purposes, such as college admission. For the summary of multivariate studies, Lavin listed major variables reported as being related to academic performance as shown in Table 3.

Secondly, he classified the list according to six underlying dimensions, along with the names of the variables constituting each as presented in Table 4.

The findings of both the single-variable and multivariate studies were synthesized by Lavin using the ad hoc dimensions formulated to summarize the results of the multivariate studies and assessing the degree to which the findings of the single-variable studies seem to fit into this structure. The degree of alignment between the two is illustrated in Table 5.

Barclay (1965) analyzed and discussed the research that has been done on the subject of predictors and criteria of collegiate success. In summarizing his remark on the "present research perspective on testing for higher education," Barclay noted:
TABLE 3

LISTING OF PERSONALITY VARIABLES ASSOCIATED WITH ACADEMIC PERFORMANCE IN MULTIVARIATE STUDIES

<table>
<thead>
<tr>
<th>Higher levels of performance tend to be associated with:</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. higher achievement motivation</td>
</tr>
<tr>
<td>2. higher need for order</td>
</tr>
<tr>
<td>3. more endurance</td>
</tr>
<tr>
<td>4. greater socialization</td>
</tr>
<tr>
<td>5. greater social presence</td>
</tr>
<tr>
<td>6. greater femininity</td>
</tr>
<tr>
<td>7. higher conformance</td>
</tr>
<tr>
<td>8. greater curiosity</td>
</tr>
<tr>
<td>9. greater independence</td>
</tr>
<tr>
<td>10. greater flexibility</td>
</tr>
<tr>
<td>11. greater originality</td>
</tr>
<tr>
<td>12. greater social maturity</td>
</tr>
<tr>
<td>13. moderate impulsivity (lack of constructiveness)</td>
</tr>
<tr>
<td>14. greater ability to visualize a configuration when moved</td>
</tr>
<tr>
<td>15. more relevant thinking in the classroom</td>
</tr>
<tr>
<td>16. more class participation (quality and frequency)</td>
</tr>
<tr>
<td>17. restraint in social behavior</td>
</tr>
<tr>
<td>18. greater liking for thinking</td>
</tr>
<tr>
<td>19. less stereopathy</td>
</tr>
<tr>
<td>20. higher morale</td>
</tr>
<tr>
<td>21. greater stability</td>
</tr>
<tr>
<td>22. higher activity level</td>
</tr>
<tr>
<td>23. greater freedom from neurotic orientation to study</td>
</tr>
<tr>
<td>24. lower need for affiliation</td>
</tr>
<tr>
<td>25. responsibility</td>
</tr>
<tr>
<td>26. low conformity to peer group standards</td>
</tr>
</tbody>
</table>

Source: This table was taken from the chapter on Personality Factors as Predictors in the book Prediction of Academic Performance by Lavin, 1965.
<table>
<thead>
<tr>
<th>Item*</th>
<th>Item</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Dimension I:</strong> Social Maturity in the Student Role</td>
<td><strong>Dimension IV:</strong> Cognitive Style</td>
</tr>
<tr>
<td>5. greater social presence</td>
<td>8. greater curiosity</td>
</tr>
<tr>
<td>25. responsibility</td>
<td>10. greater flexibility</td>
</tr>
<tr>
<td>12. greater social maturity</td>
<td>11. greater originality</td>
</tr>
<tr>
<td>4. greater socialization</td>
<td>14. greater ability to visualize a configuration when moved</td>
</tr>
<tr>
<td>17. restraint in social behavior</td>
<td>15. more relevant thinking in class</td>
</tr>
<tr>
<td><strong>Dimension II:</strong> Emotional Stability</td>
<td>16. more class participation (quality and frequency)</td>
</tr>
<tr>
<td>20. higher morale</td>
<td>18. greater liking for thinking</td>
</tr>
<tr>
<td>71. greater stability</td>
<td>19. less stereopathy</td>
</tr>
<tr>
<td>23. greater freedom from neurotic orientation to study</td>
<td><strong>Dimension V:</strong> Achievement via Conformance</td>
</tr>
<tr>
<td><strong>Dimension III:</strong> Achievement Motivation Syndrome</td>
<td>2. higher need for order</td>
</tr>
<tr>
<td>1. higher achievement motivation</td>
<td>6. greater femininity</td>
</tr>
<tr>
<td>22. higher activity level</td>
<td>7. higher conformance</td>
</tr>
<tr>
<td>3. more endurance</td>
<td><strong>Dimension VI:</strong> Achievement via Independence</td>
</tr>
<tr>
<td></td>
<td>24. lower need for affiliation</td>
</tr>
<tr>
<td></td>
<td>9. greater independence</td>
</tr>
<tr>
<td></td>
<td>26. low conformity to peer group standards</td>
</tr>
<tr>
<td></td>
<td>13. moderate impulsivity (lack of constrictedness)</td>
</tr>
</tbody>
</table>

*Multivariate study items describe characteristic of the high achiever. Source: this table was taken from the chapter on Personality Factors as Predictors in the book Prediction of Academic Performance by Lavin, 1965.
## TABLE 5

ALIGNMENT OF FINDINGS FROM SINGLE VARIABLE STUDIES WITH DIMENSIONS SUMMARIZING MULTIVARIATE STUDIES

<table>
<thead>
<tr>
<th>Multivariate Summary Dimensions</th>
<th>Alignment of Single-Variable Findings</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Higher levels of performance tend to be associated with:</td>
</tr>
<tr>
<td>I. Social Maturity in the Student Role</td>
<td>better study habits and more positive attitudes toward school—less hostility</td>
</tr>
<tr>
<td>II. Emotional Stability</td>
<td>less test anxiety</td>
</tr>
<tr>
<td>III. Achievement Motivation Syndrome</td>
<td>higher achievement motivation</td>
</tr>
<tr>
<td>IV. Cognitive Style</td>
<td>greater flexibility in problem solving</td>
</tr>
<tr>
<td>V. Achievement via Conformance</td>
<td></td>
</tr>
<tr>
<td>VI. Achievement via Independence</td>
<td>more independence and/or introversion</td>
</tr>
<tr>
<td></td>
<td>less impulsivity</td>
</tr>
<tr>
<td></td>
<td>greater independence in choice of vocational interests</td>
</tr>
</tbody>
</table>

Non-aligned Findings:
- more positive self-image
- less defensiveness about revealing personal adequacy
- greater interest in content areas of high achievement

Source: This table was taken from the chapter on Personality Factors as Predictors in the book Prediction of Academic Performance by Lavin, 1965.
With regard to predictors of success it is apparent that non-intellectual factors of personality, motivation, etc., do not possess power functions in prediction once the ability groupings are held constant. Three personality inventories appear to offer substantial promise for continued research. These are the California Psychological Inventory, the Edwards Personality Preference Schedule, and the 16 Personality Factor Test. These tests, though not specially designed for the admission problem, have value in the fact that a considerable amount of research has been done with them that relates to non-intellective predictors of college success. Other promising techniques that should be explored further are Holland's vocational preference inventory, Gough's adjective check list technique, the OAIS of Fricke, the CPI of McConnell, and Heist and Osgood's semantic differential technique. The use of negative criteria for the prediction of college failure or dropout status also offers an important supplementary alternative for increasing the prediction of college success.

**Prediction Studies Based on Samples of Black Students Using Non-intellectual Variables**

Research pertaining to Black college students in the South has reported problems particularly acute due to personality deficiencies. Boykin (1957) administered the Bell Adjustment Inventory to 2,078 Black college freshmen students (1,019 men and 1,059 women) over a four-year period. The investigator found that 21 percent of the men and 29 percent of the women or 25 percent of the total sample were poorly adjusted in terms of total adjustment scores and about 20-25 percent poorly adjusted in the areas of home, social relations, health, and emotions. No attempt was made, for example, to determine the relationship
of adjustment to academic success, etc. However, there is one of several possible inferences that may be drawn from the findings of Boykin's study:

... students who were "poorly adjusted" in terms of Total Adjustment Scores indicates the need to give serious attention to the adjustment problems of entering freshman students. For example, a student's emotional state of being affects his academic performance. (Italics mine.)

A number of studies of motivation and performance of Black student populations suggests that Black students were less likely to hold strong beliefs in internal control; that social class and race probably interact so that lower-status Blacks particularly stand out as externally oriented; and that internal control was a critical determinant of academic performance.

In the Coleman study on Equality of Educational Opportunity (Coleman, et al, 1966), internal control proved in two ways to be unusually important for Black students. It explained more of the variance in achievement of Black than for white students; furthermore, it explained more variance for Black students than any other measure included in that massive survey of academic behavior. According to Coleman, non-intellectual measures such as interests, self-concept, and "sense" of environmental control have a higher relationship to the academic success of Black students than all other school factors together.
Grossack (1957) found that Black female college students show significantly higher scores on the need achievement scale than do white females of the normative sample on the Edwards Personal Preference Schedule (EPPS). However, the Black male college students and white males of the normative sample were not significantly different.

Harrison (1959) analyzed the achievement motivational characteristics of a sample of Black freshmen in a Southern college. He reported that the students in his study manifested achievement motivation characteristics of unwillingness to postpone the gratification or satisfaction that is normally requisite to achievement in middle-class America.

Boose and Boose (1967) found for 167 college freshmen females and 119 males enrolled in a Southern undergraduate college for culturally disadvantaged students scored high on the need achievement scale of the EPPS with means at the 52 and 66 percentiles respectively. Moreover, the investigators' finding is noteworthy in view of the positive correlation between achievement and grade-point average for students in general. In addition, it is noted that the culturally disadvantaged females scores significantly higher on the need achievement than did the normative female sample; while there was no difference on that need between the two male groups.

McClain (1967) administered Cattell's Sixteen
Personality Factor Questionnaire to 297 undergraduate students (99 men and 198 women) in two Southern schools, one a private liberal arts college for Blacks and the other a state university for Blacks. The investigator found the mean sten scores of the Black men students on the index for predicting academic success was extremely significantly deviant from the norm for college men in the direction of failure. The mean sten score of the Black men students was 2.66 and 5.50 for norm for college men. The same extreme deviation was found for the Black women students on the index for predicting academic success; their mean sten score was 2.50. Both Black males and females sten scores fell at about the seventh percentile in the total college population.

Bradley (1967) investigated selected characteristics, academic performance, personal problems, and successes of Black undergraduate students enrolled in seven formerly all-white state institutions in Tennessee. For a total of 583 students who were regularly enrolled, Bradley employed the multiple regression analysis to determine if there was a relationship between a student's success in college, as measured by the over-all grade-point average and certain intellective (high school grade-point average and ACT scores) and non-intellective (education of both parents, an acceptance factor, confidence and ability factor, and morale
factors) variables. He found a multiple $R$ of 0.6131, the standard error of estimate was 0.5451 and the $F$-ratio was 16.413 for four of the independent variables. The four variables which gave the greatest increment in $R^2$ are in the following order: (1) high school grade-point average, (2) the confidence and ability factor, (3) ACT Social Studies score and (4) the morale factor. None of the other ACT scores added any significant increase in $R^2$ and the ACT mathematics score was not entered into the summary table because its increase in $R^2$ was negligible or non-existent.

Not unexpectedly, high school grade-point average played a prominent part in the equation. The lack of predictive success of pre-college tests (ACT) would tend to collaborate the findings of the Clark and Plotkin study. They stated, in their use of the Scholastic Aptitude Test (SAT), that:

These scores, and those from similar examinations, cannot be used as a basis for predicting the academic success of the Negro students of this sample - or probably Negro students in general - in the same way that they are used to predict college success for more privileged white students.

Epps (1969) found that self-concept of ability was the strongest personality correlate with grades. For Northern high school students (400 males and 566 females), this variable was more highly correlated with grades than vocabulary score .34 and .42 respectively. For 721 Southern
high school Black males and 851 females, he found the relationship of self-concept of ability to grades strong, but not as good a predictor as vocabulary score. The correlation coefficient for self-concept of ability with grades was .43 for males and .44 for females, and for vocabulary score with grades, the coefficient was .49 and .44 respectively. Second to self concept of ability and vocabulary score, amount of expected future education was the variable most consistently related to grades among the four groups of students (Northern males .38 and females .36; and Southern males .38 and females .36). Further, Epps found that these three variables when combined with six other non-ability variables and vocabulary scores resulted in the following multiple correlation coefficients with grades as the dependent variable: Northern males, .55; Southern males, .61; Northern females, .67; and Southern females, .66.

Gurin, et al. (1969) examined the relationship between three control scores - the sense of personal control, control of ideology, and the total [Rotter Internal - External Control Scale](https://example.com) - and a variety of motivational and performance measures with a sample of Black college students. The authors found in the performance area that the two control measures, the personal and the ideological, work in opposite ways. Students who were strongly internal in the personal
sense had higher achievement test scores, achieved higher grades in college, and performed better on anagram tasks which were included in the instruments administered in the study. In contrast, students who were strongly internal in the sense of believing that internal forces were the major determinants of success in the culture at large performed less well than the more externally-oriented students.

Pfeifer and Sedlacek (1970) investigated non-intellectual variables related to academic performance of Black freshmen students at the University of Maryland. The researchers found for a Black sample of 66 correlation coefficients with grade-point average for three scales of the Holland Vocational Preference Inventory: Social, .25; Infrequency, .31; and Masculinity, .26. A Black sample of 79 correlations with grade-point average were computed for each of the scales of the California Personality Inventory. It was found that Socialization, Communality, and Achievement via Independence showed the most relation to grade-point average with coefficients of .38; .34; and .35 respectively.

Cameron (1970) administered two sub-tests from the Michigan M-Scale (measure of academic self-concept and academic personality factors) to 58 Black female students. Correlations between grade-point average and scores from the SCAT and the M-Scales were computed. Cameron reported when SCAT-total was combined in a multiple regression
equation with the two M-Scales an $R$ of .59 was achieved. Although $R$ is significantly different from zero, the contribution of the two M-Scales to validity coefficient was negligible. The correlation coefficients of the two M-Scales (academic self-concept and academic personality factors) with grade-point average were .18 and .27 respectively.

Dispenzierei, et al. (1970) investigated the academic motivation of disadvantaged students in a special community college program and a group of regular matriculants. The investigators found for the special-program group, the predictors which yielded the highest correlations with the criteria were high school average, Otis IQ, Critical Thinking, Study Survey, and some items from the Expectations Questionnaire. Most of the correlations were low to moderate.

Studies Utilizing the OAIS

Only within the past ten years has the OAIS been available for research purposes. The majority of the validation studies have been conducted with students at the Universities of Michigan and Minnesota primarily by Benno Fricke, the author of the OAIS. This section will include a review of all known studies employing the OAIS.

Fricke (1965) reported the findings of extensive research conducted with freshmen at the University of Michigan and Minnesota. Coefficients were computed between
the 14 Opinion Attitude and Interest Survey (OAIS) scales and pertinent scales from well-known inventories and scores from other instruments such as ACE-Quantitative and Linguistic, English proficiency, mathematics achievement test and by the high school percentile rank. Some of the findings are as follows:

1. Scores on the Achiever Personality (Ach P)
   Scale for 534 freshmen men at Michigan correlates .39 with first year grade-point average (GPA). For 567 freshmen women at Michigan the Ach P correlates .36 with GPA. The mathematics achievement test correlates .41 with grades while the ACE Q and L scores coefficients are below .39.

2. The Ach P correlations with ACE Quantitative and Linguistic Aptitude, with English and mathematics achievement, and with HSPR are .03, .14, .16, .18 respectively. Ach P correlates appreciably with college grades and negligibly with measured intelligence.

3. The Ach P for most groups studied at Michigan increases the accuracy of predicting grades when included in a regression equation. The predictive power improves about 17 percent.
4. The 62 Black students at Michigan yielded a .32 correlation between the Ach P and college GPA.

5. The Intellectual Quality (Int Q) scores for the men correlates appreciably with scores from standard ability tests: .24 with ACE Quantitative aptitude, .55 with ACE Linguistic aptitude, .48 with English achievement, and .26 with Mathematic achievement. The average correlation of the Int Q scale with the ability test is about .37; this is not much lower than the average inter-correlation of the four ability tests, .39. The Int Q predicts scores on ability tests about as well as the ability tests predict each other.

6. The Int Q correlations for men with high school and college grades are .15 and .23 respectively.

7. The Int Q scores for the women correlates about .35 with tested ability and .08 and .24 with grades in high school and college.

8. Scores from the Creativity Personality Scale (Cre P) for men at Michigan and Minnesota correlates negatively with GPA (-.01 and -.12, respectively). For women at both
universities the correlations are .07 and .19, respectively.

9. At both universities for both sexes Cre P tends to correlate positively with ability tests, about .12 on the average. Cre P correlates negatively (about -.08) with HSPR in three of the four groups; the exception is for women at Minnesota where the correlation is barely positive (.02).

10. The 62 Black students at Michigan yielded a .32 correlation between the Ach P and college GPA.

11. The Social Adjustment (Soc A) scores for 534 Michigan freshman men correlates .28 with social adjustment peer ratings. Soc A correlates -.05 and -.13 with grades in high school and college, respectively. A correlation of .10 was found between Soc A and emotional adjustment criteria ratings.

12. A correlation of .37 was found between Soc A scores of 567 women and the social adjustment criterion and .18 with emotional adjustment. Correlations between Soc A, and grades, and
tested ability are similar to those for the men.

13. For the 200 Minnesota men, Emotional Adjustment (Emo A) correlates .31 with the emotional adjustment criterion, about .09 with tested ability and about -.03 with grades.

14. Essentially the same results for Emo A are found for the 179 Minnesota women; the validity for adjustment ratings is .38. Emo A correlates negatively, about -.05 with tested ability, and about -.07 with grades.

15. According to validation studies conducted at Michigan and Minnesota, each of the eleven scales correlated more highly with criterion it was designed to predict than it did with any other criterion.

Fricke (1965) reported that the Achiever Personality (Ach P) scale predicts college grades about as well as ability tests predict college grades (.35 and .37 respectively). Further, he stated that the Ach P scales and ability tests (which is about .08) is indicative of their measuring different aspects of academic behavior. Fricke (1965) also reported that the Ach P and Cre P scales of OAIS greatly
improves the predictive validity of scholastic aptitude measures for Black college students. Scores on these two scales correlated significantly (.47) with college grades when combined in a multiple regression equation with SAT scores.

At several institutions correlational studies between the Ach P scale and college grades have been conducted. For example, at Emory, Princeton, Michigan, and Millsap Colleges correlations of .42, .38, .34, and .34 respectively were obtained (OAIS Interpretation Leaflet, 1964).

Other research results reported by the OAIS Testing Program have yielded similar correlations between Ach P and college grades. For example, at Seton Hill College a correlation of .35 between Ach P scores and two-year cumulative grades of sophomore women were obtained. At Baylor University the validity coefficient was found to be .47 for a combined group of freshmen men and women. Some other representative Ach P validity coefficients were: University of North Carolina, .41; Wittenburg University, .27; Canisius College, .31; Albion College, .48; and Bethany College, .39.

A summary of the median correlation coefficients of three OAIS scales, SAT scores, high school record, and college grade average is shown in Table 6. The number of students in the samples ranged from 90 to 221.
### TABLE 6

**AVERAGE INTERCORRELATION OF PERSONALITY, APTITUDE, AND ACHIEVEMENT VARIABLES FOR TWENTY SAMPLES AT THIRTEEN INSTITUTIONS**

<table>
<thead>
<tr>
<th></th>
<th>AP</th>
<th>O AIS Int Q</th>
<th>CP</th>
<th>SAT V</th>
<th>SAT M</th>
<th>HIS Rec.</th>
<th>COLL GA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Achiever Personality</td>
<td>.20</td>
<td>-.18</td>
<td>.13</td>
<td>.05</td>
<td>.21</td>
<td>.36</td>
<td></td>
</tr>
<tr>
<td>Intellectual Quality</td>
<td>.02</td>
<td>.29</td>
<td>.52</td>
<td>.26</td>
<td>.08</td>
<td>.23</td>
<td></td>
</tr>
<tr>
<td>Creative Personality</td>
<td>-.18</td>
<td>.29</td>
<td>.20</td>
<td>.01</td>
<td>-.12</td>
<td>.06</td>
<td></td>
</tr>
<tr>
<td>SAT-Verbal Ability</td>
<td>.10</td>
<td>.32</td>
<td>.20</td>
<td>.42</td>
<td>.20</td>
<td>.38</td>
<td></td>
</tr>
<tr>
<td>SAT-Math Ability</td>
<td>.05</td>
<td>.26</td>
<td>.01</td>
<td>.42</td>
<td>.21</td>
<td>.33</td>
<td></td>
</tr>
<tr>
<td>High School Record</td>
<td>.21</td>
<td>.08</td>
<td>-.12</td>
<td>.20</td>
<td>.21</td>
<td>.50</td>
<td></td>
</tr>
<tr>
<td>College Grade Average</td>
<td>.36</td>
<td>.23</td>
<td>.06</td>
<td>.38</td>
<td>.33</td>
<td>.50</td>
<td></td>
</tr>
</tbody>
</table>

Source: This table was taken from the article "The OAIS Test and Testing Program", by Fricke, 1965.
The range of the Ach P coefficients for the 13 institutions is .07 to .49 with a median validity coefficient of .36. The Ach P scale predicts college grades about as well as SAT (.36 versus .38). The Ach P and SAT correlate about the same with high school grades. The low correlation (.10 and .05) between Ach P and SAT tests indicates that these two scales measure something different.

Webb (1965) reported the results of two cross-validations of the OASIS based on data from 205 students entering the freshman class in the fall of 1963 in the liberal arts college at Emory University. Each group included approximately 60 percent boys and 40 percent girls. To assess the contribution of the Ach P scale to the multivariate prediction of grades, the investigator computed a multiple validity coefficient involving use of HSA, Sex, SAT-V, SAT-M, and predictors, both with and without Ach P as a variable. The percentage of improvement in variance accounted for when Ach P is used with the other variables is 11.09 for the 1962 class and 6.74 for the 1963 class. When sex is considered separately the percentage of gain in variance accounted for by Ach P ranges from 9.09 to 25.27. Table 7 illustrates the percentage of gain in variance accounted for in R with or without Ach P.
### TABLE 7

PERCENTAGE OF GAIN IN VARIANCE ACCOUNTED FOR IN R BY ADDITION OF Ach P TO HSA, SAT-V, AND SAT-M

<table>
<thead>
<tr>
<th></th>
<th>Shrunken R</th>
<th>N</th>
<th>Without Ach P</th>
<th>With Ach P</th>
<th>Percentage of Gain</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Sex</strong></td>
<td><strong>Year</strong></td>
<td><strong>N</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women</td>
<td>1962</td>
<td>81</td>
<td>.550</td>
<td>.601</td>
<td>19.40</td>
</tr>
<tr>
<td></td>
<td>1963</td>
<td>86</td>
<td>.517*</td>
<td>.540</td>
<td>9.90</td>
</tr>
<tr>
<td>Men</td>
<td>1962</td>
<td>139</td>
<td>.570</td>
<td>.616</td>
<td>16.81</td>
</tr>
<tr>
<td></td>
<td>1963</td>
<td>123</td>
<td>.486</td>
<td>.544</td>
<td>25.27</td>
</tr>
<tr>
<td>Total</td>
<td>1962</td>
<td>220</td>
<td>.611</td>
<td>.644</td>
<td>11.09</td>
</tr>
<tr>
<td></td>
<td>1963</td>
<td>209</td>
<td>.542</td>
<td>.560</td>
<td>6.74</td>
</tr>
</tbody>
</table>

*SAT-M did not enter multiple correlation

Source: This table was taken from the article "Two Cross Validations of the Opinion, Attitude and Interest Survey" by Webb, 1965.

In regard to either the Psychological Adjustment or the Educational Interest Scales, the investigator concluded:

In terms of the criteria used, the data available offers little support to the validity of these scales relative to prediction.

Graves and Ingersoll (1964) examined the predictive relationship of the OAHIS to academic success for two comparable groups of 74 first-year medical students exposed to different methods of learning in the Department of Anatomy at The Ohio State University College of Medicine. The investigators reported the following:
1. The Physical and Humanities Interest scores were significant variables in the prediction of success for students in the traditional section of gross anatomy (R = .74). The Emotional Adjustment and Humanities Interest scores were significant predictors of success in the experimental section (R = .70).

2. The Creativity Personality and Humanities Interest scores were significant variables in the prediction of success in the traditional section of histology (R = .73). The Achiever Personality, Social Science Interest, and Social Adjustment scores were significant predictors for students in the experimental section (R = .81).

3. The Emotional Adjustment and Physical Science Interest scores were significant variables in the prediction of success in the traditional section of embryology (R = .75). The Physical Science Interest, Humanities Interest, and Social Undesirability scores were significant predictors for students in the experimental section (R = .86).
4. In the experimental section, the Creative Personality score was correlated significantly (.25) only with the scores on creative type questions, not factual portions of the open-book examinations nor the open-book examinations in general.

Graves and Ingersoll (1965) used the OAIS, along with 34 independent variables, in a multiple regression analysis to predict the success of 150 medical students in their first year at The Ohio State University College of Medicine. The authors found that for the total group of 150 medical students the OAIS Social Adjustment score was among the best combinations of predictors in the order of significance of contribution. The traditional group, consisting of 75 students, was evaluated separately in terms of success at the end of the first year. It was found that OAIS Social Adjustment was the best combination of predictors and the Biological Science Interest and Physical Science Interest scores should be considered. In the experimental group, it was found that among the best combinations were the Biological Interest, Humanities Interest, and the Emotional Adjustment scores. The authors concluded that: (1) the non-intellectual factors should be measured objectively as a part of the procedures for selection of applicants for medical school, and
(2) combinations of intellectual information need to be considered, both objectively and in the interview, to determine an individual's possibility of success in a medical program.

In order to determine the cognitive and affective qualities essential for a student to succeed in the Medical Dietetic Program in the College of Medicine at The Ohio State University, Wenberg and Ingersoll (1965) used the OAIS in an attempt to develop specific evaluative techniques for the program. The group mean percentile on the Academic Promise Scale was 69th for Ach P, 58th for Int Q, and 38th for Cre P suggests that these individuals have a strong motivation to succeed. They scored at the 54th, 46th, and 41st percentile on the Soc A, Emo A, and Mas O scales. Their interest scores present an expected pattern with the group's major expressed interest in biological science and social science. The authors concluded that the OAIS along with the Cooperative English Test (of which the group were higher than the national normative group) and Watson-Glasser Critical Thinking Test (of which the group scored at the 57th percentile) showed promise as an evaluative tool.

Gussett (1967) investigated the predictability of OAIS for 107 students enrolled in an elementary education student-teaching class and 46 students enrolled in a secondary education student-teaching class in the College
of Education at The Ohio State University. The investigator found that the Ach P had the highest correlation with grade-point average for the total group (.38) and for the elementary group (.45). The Humanities Interest scale had the highest correlation with grade-point average for the secondary education group (.34). In correlation with the student-teaching grades, Gussett found the highest for the Ach P with the elementary group, .28. For the total group the highest correlation with grades in student-teaching were Ach P, .21, and Emo A, .21. The Biological Interest scale (.17) had the highest correlation with student-teaching grades for the secondary education group. The Ach P and Emo A scales were statistically significant variables in the regression equations of both the total group and the elementary group. None of the variables in the secondary education student-teaching group as a whole for the male, were significant. For females of this group, the Biological Interest, Humanities, and Social Science Interest scales were all significantly positive. The OAIS scales yielded multiple r's from .338 to .912. The greatest amount of variance of the grade-point average attributed to OAIS was with the secondary education student-teaching males, .598, and the secondary education females, .912.

In the Handbook for Opinion Attitude and Interest Survey, Fricke (1965), stated: "Students who score low on
the Emotional Adjustment scale tend to be judged by counselors to be anxious, hypersensitive, nervous, and in need of personal emotional counseling." Sorensen's study (1968) was essentially that of checking the validity of Fricke's statement in regard to the emotional adjustment scales. This study involved 281 freshmen who availed themselves of services offered by the University Counseling Center. Sixty freshmen counselors were designated in need of emotional counseling and 22 counselors in need of educational or vocational counseling. Each freshman had completed the OAIS during the summer orientation program. The investigator found that the OAIS Emotional Adjustment Scale failed to discriminate between freshmen counselors whose problems were classified as emotional and freshmen counselors whose problems were classified as educational or vocational. Significant differences were found between percentile scores for the total freshmen group and counselors with emotional problems on the Infrequent Response, Intellectual Quality, and Creative Personality scales. These three scales, the investigator concluded, appeared to be better indicators than the Emotional Adjustment Scale.

Donnan (1968) used the OAIS to determine the relationship between measured personality factors and achievement-attrition data at the University of North Carolina at Chapel Hill. Two populations were used in the
study. Group I consisted of a sample of 375 1962-1963 freshman students and Group II consisted of the entire 1964-1965 freshman class of 1,747 students. Donnan found that of the six OAIS scales used, only the Achiever Personality scores to be associated with the criteria, one- and two-year grade-point averages. These correlation coefficients of .41, .36, and .41 were comparable to the corresponding correlations for academic indices. Combined SAT scores and high school rank yielded values of .56 and .55 when correlated with grade-point average. The addition of scores from Achiever Personality Scale increased the predictive power of these intellectual variables by .63.

James and Bronson's (1968) study was conducted to evaluate the OAIS for use in the counseling of college students at the University of Arizona. For 138 freshmen who had completed the OAIS and the SVIB, the following correlations between the OAIS Interest Areas and corresponding SVIB Areas were reported:

1. For 91 males - Business .32, Humanities .47, Social Science .43, Physical Science .25, and Biological Science .38.

2. For 47 females - Business .44, Humanities .42, Social Science .17, Physical Science .42, and Biological Science .46.
In regard to the Academic Promise Scales, the researchers found no significant difference between OAIS, Int Q-GPA correlation (.40), and either the SAT-Verbal-GPA (.32) or the SAT-Mathematical-GPA (.37) correlations; nor was there a significant difference between the OAIS, Int Q-GPA correlation (.40), and the ACT composite-GPA correlation (.51). The Ach P scale predicts grade average almost as well (.32) as the Int Q scale, thus supporting the contention in the OAIS Manual that the scale is a measure of motivation and conscientiousness. In terms of the Psychological Adjustment Scales, it was found that Soc A and Emo A scales scores agree with self-judgments obtained by Q-sort techniques, but unrelated to peer judgments similarly obtained.

Dohner (1969) attempted to determine the predictive abilities of the OAIS in academic performance of 813 freshmen (452 males and 361 females) entering The Ohio State University in 1965. Dohner found for the total group, the zero-order correlation (r) of .28 for the Ach P scale. The r's for the Ach P range from .19 in Education and Engineering to .43 in Home Economics. The Business Interest Scale correlated negatively with first quarter point-hour ratio, the criterion, for all groups. The r's for the Int Q scales ranged from .11 to .45.

Dohner's regression analysis yielded multiple R's
of .39 for males and .48 for females. Four scales (Ach P, Int Q, Soc A, Hum) are significant contributors for males and three scales (Ach P, Int Q, Hum) for females. The Ach P had an r of .30 for males and .24 for females, while the Int Q had an r of .21 and .36 for males and females respectively. The multiple R for the College of Arts and Science was .47 and for the College of Education, the multiple R was .41. The multiple R's for the College of Agriculture, Commerce, Engineering, and Home Economics were .66, .57, .50, and .65, respectively. Further, it was found that when the Ach P is added to HSR and ACT composite, the increase in the multiple R was significant beyond the .01 level for the College of Arts and Sciences. However, Dohner concluded that the personality attributes measured by the OAIS, even though making statistically significant increase in the multiple validity coefficients, did not add enough to the presently available data to warrant its use.

Miller and O'Connor (1969) investigated the Achiever Personality scales of OAIS as it relates to academic success for Black recipients of an Opportunity Award Scholarship at the University of Michigan who entered as freshmen in 1964 and 1965. The investigators found that neither high school percentile rank nor SAT scores had any relationship to grades of freshmen men. The Ach P scale was significantly related to both grades and to later success, but only for
those men scoring low on the SAT. For women, it was found that SAT scores, but not high percentile rank, was associated with freshmen grades. The relationship between the SAT scores and grades held for both low and high Ach P women. Ach P was strongly associated with grades and continuation as a junior for both low and high SAT women. The investigators summarized the impact of the findings of the study for students classified as low SAT scorers as follows:

1. Among the students whose total SAT scores were in the lower 15 percent (men) and lower seven percent (women) of the University as a whole, 71 percent of the students with high Ach P as contrasted with 17 percent of those with low Ach P scores were academically successful freshmen. The advantage held by the high Ach P students persisted in their becoming upperclassmen.

2. The Ach P scale was shown to be a valid predictor even among the sub-group of low SAT students who were further disadvantaged by coming from the poorer high schools. Miller and O'Connor concluded that the most meaningful finding
of their study was the fact that many
students were able to meet stiff
competition successfully, despite
very low scores on the SAT.

Graff and Hansen (1970) examined the relationship
between the scales of the OAIS and college achievement for
303 freshman female students at a private liberal arts
college. The investigators found that high school average
(HSA) was the best predictor of first semester grade-point
average (r = .58), followed by SAT-M and SAT-V with correlations
of .39 and .33 respectively. The validity OAIS scales
indicated that Ach P was significantly correlated at .19
with grade-point average. None of the other OAIS scales
were statistically related to achievement. The multiple
R for SAT-V, SAT-M, HSA, and OAIS scales with first semester
grade-point average was .61 of the six OAIS scales. The
Ach P was the best contributor in the improvement of the
Multiple R. The investigators concluded that results offer
little support for the use of the OAIS as a single or
supplementary predictor of academic performance.

Graff and Beggs (1970) investigated the validity of
the Academic Promise Scales (Ach P, Int Q, and Cre P) and two
of the Psychological Adjustment Scales (Emo A and Soc A) of
the OAIS. In the validation of the Ach P and the Int Q
scales, grade-point average for the first semester was used.
A modified form of Davis' semantic differential consisting of three dimensions (creativity, popularity and anxiety) was used respectively as criterion measures for the Cre P, Soc A, and Eno A scales. The subjects consisted of the total population of resident hall freshmen (161) at a private single-sex college in Western New York. They reported a positive relationship between Ach P and SAT-V, SAT-M, and a high school average (r=.55, r=.23 and r=.75). The authors noted that since the Academic Promise Scales were highly intercorrelated with the conventional predictors, they do not contribute appreciably to the variance in the criterion when combined with the usual predictors of scholastic aptitude and high school achievement. In terms of the second phase of the study, a very small relationship was found between each of the three dimensions on Davis' Semantic Differential scale. Likewise, the degree of relationship between Cre P and the variable on the Davis dimension is quite minimal.

The authors concluded that the results provided little support for the validity of either the Academic Promise Scales or the Psychological Adjustment Scales relative to prediction.

Bateman (1972) investigated the ability of the OAIS to discriminate between students who were or were not academically successful; between students who were rated by
resident assistants as high or low on the Psychological Adjustment scales, and who declare their academic majors in particular educational-vocational interest areas. The investigator found that the Cre P scale contributed most to the discrimination (−.789), followed by the Ach P scale (.716). The contribution of the Int Q (=.022) scales was limited. The percentage of correct classification of academic non-successful and academic successful groups was 66 percent and 62 percent respectively.

Bateman found that Fisher's t-tests did not support the validity of two of the psychological adjustment scales (Soc A or Emo A). However, the validity of the Mas O scale was supported. In terms of the five interest scales, he found that the collective power of these scales was statistically significant.

Bateman concluded that nine out of fourteen OAIS scales were statistically valid for the purpose for which they were designed. To that degree the OAIS provided useful information about students.

Although much of the research with the OAIS has been noteworthy, not all investigators have found the noteworthiness of the OAIS. In addition, not all authorities in the field of Tests and Measurements agree with the claims of the OAIS. For example, in two reviews in the Buros' Sixth Mental Measurement Yearbook, Crites (1965) criticized
the OAIS in its scant theoretical significance; its minimal reliability; and its failure to measure neither variables nor constructs with acceptable validity. He concluded that with possible exceptions of the Ach P and Cre P scales, the inventory does not fulfill the claims which were made for it, and it was not ready for use in either vocational-educational counseling or academic selection.

Webster (1965), another critic, agreed with Crites that the inventory lacked sufficient reliability and general theory. The most serious criticism was that the scale scoring was not available in the manual. He noted that this omission makes it impossible to study scale scoring in order to formulate hypotheses as to why the scales work as well as they do. Webster concluded that the OAIS represents a good beginning in the study of the expressed attitudes of college students, but will require considerably more work before it does more than contribute a small increment of predictability to a few criteria that are presently not well understood.

Summary

The review of literature has shown that prediction of academic success for college students has been the subject of a considerable body of research. The major variables used in prediction studies were high school performance, achievement tests, and scholastic aptitude tests. Most
multiple correlation coefficients in racially undifferentiated samples ranged between .50 to .70. High school grades or rank appeared to be the best single predictor of college grade-point, producing correlations ranging from .40 to .60. Scholastic aptitude and achievement tests appeared the second best single predictor with correlations ranging from .30 to .70.

Until a few years ago these variables were not widely examined in terms of predicting the academic success of Black college students. However, the available research is somewhat restricted and frequently contradictory. For example, high school grade-point average ranged from the most inconsistent (.02) contributor for predicting college grades for Black students to that of predicting as well for Black students as white students (.34 to .47). In terms of scholastic aptitude and achievement tests as a predictor, correlations ranged from a .25 to .45 with freshman grades in Black colleges to correlations ranging from -.01 to .06.

During the past several years attention has been increasingly focused upon the use of non-intellectual predictors of academic success. In general, the findings have not been consistently outstanding. A variety of inventories such as personality characteristics, study habits, interest motivation, and biographical data have been used as measures of non-intellectual predictors in these studies.
Correlations with academic success in college ranged from .01 to .63. When non-intellectual predictors were used in combination with intellectual predictors by means of multiple correlation techniques, the gain in the coefficient obtained was small.

In general, studies employing the OAIS produced promising results. The median validity coefficient for the Ach P scale was about .36. In fact in the studies reviewed, the Ach P scale predicts about as well as many of the frequently used scholastic aptitude and/or achievement tests. In terms of studies with Black samples, the Ach P added appreciably to the accuracy of prediction.
CHAPTER III

RESEARCH METHODS

The material in this chapter is divided into five sections. It contains the design of the investigation including a discussion of the following: (1) the setting in which the study was conducted, (2) subjects in the study, (3) description of the instruments, (4) data collection and processing procedures, and (5) data analyses procedures.

The Design

To investigate the relationship between the Opinion Attitude and Interest Survey (OAIS) and college performance for students enrolled in a private Black college during the 1972-73 academic year, the entering freshman class was selected. For each student of the 1972-73 freshman class, the following data were collected: (1) eleven OAIS scores, (2) five American College Test (ACT) scores, (3) high school average, and (4) first semester grade-point average.

A multiple regression analysis was performed in order to investigate the predictability of the OAIS. Seventeen predictor variables were used in the study. They were the five ACT scores, the high school average, and eleven
OAIS scales (three academic promise scales, three psychological adjustment scales, and five educational-vocational interest scales). The criterion variable was the first semester grade-point average.

Multiple regression equations using the OAIS scales as predictor variables and first semester grade-point average as the criterion variable were computed for the total group and for both males and females in the total group. Multiple regression equations were also computed for the total group and for both males and females employing ACT scores, high school average, and OAIS scales as predictor variables with first semester grade-point average as the criterion variable.

The Setting

This study was conducted at a private, Southern, church-related, Black liberal arts college during the 1972-1973 academic year. This college was founded in 1882 by the Colored Methodist Episcopal Church in America. The college offers two degrees: The Bachelor of Arts and the Bachelor of Science. The Bachelor of Arts is awarded to students whose major field is Elementary Education, English, History, Music, Religion, or Sociology. The Bachelor of Science is awarded to students whose major field is Biology, Business Education, Chemistry, Mathematics, or Physical Education and Health.
The student body is 99 percent Black and one percent of the 822 students enrolled during the 1972-1973 academic year are either from within the state or from several bordering states. More than 50 percent of the students are from cities with populations less than 40,000. Eighty percent of the students come from families whose average income is less than $5,000 annually.

Subjects in the Study

The students who served as subjects for this study were first semester freshmen, with twelve or more credit hours, who entered college in September of 1972. For a student to be eligible to participate in the study, he must have completed both the OAIS and the ACT.

The 1972-1973 freshman class had an enrollment of 215 students. One hundred fifty-two or 77 percent of the students were eligible to participate in the study and of these 87 were females and 65 were males. On the basis of the number of students who were eligible to participate in the study, it seems logical to conclude that they were representative of the 1972-1973 freshman class.

Description of the Instruments

Two instruments were employed in this study. These instruments were: (1) the Opinion Attitude and Interest Survey (OAIS) and (2) the American College Test (ACT). Each
of these instruments will be described below.

**Opinion, Attitude and Interest Survey (OAIS)**

This instrument was designed by Benno G. Fricke at the University of Michigan to improve student assessment for guidance and selection purposes. It was developed for the purpose of measuring individual characteristics not reflected in traditional academic aptitude tests, such as personality and motivational factors. The instrument measures such non-intellective factors as motivation, attitudes, self-perceptions important in academic success, personal adjustment, and creativity.

The OAIS was essentially developed by empirical methods over a period of ten years at the Universities of Michigan and Minnesota. The 396 statements of opinion, attitude, and interest were selected from an original pool of 700 items. The true or false responses of approximately 10,000 freshmen were used to construct the fourteen scales.

All scales were constructed more or less simultaneously. Various methods were used to select criterion groups for each of the scales. For example, the formation of criterion groups for the Achiever Personality Scale involved a rather sophisticated method of determining achievers and non-achievers. An item analysis of the 10,000 responses disclosed items having the greatest discriminating power.
An overall examination suggested compromises in the final item selection for each scale. Then a major attempt was made to develop independent scales having distinctive validity within the four areas of academic promise, psychological adjustment, educational-vocational interest, and response bias.

The fourteen scales are organized into four groups: three bias, three academic potential, three psychological adjustment, and five educational-vocational interest scales (OAIS Handbook, Fricke, 1965). The scales will be briefly described below.

**Group I. RESPONSE BIAS SCALES**

**Scale 1. Set for True (Set T; 83 items)**
estimates an individual's tendency to acquiesce to the statements. A high score on this scale indicates the individual has answered "True" more often than most students.

**Scale 2. Infrequent Response (Inf R; 93 items)**
appraises an individual's tendency to provide frequently given responses. A high score on this scale indicates the students have marked many responses that are usually not marked by many individuals. It may indicate those who carelessly respond to statements.
Scale 3. Social Undesirability (Soc U; 87 items) measures the individual's tendency to give socially desirable or undesirable answers. An individual desiring to make a good impression will score very high. Individuals with a very low score were overly frank and honest with an abnormally large number of socially desirable responses. This scale reflects that an individual thinks he is like or how he would like others to perceive him.

Group II. ACADEMIC PROMISE SCALES

Scale 4. Achiever Personality (Ach P; 86 items) assesses personality traits associated with academic success. Individuals who score high on this scale generally achieve high grade-point averages in college. These scores do not correlate significantly with intelligence test scores. This scale appears to be measuring an individual's academic motivation not reflected in the usual ability tests.

Scale 5. Intellectual Quality (Int Q; 85 items) appraises personality traits associated with intelligent behavior. Individuals who score high on this scale tend to receive high scores on intelligence tests. This scale appears to measure academic potential through the use of non-intellectual material.
Scale 6. Creative Personality (Cre P: 101 items) measures personality attributes associated with creative behavior. Individuals who score high on this scale tend to show the greatest imagination and originality in their thinking and a capacity for reorganizing ideas. This is a measure of creative potential.

Group III. PSYCHOLOGICAL ADJUSTMENT SCALES

Scale 7. Social Adjustment (Soc A: 91 items) appraises personality factors associated with the capacity for having good interpersonal relationships. Individuals scoring high on this scale tend to get along well with others and tend to be well-liked by their peers.

Scale 8. Emotional Adjustment (Emo A: 91 items) appraises personality attributes associated with feelings of security, optimism, personal worth, and calmness. Individuals scoring low tend to be anxious, hypersensitive, and nervous on the basis of ratings made by counseling psychologists.

Scale 9. Masculine Orientation (Mas O: 96 items) assesses the psychological sex of an individual. Regardless of the sex of the individual, high percentiles indicate responses given generally by men; while low percentiles indicate responses given more typically by women. High scores suggest that the individual
is interested in athletics and the out-of-doors; and that he is aggressive, independent, inconsiderate, unpolished, immature, and has an interest in the more masculine occupations such as engineering.

Group IV. EDUCATIONAL- VOCATIONAL SCALES

Scale 10. Business Interest (Bus; 104 items) estimates personality attributes associated with interest in accounting, commerce, contracting, finance, management, investments, merchandising, production, real estate, secretarial science, selling, etc.

Scale 11. Humanities Interest (Hum; 100 items) measures personality attributes associated with interest in art, classics, foreign languages, history, dramatic arts, journalism and writing, literature, library science, music, philosophy, religion, speech, etc.

Scale 12. Social Science Interest (Soc Sc; 99 items) assesses personality attributes associated with interest in anthropology, economics, criminology, government, education, guidance, human relations, political science, psychology, social work, sociology, etc.

Scale 13. Physical Science Interest (Phy Sci; 117 items) measures personality attributes associated
with interest in astronomy, chemistry, electronics, engineering, geology, mathematics, mineralogy, physics, etc.

Scale 14: Biological Science Interest (Bio; 108 items) measures personality attributes associated with interest in anatomy, animal husbandry, bacteriology, botany, chiropractic, dentistry, entomology, farming, forestry, horticulture, medicine, nursing, occupational therapy, physiology, veterinary science, wildlife management, zoology, etc.

Reliability of the OAIS

Stability and internal consistency types of reliability are available for the OAIS scales. Stability coefficients were derived from the scores of 69 students (65 tested two years apart and 4 tested four years apart). According to the stability coefficients, the three least reliable scales were Soc A (.46), Int Q (.51), and Soc U (.51); while the three most reliable were Mas O (.76), Soc (.71) and Emo A (.66). The median stability coefficient for the fourteen scales was .62.

The sample on which internal consistency coefficients were determined was comprised of 1,101 freshmen from the University of Michigan. The Spearman Brown formula was used with the odd-even scores. The three lowest coefficients
were Inf R (.58), Bio (.59), and Soc A (.60); and the three highest internal consistency scales were Emo A (.78), Mas O (.77), and Set T (.73). The median consistency coefficient was .65.

Validity of the OAIS

Several hundred coefficients are available from the results of studies which bear directly on the validity of the scores obtained from the OAIS as was presented in Chapter II. Briefly, the predictive validity of the Achiever Personality sub-test of the Academic Promise Scale is presented. This sub-test has been demonstrated to greatly improve the prediction of college success of Black college freshmen (Pricke, 1965).

Validity of Ach P: Men.--The Ach P score of the 543 male freshmen at Michigan correlated .39 with first term grade-point average. The only measure having a higher predictive validity was mathematics achievement test which correlated .41 with grades. Scores from the three other tests, ACE-Quantitative, ACE-Linguistic Aptitude, and English proficiency all produced coefficients below .39. At Michigan, the high school grade record summarized by high school percentile rank correlated .38 with college grades. Ach P was not merely measuring factors already measured by the ability tests and high school percentile rank. The correlations with quantitative and linguistic aptitude, and
with English and mathematics achievement and high school standing were .03, .14, .14, .16, and .6 respectively. These low correlations, together with the relatively high correlation with GPA, indicates that Ach P was tapping something important in academic success not reflected in the standard measures of academic promise (CAIS Handbook, Fricke, 1965).

The Ach P scores of the 209 male freshmen at Minnesota correlated .39 with first-quarter grades. While the total score on the ACE also correlated .29 with grade-point average, score from the English test, The Ohio State University verbal aptitude test, and MIPR all correlated about .39 with grade-point average. However, the correlations among the three ability tests averaged about .58, indicating that they were measuring similar factors. While Ach P was not measuring these same factors can been seen from the correlation of about .09 with the three tests (CAIS Handbook, Fricke, 1965).

Validity of Ach P: Women.--The Ach P for the 567 female freshmen at Michigan correlated .36 with grade-point average. But with the two groups of men, the ability tests correlated appreciably with each other .44. Ach P, again by comparison, correlated .08 with the ability tests.

The Ach P for 179 female freshmen at Minnesota correlated .19 with college grades. In this sample the
four standard academic success predictors all correlated appreciably higher with grade-point average, about .47. The three ability tests correlated highly with each other, about .67. Ach P correlated .00 with the tests, and thus was measuring something affecting college success that was independent of tested ability (CAIS Handbook, Fricke, 1965).

American College Test (ACT)

The ACT battery consists of four tests in English, mathematics, social sciences, and natural sciences. These tests were developed to measure as directly as possible the abilities the student has that can be applied in his college work. The tests were designed to measure the student's ability to perform the intellectual tasks typically performed by college students. These four tests of educational development and academic potential, a set of self-reported high school grades, and a student information blank make up the ACT student assessment program for a college. The four-section battery of tests of educational development is described in detail below. (Using ACT on the Campus, 1971).

The English Usage Test is a 75-item, 40-minute test of the essentials of effective writing, emphasizing clarity of expression, rather than rote recall of grammar rules. Four prose passages with certain portions underlined and numbered make-up this test's format. Four alternatives are given as changes that would improve underlined sections.
The student must decide which alternative is most correct.

The Mathematics Usage Test is a 40-item, 50-minute test measuring mathematical reasoning ability. Test items assess quantitative reasoning powers instead of memorization of formulas or computational skills. Test items are of two main types: the first, verbal problems that present practical situations requiring the solution of quantitative problems; the second, formal exercises in arithmetic, algebra, and geometry. Each item poses a question and five alternative answers, the last of which may be "not given."

The Social Studies Reading Test is a 52-item, 35-minute test that measures problem-solving skills required in social studies. This test is sub-divided into two types of questions. The first type includes four reading passages designed to test reading comprehension skills, the ability to make inference, analogize between ideas expressed in the passages to new situations, draw conclusions from experimental or graphic data, and recognize a writer's bias and style. The second form of questioning surveys general information taught in high school social studies courses. All items are multiple-choice with four alternatives.

Reliability of ACT

The internal consistency was determined using the odd-even procedure which involved student samples ranging from 864 to 1,155. The median reliabilities of the ACT tests
ranged from .84 for a single test to .95 for the complete score.

One study of parallel forms has been completed. It included 433 high school students who were administered Form 7AC after having taken Form 6AC two weeks earlier. The correlated retest reliabilities of the four tests ranged from .78 to .87. Lastly, a study of 63 students were retested after two years of college. The retest form was different from any of the forms used in the original testing. The retest coefficients ranged from .67 to .84 (ACT Technical Report, 1965).

Validity of the ACT

The median predictive validity of the individual ACT tests ranged from .37 to .50, based on data from a 20 percent random sample of college participants (over one million) in the 1962, 1963, and 1964 Research Service Programs. The median correlations for the five criteria based on data from all Research Service participants ranged from .42 to .53 (ACT Technical Report, 1965).

Since 1961, self-reports of high school grades have been collected and transmitted to the colleges along with ACT scores. In estimating academic promise there has been a substantial increase in the predictive validity. Correlations based on the equation of the four ACT tests and the equation based on the four self-reported high school grades
Data Collection and Processing Procedures

As part of the college's Freshman Orientation Program, 203 out of a total of 215 freshmen students were administered the OAIS by the investigator. Twelve students were absent the day that the OAIS was administered. Fifty-one of the 203 students were excluded from the study for: (1) incomplete answer sheets and (2) unavailable ACT results. The answer sheets for the OAIS were scored by the Measurement Research Center, Iowa City, Iowa.

The students' ACT scores and high school average were obtained from the records of the Office of Admissions. Their first semester grade-point averages were obtained from the Office of the Registrar.

For each student participating in this study, the following data were punched on data cards: (1) sex, (2) ACT scores, (3) high school average, (4) OAIS scores, and (5) first semester grade-point average. All data were subjected to computer analysis in order to maximize accuracy and time usage.

Data Analysis Procedures

This section contains two parts. First an overview of the statistical procedures used is presented. Then the
specific procedures utilized to analyze the data in terms of each hypothesis are described.

The Stepwise Multiple Regression Program - EMDO2R at the Instruction and Research Computer Center at The Ohio State University was used to analyze the data. The statistical analysis was performed on the IBM 370/165 computer. The Stepwise Multiple Regression is a direct extension of the linear regression model.

The initial step in the program is the generation of a matrix containing the zero-order correlations for all the possible variable combinations, including the criterion-independent variable combinations. This program develops regression equations on a stepwise manner. The variables having the highest zero-order correlation with the criterion is the first variable selected for the regression equations which are to be developed. The variables are thus divided into two dis-joint sets at each step. One set is comprised of those variables which have been used to form the regression equations and the second set is comprised of those variables not so selected. Partial correlations are then computed in the second set. The variable having the largest partial correlation and significant F is then selected in the next step and is combined with previously selected variables to form a new multiple regression.
Next, an analysis of variance was performed to determine the significance of the coefficient of multiple correlation which is produced in each step. The multiple correlation coefficients indicate the strength of the relationship between one variable and two or more variables taken together. The following will further clarify the procedure used in the BMDO2R program.

The program computes a sequence of multiple linear regression equations in a stepwise manner. At each step, one variable is added to the regression equation. The variable added is the one which makes the greatest reduction in the error sum of squares. Equivalently it is the variable which has the highest partial correlation with the dependent variable partialled on the variables which have already been added; and equivalently it is the variable which if it were added, would have the highest F value. In addition, variables can be forced into the regression equation. Non-forced variables are automatically removed when their F values become too low (Dixon, 1965).

The significance of the regression weights, the partial correlation coefficients, and the coefficients of multiple correlation was determined by the F ratio.

Hypothesis I stated there is no significant difference between the multiple correlation for male and female freshmen when the OAIS is used as a predictor of first semester grade-point average. The significance of the difference between the multiple correlations for males and females was computed by converting the multiple R's into Fisher's z function in order to test Hypothesis II. The
following formula (Garrett, 1966) was used:

\[ SE = \sqrt{\frac{z_1 - z_2}{\frac{1}{N_{1-3}} + \frac{1}{N_{2-3}}}} \]

The predictor variables for both Hypotheses I and II were the OAIS: (1) three academic promise scales, (2) three psychological adjustment scales, and (3) five educational-vocational interest scales. The criterion variable was first semester grade-point average.

Hypothesis III stated that the multiple correlation for the total group when the OAIS is used in concert with ACT and high school average as a predictor of first semester grade-point average will not be significantly different from zero. The statistical method used to test the significance of the multiple R derived from Hypothesis III was accomplished by applying the following formula (Garrett, 1966):

\[ SE_R = \sqrt{\frac{1 - R^2}{N-3}} \]

The fourth and last Hypothesis, stated that the multiple correlation will not be significantly different for males and females when the OAIS is used in conjunction with ACT and high school average in predicting first semester grade-point average. The same method for testing this hypothesis was used in testing Hypothesis II.
Hypothesis III and IV employed the same predictor variables. They were: (1) ACT scores, (2) high school average, and (3) the OAIS: (a) three academic promise scales, (b) three psychological adjustment scales, and (c) five educational-vocational scales. The criterion variable was first semester grade-point average.
CHAPTER IV

FINDINGS OF THE STUDY

This chapter presents the statistical analysis and findings of the study. The findings are reported in terms of each hypothesis.

Testing of the overall null hypothesis shows that no relationship exists between college performance and non-intellectual factors, as measured by the Opinion Attitude and Interest Survey (OAIS), for college freshmen at a private Black college was accomplished by formulating and testing the following sub-hypotheses:

1. There is no significant relationship between scores obtained on the OAIS and college performance based on first semester grade-point averages for the total group of Black college freshmen.

2. There is no significant difference between the multiple correlation for Black male and female college freshmen when OAIS is used as a predictor of first semester grade-point average.
3. The multiple correlation for the total group when the OAIS is used in concert with the American College Test (ACT) and high school average as a predictor of first semester grade-point average will not be significantly different from zero.

4. The multiple correlation will not be significantly different for male and female college freshmen when the OAIS is used in conjunction with ACT and high school average in predicting first semester grade-point average.

The hypotheses of this study were analyzed by computing correlations and multiple regression equations. By applying this statistical analysis, it was possible to determine the relationship between all the variables under investigation.

The OAIS was administered to those students who were freshmen during the Fall Semester of 1972-73 at a predominantly Black college. The subjects for the study consisted of 152 students, 87 females and 65 males. The following data were available for each subject in the study: (1) ACT scores, (2) high school average, and (3) OAIS scores.

In this study the predictor variables were: (1) the OAIS scales, (2) ACT scores, and (3) high school average. The OAIS scales were used as predictor variables along and
in conjunction with ACT and high school average. The criterion variable was first semester grade-point average.

In the first analysis, eleven OAIS scales, (three academic promise scales, three psychological adjustment scales, and five educational-vocational interest scales) were employed as predictor variables. First semester grade-point average was the criterion variable. The zero-order correlations and the multiple correlation of coefficients for the total group and for both males and females of the total group are presented. An interpretation of the findings was made relative to the predictability of the OAIS scales in terms of the criterion.

The second analysis included the eleven OAIS scales combined with ACT scores and high school average as predictor variables with first semester grade-point averages as the criterion variable. The zero-order correlations and the multiple correlation coefficient for both males and females and for the total group are presented. An interpretation of the findings was made relative to the predictability of the OAIS in concert with ACT scores and high school average in terms of the criterion.

Table 8 presents the means and standard deviations of the OAIS scores. These statistics are provided for both males and females and for the total group.
TABLE 8
MEANS AND STANDARD DEVIATIONS OF THE ACTS FOR FRESHMEN MALES, FEMALES, AND THE TOTAL GROUP AT A BLACK COLLEGE, 1972

<table>
<thead>
<tr>
<th>Predictor Variables</th>
<th>Males (N=65)</th>
<th>Females (N=87)</th>
<th>Total (N=152)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ach P</td>
<td>489.32</td>
<td>507.22</td>
<td>499.57</td>
</tr>
<tr>
<td>SD</td>
<td>70.48</td>
<td>77.93</td>
<td>75.12</td>
</tr>
<tr>
<td>M</td>
<td>344.55</td>
<td>359.08</td>
<td>352.77</td>
</tr>
<tr>
<td>Int Q</td>
<td>77.57</td>
<td>84.51</td>
<td>81.67</td>
</tr>
<tr>
<td>SD</td>
<td>519.26</td>
<td>469.88</td>
<td>490.15</td>
</tr>
<tr>
<td>M</td>
<td>88.39</td>
<td>88.66</td>
<td>90.15</td>
</tr>
<tr>
<td>Cre P</td>
<td>383.72</td>
<td>412.79</td>
<td>400.36</td>
</tr>
<tr>
<td>SD</td>
<td>70.00</td>
<td>64.41</td>
<td>67.11</td>
</tr>
<tr>
<td>M</td>
<td>417.92</td>
<td>435.04</td>
<td>426.51</td>
</tr>
<tr>
<td>Soc A</td>
<td>77.42</td>
<td>83.12</td>
<td>80.78</td>
</tr>
<tr>
<td>SD</td>
<td>453.44</td>
<td>607.87</td>
<td>557.69</td>
</tr>
<tr>
<td>M</td>
<td>75.35</td>
<td>78.62</td>
<td>97.55</td>
</tr>
<tr>
<td>Mas O</td>
<td>463.19</td>
<td>480.00</td>
<td>472.81</td>
</tr>
<tr>
<td>SD</td>
<td>72.80</td>
<td>83.75</td>
<td>79.44</td>
</tr>
<tr>
<td>M</td>
<td>466.27</td>
<td>450.81</td>
<td>458.53</td>
</tr>
<tr>
<td>Bus</td>
<td>82.54</td>
<td>89.22</td>
<td>86.46</td>
</tr>
<tr>
<td>SD</td>
<td>365.33</td>
<td>398.74</td>
<td>384.67</td>
</tr>
<tr>
<td>M</td>
<td>83.34</td>
<td>86.43</td>
<td>86.62</td>
</tr>
<tr>
<td>Soc Sci</td>
<td>453.44</td>
<td>427.68</td>
<td>438.11</td>
</tr>
<tr>
<td>SD</td>
<td>79.73</td>
<td>84.83</td>
<td>83.84</td>
</tr>
<tr>
<td>M</td>
<td>446.55</td>
<td>466.62</td>
<td>458.03</td>
</tr>
<tr>
<td>Phy Sci</td>
<td>83.16</td>
<td>76.20</td>
<td>79.61</td>
</tr>
</tbody>
</table>

Table 9 presents the means and standard deviations of the ACT scores, high school average, and first semester grade-point average. These statistics are provided for both males and females, and for the total group.
TABLE 9
MEANS AND STANDARD DEVIATIONS OF ACT, HIGH SCHOOL AVERAGE, AND FIRST SEMESTER GRADE-POINT AVERAGE FOR FRESHMEN MALES, FEMALES, AND THE TOTAL GROUP AT A BLACK COLLEGE 1972

<table>
<thead>
<tr>
<th>Predictor Variables</th>
<th>Males (N=65) M</th>
<th>Females (N=87) M</th>
<th>Total (N=152) M</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACT Eng SD</td>
<td>4.20</td>
<td>4.49</td>
<td>4.62</td>
</tr>
<tr>
<td>ACT Math SD</td>
<td>4.60</td>
<td>4.41</td>
<td>4.48</td>
</tr>
<tr>
<td>ACT Soc Sci SD</td>
<td>5.35</td>
<td>4.76</td>
<td>5.01</td>
</tr>
<tr>
<td>ACT Nat Sci SD</td>
<td>4.23</td>
<td>3.64</td>
<td>3.90</td>
</tr>
<tr>
<td>ACT Comp SD</td>
<td>3.17</td>
<td>3.15</td>
<td>3.20</td>
</tr>
<tr>
<td>HSA SD M</td>
<td>2.03</td>
<td>2.47</td>
<td>2.28</td>
</tr>
<tr>
<td>GPA SD M</td>
<td>.63</td>
<td>.68</td>
<td>.70</td>
</tr>
</tbody>
</table>

The Validity of the OAIS in the Prediction of First Semester Grade-Point Average

Predictive Efficiency of the OAIS Scales for the Total Group

Hypothesis I.—There is no significant relationship between scores obtained on the OAIS and college performance based on first semester grade-point average for the total group of Black college freshmen. Table 10 presents the regression analysis for the total group of 152 freshmen students using first semester grade-point average as the
criterion. It shows the zero-order correlations (r's), the order in which the predictor variables were selected to enter the regression equations, the F to enter for the partial correlation coefficients of the variables selected, the multiple correlation coefficients (R's), the amount of variance that each variable accounted for, and the standard errors of estimate (SE-EST) for the total group.

**TABLE 10**

**PREDICTION OF FIRST SEMESTER GRADE-POINT AVERAGE FROM THE OAIS FOR THE TOTAL GROUP (N=152)**

<table>
<thead>
<tr>
<th>Predictor Variables</th>
<th>r with GPA</th>
<th>Steps</th>
<th>F to enter</th>
<th>R²</th>
<th>SE-EST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Int Q</td>
<td>.207</td>
<td>1</td>
<td>6.699ᵇ</td>
<td>.206</td>
<td>.042</td>
</tr>
<tr>
<td>Cre P</td>
<td>-.206</td>
<td>2</td>
<td>10.366ᵇ</td>
<td>.324</td>
<td>.105</td>
</tr>
<tr>
<td>Soc Sci</td>
<td>.164</td>
<td>3</td>
<td>2.835ᵇ</td>
<td>.349</td>
<td>.121</td>
</tr>
<tr>
<td>Mas O</td>
<td>.119</td>
<td>4</td>
<td>1.461</td>
<td>.361</td>
<td>.130</td>
</tr>
<tr>
<td>Soc A</td>
<td>.142</td>
<td>5</td>
<td>.507</td>
<td>.365</td>
<td>.133</td>
</tr>
<tr>
<td>Bus</td>
<td>-.010</td>
<td>6</td>
<td>.0382</td>
<td>.368</td>
<td>.135</td>
</tr>
<tr>
<td>Emo A</td>
<td>.122</td>
<td>7</td>
<td>.304</td>
<td>.370</td>
<td>.137</td>
</tr>
<tr>
<td>Ach P</td>
<td>.107</td>
<td>8</td>
<td>.027</td>
<td>.371</td>
<td>.137</td>
</tr>
<tr>
<td>Bio</td>
<td>.042</td>
<td>9</td>
<td>.250</td>
<td>.371</td>
<td>.137</td>
</tr>
<tr>
<td>Phy Sci</td>
<td>-.005</td>
<td>10</td>
<td>.168</td>
<td>.371</td>
<td>.137</td>
</tr>
<tr>
<td>Hum</td>
<td>-.090</td>
<td>11</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

ᵃThe R in each step involves the variables in that step combined with all previously selected variables.

ᵇSignificant at the .05 level.
The first variable selected to enter the regression equation was the Int Q, since it yielded the highest zero-order $r$ (.207) with first semester grade-point average. The second variable selected, with the largest partial correlation coefficient and $r$ of -.206, was Cre P. It was negatively correlated or inversely related with the criterion. The Soc Sci was the third variable selected to enter the equation, its $r$ was .164. The three variables combined were statistically significant at the .05 level and accounted for 12.1 percent of the variance of grade-point average. These three variables produced a multiple $R$ of .349 and the shrunken $R$ (which is a better measure to the population $R$) was .305.

The Mas O was the last variable that made a contribution to the regression equation. It had an $r$ of .119, but was not statistically significant at the .05 level. When added to the equation, the multiple $R$ was increased only .12. The partial correlation coefficients for the other six variables were not significant and when added to the regression equation, made a small increase in the multiple $R$. The seventh variable, Hum, partial correlation and $F$ to enter was so very low that it was not selected to enter the regression analysis. The multiple $R$ using ten scales of the OAIS for 152 freshmen study was .371. This multiple $R$ is significant at the .05 level of confidence. Of the
13.7 percent contribution of the OAIS variance of grade-point average, 12.1 percent was attributed to the Int Q, Cre P, and the Soc Sci variables. The remaining 86.3 percent of the variance of first semester grade-point average evidently is due to factors other than those measured by the OAIS.

The regression analysis revealed that seven of the ten OAIS scales correlated negligibly with the criterion, first semester grade-point average. Three of the scales, Int Q, Cre P, and Soc Sci correlated slightly with the criterion. The r's (.207, -.206, and .164 respectively) were significant at the .05 level, but indicated limited support to these variables as being efficient predictors of college performance for the total group.

Only three of the OAIS scales (Int Q, Cre P, and Soc Sci) correlated with first semester grade-point average for the total group of Black college freshmen at the .05 level of significance. Therefore, in view of these findings Hypothesis 1 could not be rejected.

Predictive Efficiency of the OAIS of First Semester Grade-Point Average for the Freshmen Males

The results of the multiple regression analysis for 65 freshman males, employing nine of the eleven OAIS scales as predictors and first semester grade-point average as the criterion, are reported in Table 11. It revealed that
Cre P was the first variable selected. It correlated negatively with the criterion and had the highest single zero-order r of -.234. The Cre P and Phy Sci were the only statistically significant variables at the .05 level of confidence.

**TABLE 11**

**PREDICTION OF GRADE-POINT AVERAGE FOR THE MALES FROM THE OAIS**

(N=65)

<table>
<thead>
<tr>
<th>Predictor Variables</th>
<th>r with GPA</th>
<th>F to enter</th>
<th>R²</th>
<th>R²</th>
<th>SE-EST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cre P</td>
<td>-.234</td>
<td>1</td>
<td>3.660ᵇ</td>
<td>.234</td>
<td>.054</td>
</tr>
<tr>
<td>Phy Sci</td>
<td>.106</td>
<td>2</td>
<td>2.240ᵇ</td>
<td>.312</td>
<td>.087</td>
</tr>
<tr>
<td>Ach P</td>
<td>.116</td>
<td>3</td>
<td>1.084</td>
<td>.336</td>
<td>.113</td>
</tr>
<tr>
<td>Soc A</td>
<td>-.047</td>
<td>4</td>
<td>0.868</td>
<td>.355</td>
<td>.126</td>
</tr>
<tr>
<td>Mas O</td>
<td>-.069</td>
<td>5</td>
<td>0.065</td>
<td>.356</td>
<td>.127</td>
</tr>
<tr>
<td>Hum</td>
<td>-.076</td>
<td>6</td>
<td>0.437</td>
<td>.357</td>
<td>.127</td>
</tr>
<tr>
<td>Emo A</td>
<td>-.040</td>
<td>7</td>
<td>0.519</td>
<td>.358</td>
<td>.128</td>
</tr>
<tr>
<td>Int Q</td>
<td>.006</td>
<td>8</td>
<td>0.512</td>
<td>.359</td>
<td>.129</td>
</tr>
<tr>
<td>Bus</td>
<td>.020</td>
<td>9</td>
<td>0.015</td>
<td>.360</td>
<td>.129</td>
</tr>
<tr>
<td>Soc Sci</td>
<td>-.040</td>
<td>10</td>
<td>-----</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td>Bio Sci</td>
<td>.066</td>
<td>11</td>
<td>-----</td>
<td>----</td>
<td>----</td>
</tr>
</tbody>
</table>

ᵃThe R in each step involves the variable in that step combined with all previously selected variables.

ᵇSignificant at the .05 level.

The next two variables that made a contribution to the regression equation were Phy Sci and Ach P. These two variables correlated with the criterion with zero-order r's of .196 and .116, respectively. The Cre P, Phy
Sci, and Ach P, when combined, accounted for 11.3 percent of the variance in the criterion. These three variables produced a multiple R of .337 and the shrunken R was .264. The other variables correlated poorly and negatively with the criterion. The Soc Sci and Bio Sci variables F to enter were less than .0100, therefore they were not selected to enter the regression equation by the stepwise procedure. The standard errors of estimate were not improved by adding the other variables to the regression equation after the third step. The multiple regression analysis with the nine OAIS scales yielded a multiple R of .360 and is significant at the .05 level of confidence. Of the 13 percent of the variance in grade-point average accounted for by the nine variables, 11 percent can be attributed to the first three variables (Cre P, Phy Sci, and Ach P) which entered the regression equation. Eighty-seven percent of the variance must be attributed to factors other than those measured by the OAIS scales.

**Predictive Efficiency of the OAIS of First Semester Grade-Point Average for the Freshmen Females**

The prediction of first semester grade-point average for 87 freshman females using the OAIS scales as predictor variables was investigated. Table 12 reports the regression analysis. It shows that the Int Q had the largest zero-order correlation (r=.305) and was the first variable
selected. The selection of the next three variables to enter the regression equation were Mas O, Ach P, and Cre P with zero-order r's of -.194, -.124, and -.044 respectively. These variables correlated negatively with grade point average and were not significant at the .05 level of confidence. However, they made a substantial increase in the multiple R when added to the regression. The multiple R of these three variables combined with Int Q was .381 and accounted for 15 percent of the variance in the criterion.

### TABLE 12

**PREDICTION OF GRADE-POINT AVERAGE FOR THE FEMALES FROM THE OAIS**

(N=87)

<table>
<thead>
<tr>
<th>Predictor Variables</th>
<th>r with GPA</th>
<th>F to enter</th>
<th>( R^a )</th>
<th>( R^2 )</th>
<th>SE-EST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Int Q</td>
<td>.305</td>
<td>8.74(^b)</td>
<td>.305</td>
<td>.093</td>
<td>.653</td>
</tr>
<tr>
<td>Mas O</td>
<td>-.194</td>
<td>2.73(^b)</td>
<td>.349</td>
<td>.121</td>
<td>.647</td>
</tr>
<tr>
<td>Ach P</td>
<td>-.124</td>
<td>1.21</td>
<td>.365</td>
<td>.133</td>
<td>.646</td>
</tr>
<tr>
<td>Cre P</td>
<td>-.044</td>
<td>1.13</td>
<td>.381</td>
<td>.145</td>
<td>.646</td>
</tr>
<tr>
<td>Soc A</td>
<td>.162</td>
<td>1.23</td>
<td>.397</td>
<td>.158</td>
<td>.645</td>
</tr>
<tr>
<td>Soc Sci</td>
<td>.250</td>
<td>0.37</td>
<td>.402</td>
<td>.162</td>
<td>.647</td>
</tr>
<tr>
<td>Bus</td>
<td>-.100</td>
<td>0.24</td>
<td>.405</td>
<td>.164</td>
<td>.650</td>
</tr>
<tr>
<td>Bio Sci</td>
<td>-.051</td>
<td>0.41</td>
<td>.411</td>
<td>.169</td>
<td>.653</td>
</tr>
<tr>
<td>Emo A</td>
<td>.178</td>
<td>0.39</td>
<td>.416</td>
<td>.173</td>
<td>.655</td>
</tr>
<tr>
<td>Hum</td>
<td>-.066</td>
<td>0.06</td>
<td>.417</td>
<td>.174</td>
<td>.659</td>
</tr>
<tr>
<td>Phy Sci</td>
<td>-.030</td>
<td>0.06</td>
<td>.418</td>
<td>.174</td>
<td>.663</td>
</tr>
</tbody>
</table>

\(^a\)The R in each step involves the variable in that step combined with all previously selected variables.

\(^b\)Significant at the .05 level.
The second highest single zero-order correlations with grade-point average were .250, .178, and .162 for Soc Sci, Emo A, and Soc A respectively. However, the Emo A did not enter the equation until step nine and increased the multiple R only .02. Only the Int Q and Soc Sci variables were significant at the .05 level of confidence. The first five OAIS scales accounted for 15.8 percent of the variance in the criterion and combined yielded a multiple R of .397 and a shrunken R of .326. The addition of the remaining six variables to the multiple regression equation increased the multiple R slightly, but did not improve the standard error of estimate. The multiple R employing the eleven scales of the OAIS was .418 and was significant at the .05 level of confidence. All of the variables accounted for 17 percent of the variance of grade-point average. Eighty-three percent of the variance of grade-point average must be attributed to factors not measured by the OAIS scales.

**Hypothesis II.**--There is no significant difference between the multiple correlation for Black male and female college freshmen when the OAIS is used as a predictor of first semester grade-point average. As shown in Table 11 and 12, the results of the regression analysis for freshmen males and females, employing the eleven OAIS scales as predictors and first semester grade-point average as the
criterion, clearly indicated differential predictor patterns. The multiple regression analysis yielded coefficients of multiple correlations of .360 for males and .481 for females. Only 13 percent of the variance explained in grade-point average for males and 17 percent of the variance explained in grade-point average for females can be attributed to the OAIS scales. The grade-point average for males appears to be predicted with slightly better accuracy than that of females using the OAIS scales as predictors. The standard error of estimate with the first four variables for males was .609 and .646 for females.

The Ach P was the only variable of the first four selected to enter the equation in the same order for both males and females. It yielded zero-order r's with the criterion of .116 for males and -.124 for females, but neither were statistically significant at the .05 level of confidence. Motivation as measured by the Ach P scale, may be slightly more important in the college performance of males than of females. There were only two statistically significant variables at the .05 level of confidence in the regression analysis for both males and females. For males Cre P and Phy Sci made significant contributions to the prediction equation, while for females their zero-order r's were low and negative and made no contribution to the regression equation. For females Int Q and Soc Sci were
statistically significant, however, only the Int Q made a
significant contribution to the prediction equation. These
variables relative to the males made no contribution to the
equation and were not selected to enter the regression
equation.

In order to test Hypothesis II, the significance
of the difference between the multiple R's for males and
females was computed by converting the multiple R to Fisher's
z function. The test of the significance between the two
multiple R's yielded a z statistic of .388, which was not
significant at the .05 level of confidence (critical ratio
value for significance was 1.96). This non-significant z
indicated that the two multiple R values were not different.
Therefore, Hypothesis II could be rejected.

The order in which the OAIS variables were selected
by the stepwise regression analysis is presented in Table
13 by sex for the total freshmen group. An examination
of these data reveals the pattern in the selection process.
The only OAIS scale selected to enter the regression
analysis at the same step for both males and females was
the Ach P.

First semester grade-point average was the criterion
used to investigate the predictive efficiency of OAIS scales
separately and in combination with each other. The Int Q,
Cre P, and Soc Sci correlated highest with grade-point
average for the total group of freshmen. Int Q had the
highest zero-order correlation of .207 followed by Cre P
\( r = -.206 \) and Soc Sci \( r = .164 \). Although not statistically
significant, Mas O made the next most significant contri-
bution to the equation. The remaining seven OAIS scales
selected made no significant contribution to the regression
equation for the total group.

**TABLE 13**

**SUMMARY OF SELECTION OF OAIS VARIABLES CONTRIBUTING
MOST TO THE PREDICTION FOR MALES, FEMALES,
AND TOTAL GROUP**

<table>
<thead>
<tr>
<th>Steps</th>
<th>Males ( (N=65) )</th>
<th>Females ( (N=87) )</th>
<th>Total ( (N=152) )</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Cre P*</td>
<td>Int Q*</td>
<td>Int Q*</td>
</tr>
<tr>
<td>2</td>
<td>Phy Sci*</td>
<td>Mas O*</td>
<td>Cre P*</td>
</tr>
<tr>
<td>3</td>
<td>Ach P</td>
<td>Ach P</td>
<td>Soc Sci*</td>
</tr>
<tr>
<td>4</td>
<td>Soc A</td>
<td>Cre P</td>
<td>Mas O</td>
</tr>
<tr>
<td>5</td>
<td>Mas O</td>
<td>Soc A</td>
<td>Soc A</td>
</tr>
<tr>
<td>6</td>
<td>Hum</td>
<td>Soc Sci*</td>
<td>Bus</td>
</tr>
<tr>
<td>7</td>
<td>Emo A</td>
<td>Bus</td>
<td>Emo A</td>
</tr>
<tr>
<td>8</td>
<td>Int Q</td>
<td>Bio</td>
<td>Ach P</td>
</tr>
<tr>
<td>9</td>
<td>Bus</td>
<td>Emo A</td>
<td>Bio</td>
</tr>
<tr>
<td>10</td>
<td></td>
<td>Hum</td>
<td>Phy Sci</td>
</tr>
<tr>
<td>11</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Significant at the .05 level.

The Cre P had the highest single \( r \) of \(-.234\) followed
by Phy Sci with an \( r \) of \(.196\) for sixty-five freshman males
with the criterion. The third variable making the most
contribution to the regression equation was Ach P. These three scales accounted for 11.3 percent of the variance in the criterion. The six other OAIS scales selected made no significant contribution to the regression equation for the freshman males.

For the freshman female group (N=87), the highest zero-order correlation was Int Q (r=.305). The next three variables, Mas O, Ach P, and Cre P had the highest partial correlations, but were negative factors in the equation. The first four variables selected to enter the multiple regression equation accounted for 14.5 percent of variance in the criterion. The second highest correlations were .250 and .178 for Soc Sci and Emo A respectively.

**TABLE 14**

**SUMMARY OF MULTIPLE CORRELATIONS AND STANDARD ERRORS OF ESTIMATE EMPLOYING THE OAIS SCALES AS PREDICTORS**

<table>
<thead>
<tr>
<th>Groups</th>
<th>Number</th>
<th>R</th>
<th>( R^2 )</th>
<th>SE-EST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>65</td>
<td>.360</td>
<td>.129</td>
<td>.635</td>
</tr>
<tr>
<td>Females</td>
<td>87</td>
<td>.418</td>
<td>.174</td>
<td>.663</td>
</tr>
<tr>
<td>Total</td>
<td>152</td>
<td>.371</td>
<td>.137</td>
<td>.679</td>
</tr>
</tbody>
</table>
A summary of the multiple R's is shown in Table 14. The eleven OAIS scales in combination yielded multiple R's of .360 for males, and .418 for females, and .371 for the total group of freshmen.

The accuracy of prediction, as indicated by the SE-EST does not vary significantly between the three groups. Analysis of the separate regression equations for males and females indicated that the hypothesis of no significant difference between multiple R's could be rejected.

The Validity of the OAIS in Conjunction with High School Average and ACT Subtests in the Prediction of First Semester-Grade Point Average

Predictive Efficiency of the OAIS in Conjunction with ACT and High School Average for the Total Group of Freshmen

An investigation was made to determine the efficiency in the prediction of first semester grade-point average of the OAIS used in conjunction with ACT and high school average. Regression analysis was performed using the eleven OAIS scales, the high school average, and the five ACT scores as predictor variables with grade-point average as the criterion variable.

Hypothesis III stated that—The multiple correlation for the total group when the OAIS is used alone as a predictor of first semester grade average and when used in concert with ACT and high school average will not be significantly different from zero.
<table>
<thead>
<tr>
<th>Predictor Variables</th>
<th>r with GPA</th>
<th>Steps F to enter</th>
<th>R^a</th>
<th>R^2</th>
<th>SE-EST</th>
</tr>
</thead>
<tbody>
<tr>
<td>High School Average</td>
<td>.469</td>
<td>1</td>
<td>42.457^b</td>
<td>.469</td>
<td>.220</td>
</tr>
<tr>
<td>ACT Comp</td>
<td>.444</td>
<td>2</td>
<td>18.627^b</td>
<td>.553</td>
<td>.306</td>
</tr>
<tr>
<td>ACT Nat Sci</td>
<td>.189</td>
<td>3</td>
<td>2.873^b</td>
<td>.565</td>
<td>.320</td>
</tr>
<tr>
<td>Soc Sci</td>
<td>.164</td>
<td>4</td>
<td>2.472^b</td>
<td>.575</td>
<td>.331</td>
</tr>
<tr>
<td>Cre P</td>
<td>-.206</td>
<td>5</td>
<td>3.059^b</td>
<td>.587</td>
<td>.345</td>
</tr>
<tr>
<td>ACT Eng</td>
<td>.453</td>
<td>6</td>
<td>1.358^b</td>
<td>.592</td>
<td>.351</td>
</tr>
<tr>
<td>ACT Soc Sci</td>
<td>.359</td>
<td>7</td>
<td>1.438^b</td>
<td>.597</td>
<td>.357</td>
</tr>
<tr>
<td>Mas O</td>
<td>.119</td>
<td>8</td>
<td>.685</td>
<td>.600</td>
<td>.360</td>
</tr>
<tr>
<td>Ach P</td>
<td>.017</td>
<td>9</td>
<td>.729</td>
<td>.603</td>
<td>.363</td>
</tr>
<tr>
<td>Int Q</td>
<td>.207</td>
<td>10</td>
<td>.465^b</td>
<td>.604</td>
<td>.366</td>
</tr>
<tr>
<td>Emo A</td>
<td>.122</td>
<td>11</td>
<td>.270</td>
<td>.605</td>
<td>.367</td>
</tr>
<tr>
<td>ACT Math</td>
<td>.230</td>
<td>12</td>
<td>.167^b</td>
<td>.606</td>
<td>.367</td>
</tr>
<tr>
<td>Hum</td>
<td>-.090</td>
<td>13</td>
<td>.135</td>
<td>.607</td>
<td>.368</td>
</tr>
<tr>
<td>Phy Sci</td>
<td>-.005</td>
<td>14</td>
<td>.339</td>
<td>.608</td>
<td>.370</td>
</tr>
<tr>
<td>Soc A</td>
<td>.142</td>
<td>15</td>
<td>.185</td>
<td>.609</td>
<td>.371</td>
</tr>
<tr>
<td>Bus</td>
<td>-.010</td>
<td>16</td>
<td>.052</td>
<td>.609</td>
<td>.371</td>
</tr>
<tr>
<td>Bio</td>
<td>.042</td>
<td>17</td>
<td>.066</td>
<td>.609</td>
<td>.371</td>
</tr>
</tbody>
</table>

^aThe R in each step involves the variable in that step combined with all previously selected variables.

^bSignificant at the .05 level.

The regression analysis for the total freshman group of 152 students multiple R was .609 when all seventeen variables were combined. The multiple R was significant at the .05 level of confidence. The analysis in Table 15 shows that the high school average produced the highest single zero-order r of .469 with grade-point average and
was the first variable selected to enter the equation.

High school average accounted for 22 percent of the variance of the criterion. The second largest zero-order \( r \) with grade-point average was the Eng variable \( (r = .453) \) followed by the ACT Comp variable \( (r = .444) \). However, ACT Comp was selected second to enter the regression analysis, followed by Nat Sci, Soc Sci, Cre P, Eng, and ACT Soc Sci; since the partial correlation coefficients for these variables were most significant to enter the equation. The single zero-order correlations with the criterion for these variables were \( .189 \), \( .164 \), \( -.206 \), \( .453 \), and \( .359 \) respectively. The multiple \( R \) obtained when these first seven variables were combined was \( .597 \) and the shrunken \( R \) was \( .569 \). Thirty-five percent of the variance of grade-point average is explained by these seven predictor variables.

The first seven variables were statistically significant at the .05 level of confidence in addition to the Int Q and Math. The Int Q and Math variables correlated with first semester grade-point average \( .207 \) and \( .230 \) respectively. Only three of the nine statistically significant variables were from the OAIS (Soc Sci, Cre P, and Int Q). Little increase in the multiple \( R \) (.012) and/or improvement in the standard error of estimate resulted when the Int Q, Math, and remaining variables were added to the
regression equation.

In order to test Hypothesis III, the standard error of the multiple $R$ was computed. It was found that the .05 level of significance for the population $R$ was $0.609 + 1.96 \times 0.051$ or from .509 to .709 was significant. Therefore, Hypothesis III could not be rejected.

**Predictive Efficiency of the Osis in Conjunction with High School Average and ACT of First Semester Grade-Point Average for Freshmen Males**

Table 16 presents the regression analysis for 65 males employing high school average, five ACT scores, and eleven Osis scales as the predictor variables. It shows the zero-order correlations ($r$'s), the order in which the variables were selected to enter the regression equations, $F$ to enter for the partial correlation coefficients of the variables selected, the multiple coefficients ($R'$s), the amount of variance that each variable accounted for, and the standard error of estimates (SE-EST) for the freshmen males.

The partial correlations and $F$ to enter for the first five variables (High School Average, Cre P, Eng, Ach P, and Phy Sci) made the most contribution to the multiple regression equation. The first variable selected to enter the regression equation was High School Average because its zero-order correlation with grade-point average
TABLE 16

PREDICTION OF GRADE-POINT AVERAGE FOR MALES FROM THE OATS, HIGH SCHOOL AVERAGE, AND ACT (N=65)

<table>
<thead>
<tr>
<th>Predictor Variables</th>
<th>r with GPA</th>
<th>Steps</th>
<th>F to enter</th>
<th>a</th>
<th>R²</th>
<th>SE-EST</th>
</tr>
</thead>
<tbody>
<tr>
<td>High School Average</td>
<td>.305</td>
<td>1</td>
<td>6.442 b</td>
<td>.304</td>
<td>.092</td>
<td>.605</td>
</tr>
<tr>
<td>Cre P</td>
<td>-.234</td>
<td>2</td>
<td>3.223 b</td>
<td>.371</td>
<td>.137</td>
<td>.595</td>
</tr>
<tr>
<td>ACT Eng</td>
<td>.259</td>
<td>3</td>
<td>3.367 b</td>
<td>.427</td>
<td>.182</td>
<td>.584</td>
</tr>
<tr>
<td>Ach P</td>
<td>.116</td>
<td>4</td>
<td>2.512</td>
<td>.464</td>
<td>.215</td>
<td>.577</td>
</tr>
<tr>
<td>Phy Sci</td>
<td>.196</td>
<td>5</td>
<td>1.173</td>
<td>.480</td>
<td>.230</td>
<td>.576</td>
</tr>
<tr>
<td>Mas O</td>
<td>-.069</td>
<td>6</td>
<td>.924</td>
<td>.492</td>
<td>.242</td>
<td>.576</td>
</tr>
<tr>
<td>Soc A</td>
<td>-.047</td>
<td>7</td>
<td>.620</td>
<td>.501</td>
<td>.251</td>
<td>.578</td>
</tr>
<tr>
<td>ACT Math</td>
<td>.129</td>
<td>8</td>
<td>.794</td>
<td>.511</td>
<td>.261</td>
<td>.579</td>
</tr>
<tr>
<td>Int Q</td>
<td>.006</td>
<td>9</td>
<td>.468</td>
<td>.517</td>
<td>.267</td>
<td>.582</td>
</tr>
<tr>
<td>Bio</td>
<td>.066</td>
<td>10</td>
<td>.641</td>
<td>.525</td>
<td>.276</td>
<td>.584</td>
</tr>
<tr>
<td>Bus</td>
<td>.020</td>
<td>11</td>
<td>.802</td>
<td>.535</td>
<td>.287</td>
<td>.585</td>
</tr>
<tr>
<td>Emo A</td>
<td>.040</td>
<td>12</td>
<td>.746</td>
<td>.545</td>
<td>.297</td>
<td>.586</td>
</tr>
<tr>
<td>Hum</td>
<td>-.076</td>
<td>13</td>
<td>.496</td>
<td>.551</td>
<td>.304</td>
<td>.589</td>
</tr>
<tr>
<td>Soc Sci</td>
<td>-.128</td>
<td>14</td>
<td>.438</td>
<td>.556</td>
<td>.310</td>
<td>.593</td>
</tr>
<tr>
<td>ACT Soc Sci</td>
<td>.162</td>
<td>15</td>
<td>.055</td>
<td>.557</td>
<td>.310</td>
<td>.557</td>
</tr>
<tr>
<td>ACT Nat Sci</td>
<td>.012</td>
<td>16</td>
<td>.023</td>
<td>.557</td>
<td>.311</td>
<td>.604</td>
</tr>
<tr>
<td>ACT Comp</td>
<td>.196</td>
<td>17</td>
<td>.060</td>
<td>.558</td>
<td>.321</td>
<td>.610</td>
</tr>
</tbody>
</table>

a The R in each step involves the variable in that step combined with all previously selected variables.

b Significant at the .05 level.

was largest (r=.305). The second intellectual variable that correlated highest with the criterion was Eng (r=.259), but was not selected to enter the regression equation until the third step. The next three variables were non-intellectual: Cre P was selected second to enter the equation and its correlation with the criterion was an r of -.234; Ach P
correlation with the criterion was an \( r \) of .116 and entered the equation at step four; and Phy Sci had an \( r \) of .196 and was selected fifth to enter the regression analysis. The two intellectual variables, High School Average and Eng, were statistically significant and only one non-intellectual variable (Cre P) was statistically significant at the .05 level of confidence. These five variables when combined yielded a multiple \( R \) of .480 and a shrunken \( R \) of .407. Twenty-three percent of the variance can be attributed to the first five variables. The ACT Comp correlated with grade-point average (\( r \)= .196) slightly, but was not selected to enter the regression equation until step twelve because of its partial correlation and \( P \) to enter was not significant at .05 level of confidence. Similarly, Soc Sci and Math correlated with the criterion higher (\( r \)'s = .162 and .129 respectively) than Ach P (\( r \)= .116) one of the first five variables.

There was minimal improvement in the predictive efficiency and standard error of estimate when all seventeen variables (high school average, ACT, and OAS) were entered into the regression equation. The multiple \( R \) yielded was .558 which accounted for 31 percent of the variance.

**Predictive Efficiency of the OAS in Conjunction with High School Average and ACT of First Semester Grade-Point Average for Freshmen Females**

The results of the regression analysis for 87
freshmen females, employing high school average, five ACT scores, and eleven OASIS scales as predictor variables and grade-point average as the criterion are reported in Table 17. It shows the zero-order correlations (r's), the order in which the variables were selected to enter the regression equations, the F ratio for the partial correlation coefficients of the variables selected, the multiple coefficients (R's), the amount of variance that each variable accounted for, and standard errors of estimates (SE-EST) for the freshmen females.

The highest single r of .586 with the criterion was ACT Comp and was the first predictor variable selected. High school average and ACT Soc Sci were the next two variables that highly correlated with the criterion (r's = .448 and .525 respectively). These three predictor variables were significant at the .01 level and accounted for 42 percent of variance of grade-point average. A multiple R of .650 was achieved when these three variables were combined and the shrunken R was .634. Three variables correlated with the criterion accordingly: (1) ACT Eng, .454; (2) ACT Nat Sci, .318; and (3) Emo A, .182. However the low partial correlation of these variables did not permit inclusion in the regression equation. The ACT Math had an r of .306 with the criterion, but did not enter the equation until the seventh step.
# TABLE 17

## PREDICTION OF GRADE-POINT AVERAGE FOR FEMALES FROM THE OAIS, HIGH SCHOOL AVERAGE, AND ACT (N=87)

<table>
<thead>
<tr>
<th>Predictor Variables</th>
<th>r with GPA</th>
<th>Steps</th>
<th>F to enter</th>
<th>$R^a$</th>
<th>$R^2$</th>
<th>SE-EST</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACT Comp</td>
<td>.586</td>
<td>1</td>
<td>40.544b</td>
<td>.568</td>
<td>.322</td>
<td>.565</td>
</tr>
<tr>
<td>High School Average</td>
<td>.448</td>
<td>2</td>
<td>8.847b</td>
<td>.622</td>
<td>.387</td>
<td>.541</td>
</tr>
<tr>
<td>ACT Soc Sci</td>
<td>.528</td>
<td>3</td>
<td>5.075b</td>
<td>.650</td>
<td>.422</td>
<td>.528</td>
</tr>
<tr>
<td>Soc Sci</td>
<td>.254</td>
<td>4</td>
<td>2.561b</td>
<td>.663</td>
<td>.440</td>
<td>.523</td>
</tr>
<tr>
<td>Int Q</td>
<td>.304</td>
<td>5</td>
<td>.678</td>
<td>.667</td>
<td>.444</td>
<td>.524</td>
</tr>
<tr>
<td>Mas O</td>
<td>-.181</td>
<td>6</td>
<td>.559</td>
<td>.669</td>
<td>.448</td>
<td>.526</td>
</tr>
<tr>
<td>ACT Math</td>
<td>.306</td>
<td>7</td>
<td>.458</td>
<td>.672</td>
<td>.451</td>
<td>.528</td>
</tr>
<tr>
<td>Soc A</td>
<td>.182</td>
<td>8</td>
<td>.270</td>
<td>.673</td>
<td>.453</td>
<td>.530</td>
</tr>
<tr>
<td>Ach P</td>
<td>-.118</td>
<td>9</td>
<td>.182</td>
<td>.674</td>
<td>.455</td>
<td>.533</td>
</tr>
<tr>
<td>Bus</td>
<td>-.094</td>
<td>10</td>
<td>.152</td>
<td>.675</td>
<td>.456</td>
<td>.536</td>
</tr>
<tr>
<td>Bio</td>
<td>-.056</td>
<td>11</td>
<td>.146</td>
<td>.676</td>
<td>.457</td>
<td>.539</td>
</tr>
<tr>
<td>Hum</td>
<td>.061</td>
<td>12</td>
<td>.199</td>
<td>.677</td>
<td>.458</td>
<td>.542</td>
</tr>
<tr>
<td>Phy Sci</td>
<td>-.033</td>
<td>13</td>
<td>.083</td>
<td>.677</td>
<td>.459</td>
<td>.545</td>
</tr>
<tr>
<td>Cre P</td>
<td>-.040</td>
<td>14</td>
<td>.533</td>
<td>.678</td>
<td>.459</td>
<td>.549</td>
</tr>
<tr>
<td>ACT Eng</td>
<td>.454</td>
<td>15</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>ACT Nat Sci</td>
<td>.318</td>
<td>16</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
<tr>
<td>Emo A</td>
<td>.182</td>
<td>17</td>
<td>—</td>
<td>—</td>
<td>—</td>
<td>—</td>
</tr>
</tbody>
</table>

$^a$The R in each step involves the variables in that step combined with all previously selected variables.

$^b$Significant at the .05 level.

The Soc Sci and Int Q of the OAIS were significant at the .05 level of confidence and had the highest single $r$'s with grade-point average ($r=.254$ and .304 respectively). The first five variables having the highest $r$ used in combination in the regression equation yielded a multiple $R$
of .677. The addition of the other variables to the regression equation made little contribution to the predictive efficiency. The multiple R obtained when all variables entered the equation was .678.

Hypothesis IV stated that—The multiple correlation will not be significantly different for male and female college freshmen when the QAIS is used in conjunction with ACT and high school average in predicting first semester grade-point average. The multiple regression analysis produced multiple correlation coefficients of .558 for freshmen males and .678 for females. The prediction of first semester grade-point average was slightly better for female than male freshmen. The standard error of estimate for males was .610 and .549 for females.

High school average yielded an r of .305 for males (the first highest r) and .448 for females (the second highest r). This was the only variable selected in the first two steps of the regression equation. The second variable with the highest zero-order r and to enter the regression equation for freshmen males was Cre P; this variable for females was the last one to enter the equation and it made a very small contribution to the regression equation. The first variable with the largest zero-order r and to enter the regression equation for freshmen females was ACT Comp, but for males it was the last variable to
enter the equation. ACT Eng and ACT Soc Sci were the third variables with the highest zero-order r's and to enter the equation for males and females respectively. These first three variables for both males and females made the most contribution to the prediction equations and accounted for the most variance in the criterion.

In testing Hypothesis IV, the significance between the multiple correlation coefficients was computed by converting the two R's into Fisher's z function. The significance of difference between the R's yielded a z statistic of .086 which did not meet the critical value ratio of 1.96 for significance at the .05 level of confidence. This non-significant z indicated that the two multiple R values were not different. Therefore, Hypothesis IV could be rejected.

The order in which the variables were selected by the stepwise regression analysis is presented in Table 18. An examination of the variables in Table 18 clearly indicated a differentiated pattern in the selection and entry procedure for both males and females. The high school average was the best predictor of first semester grade-point average for both sexes. As far as the total group was concerned, the best predictors were high school average and ACT Comp.

For males the first three variables, high school average, Cre P, and ACT Eng, were the only statistically
TABLE 18

SUMMARY OF THE ORDER IN WHICH VARIABLES WERE SELECTED TO MAXIMIZE PREDICTION FOR MALES, FEMALES, AND THE TOTAL GROUP

<table>
<thead>
<tr>
<th>Steps</th>
<th>Males (N=65)</th>
<th>Females (N=87)</th>
<th>Total (N=152)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>HSA*</td>
<td>ACT Comp*</td>
<td>HSA*</td>
</tr>
<tr>
<td>2</td>
<td>Cre P*</td>
<td>HSA*</td>
<td>ACT Comp*</td>
</tr>
<tr>
<td>3</td>
<td>ACT Eng*</td>
<td>ACT Soc Sci*</td>
<td>ACT Soc Sci*</td>
</tr>
<tr>
<td>4</td>
<td>Ach P</td>
<td>Soc Sci*</td>
<td>Soc Sci*</td>
</tr>
<tr>
<td>5</td>
<td>Phy Sci</td>
<td>Int Q*</td>
<td>Cre P*</td>
</tr>
<tr>
<td>6</td>
<td>Mas O</td>
<td>Mas O</td>
<td>ACT Eng</td>
</tr>
<tr>
<td>7</td>
<td>Soc A</td>
<td>ACT Math</td>
<td>ACT Soc Sci*</td>
</tr>
<tr>
<td>8</td>
<td>ACT Math</td>
<td>Soc A</td>
<td>Mas O</td>
</tr>
<tr>
<td>9</td>
<td>Int Q</td>
<td>Ach P</td>
<td>Emo A</td>
</tr>
<tr>
<td>10</td>
<td>Bio</td>
<td>Bus</td>
<td>Int Q*</td>
</tr>
<tr>
<td>11</td>
<td>Bus</td>
<td>Bio</td>
<td>Hum</td>
</tr>
<tr>
<td>12</td>
<td>Emo A</td>
<td>Hum</td>
<td>ACT Math*</td>
</tr>
<tr>
<td>13</td>
<td>Hum</td>
<td>Phy Sci</td>
<td>Hum</td>
</tr>
<tr>
<td>14</td>
<td>Soc Sci</td>
<td>Cre P</td>
<td>Phy Sci</td>
</tr>
<tr>
<td>15</td>
<td>ACT Soc Sci</td>
<td></td>
<td>Soc A</td>
</tr>
<tr>
<td>16</td>
<td>ACT Nat Sci</td>
<td></td>
<td>Bus</td>
</tr>
<tr>
<td>17</td>
<td>ACT Comp</td>
<td></td>
<td>Bio</td>
</tr>
</tbody>
</table>

*Significant at the .05 level.

significant ones at the .05 level of confidence. While for females five of the variables were significant at the .05 level of confidence. High school average was the only variable significant for both sexes and entered the prediction equation first for the males and second for the females. The ACT Comp was the second variable selected to enter the equation for females and was the last (seventeenth) step in the equation for males. The only OAIS variable
significant for males was Cre P. It was step two in the
equation, but for females step fourteen. For females the
first OAIS variable to enter the Soc Sci at step four in
the equation, followed by Int Q. The only OAIS variable
to enter the equations at the same time for both sexes was
Mas O (the sixth step).

Eight of the seventeen variables were significant
at the .05 level of confidence for both sexes combined.
The only variable that was significant in the total group,
but not in the male or female groups, was ACT Math. The
remaining seven variables were significant in the male or
the female equations.

Table 19 presents a summary of the multiple corre-
lations and standard errors of estimate using the OAIS,
ACT, and high school average as predictor variables. These
variables in combination yielded multiple R's of .558 for
males, .678 for females, and .609 for the total group.
The greatest portion of variance of grade-point average
attributed to the OAIS is found in the female group.

The accuracy of prediction, as indicated by the SE-
EST does not vary significantly between the three groups.
Analysis of the separate regression equations for males
and females indicated that the hypothesis of no significant
difference between the multiple R's could be rejected.
Table 19

Summary of Multiple Correlations and Standard Errors of Estimate Using the OAIS, ACT, and High School Average as Predictors

<table>
<thead>
<tr>
<th>Groups</th>
<th>Number</th>
<th>R</th>
<th>R²</th>
<th>SE-EST</th>
</tr>
</thead>
<tbody>
<tr>
<td>Males</td>
<td>65</td>
<td>.558</td>
<td>.321</td>
<td>.610</td>
</tr>
<tr>
<td>Females</td>
<td>87</td>
<td>.678</td>
<td>.459</td>
<td>.549</td>
</tr>
<tr>
<td>Total</td>
<td>152</td>
<td>.609</td>
<td>.371</td>
<td>.595</td>
</tr>
</tbody>
</table>

Table 20 shows the zero-order correlations of the OAIS, high school average, and the ACT subtest with the first semester grade-point average. The coefficients are presented for males, females, and the total group.

Summary

Chapter IV presented the findings of the investigation. The validity coefficients of the eleven OAIS scales were reported for 152 Black freshmen who served as the subjects for this study. Sixty-five were males and eighty-seven were females.

There were only three OAIS scales which correlated moderately with the criterion in the total group analysis. These three scales were the Int Q, Cre P, and Soc Sci. The remaining eight scales made no significant contribution
TABLE 20

ZERO-ORDER CORRELATIONS OF THE O ais, HIGH SCHOOL AVERAGE AND ACT WITH GRADE-POINT AVERAGE BY SEX AND FOR TOTAL GROUP

<table>
<thead>
<tr>
<th>Predictor Variables</th>
<th>Males</th>
<th>Females</th>
<th>Total Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>OAIS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ach P</td>
<td>.116</td>
<td>-.118</td>
<td>.017</td>
</tr>
<tr>
<td>Int Q</td>
<td>.006</td>
<td>.304</td>
<td>.207</td>
</tr>
<tr>
<td>Cre P</td>
<td>-.234</td>
<td>-.040</td>
<td>-.206</td>
</tr>
<tr>
<td>Soc A</td>
<td>-.047</td>
<td>.182</td>
<td>.142</td>
</tr>
<tr>
<td>Emo A</td>
<td>.040</td>
<td>.182</td>
<td>.122</td>
</tr>
<tr>
<td>Mas O</td>
<td>-.060</td>
<td>-.181</td>
<td>.119</td>
</tr>
<tr>
<td>Bus</td>
<td>.020</td>
<td>-.094</td>
<td>-.010</td>
</tr>
<tr>
<td>Hum</td>
<td>-.076</td>
<td>-.061</td>
<td>.090</td>
</tr>
<tr>
<td>Soc Sci</td>
<td>-.128</td>
<td>.254</td>
<td>.164</td>
</tr>
<tr>
<td>Phy Sci</td>
<td>.196</td>
<td>-.033</td>
<td>-.005</td>
</tr>
<tr>
<td>Bio</td>
<td>.066</td>
<td>.056</td>
<td>.042</td>
</tr>
<tr>
<td>High School Average</td>
<td>.305</td>
<td>.448</td>
<td>.469</td>
</tr>
</tbody>
</table>

| ACT                 |       |         |             |
| Eng                 | .259  | .454    | .453        |
| Math                | .129  | .306    | .230        |
| Soc Sci             | .162  | .528    | .359        |
| Nat Sci             | .012  | .318    | .189        |
| Comp                | .196  | .586    | .444        |

...to the regression analysis.

The O ais scales with the highest zero-order correlation with the criterion were the Cre P and Phy Sci. Both were significant at the .05 level. The seven other scales selected were negative and made no significant contribution
to the regression analysis.

In the female group, the highest zero-order correlation with the criterion was the Int Q followed by Soc Sci and Emo A. The Int Q, Soc Sci, and Mas O variables were statistically significant at the .05 level. The remaining OAIS variables were not significant and made little contribution to the regression analysis.

The OAIS variables seem to have predicted better for females than males. In general, the academic performance of females was predicted with slightly greater accuracy than that for males, but the difference was not significant.

When the OAIS scales were combined with high school average and the ACT subtests, in the total group and for both sexes, it was found that intellectual variables (ACT and/or HSA) were selected to enter the regression analysis more frequently than any OAIS scales. A differential pattern of selection was quite apparent with the OAIS scales in the regression analysis for males and females.

Chapter V contains the summary of the findings, the conclusions, and recommendations.
CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

For nearly a half century careers have been made and re-made by the controversy over the relative efficiency of standardized achievement and aptitude tests in predicting college performance and the use of test data as criteria for college admission. Yet the most efficient of these measures account for only 25 and 50 percent of the variation between ability and college performance. Therefore, a considerable amount of the variation in college performance is affected by factors other than those measured by standardized tests of intellectual functioning. Factors such as attitudes, motivation, interests, aspirations, opinions, and personality characteristics are difficult to assess via conventional achievement and aptitude tests. Such factors would appear to be significant non-intellectual determinants of college performance, as well as useful information in college counseling and admission processes.

Objectives of the Study

There were four major objectives formulated for
the investigation of this study. The first objective was to ascertain if there is a relationship between the Opinion Attitude and Interest Survey (OAIS) and first semester grade-point average for a group of Black male and female college freshmen. The second objective was to determine the predictive efficiency of the OAIS as an independent measure of college performance based on first semester grade-point average. Thirdly, another objective was to determine the predictive utility of the OAIS in conjunction with American College Test (ACT) scores and high school average in terms of first semester grade-point average. And lastly, the final objective was to determine the differential predictability of the OAIS based on sex independently and in concert with the ACT and high school average.

The Design

To investigate the relationship between the OAIS and college performance for students enrolled in a private, Black college during the 1972-73 academic year, the entering freshman class was selected. The following data were collected for each student of the 1972-73 freshman class: (1) eleven OAIS scores, (2) five ACT scores, (3) high school average, and (4) first semester grade point-average.

A multiple regression analysis was performed in
order to investigate the predictability of the OAIS.
Seventeen predictor variables were used in this study.
They were the five ACT scores, the high school average, and
eleven OAIS scales (three academic promise scales, three
psychological adjustment scales, and five educational-
vocational interest scales). The criterion variable was
first semester grade-point average.

Multiple regression equations using the OAIS scales
as predictor variables and first semester grade point
average as the criterion variable were computed for the
total group and for both males and females in the total
group. Multiple regression equations were also computed
for the total group and for both males and females employ-
ing ACT scores, high school average, and OAIS scales as
predictor variables with first semester grade-point average
as the criterion variable.

The Setting

The study was conducted at a private, Southern
church-related, Black liberal arts college during the 1972-
73 academic year. This college was founded in 1882 by
the Colored Methodist Episcopal Church in America. Two
degrees are offered by the college: The Bachelor of Arts
and the Bachelor of Science. The Bachelor of Arts is
awarded to students whose major field is Elementary
Education, English, History, Music, Religion, or Sociology.
The Bachelor of Science is awarded to students whose major field is Biology, Business Education, Chemistry, Mathematics, Physical Education, and Health.

The student body is 99 percent Black and one percent represents other ethnic groups or nationalities. Approximately 80 percent of the 822 students enrolled during the 1972-73 academic year are either from within the state or from several bordering states. More than 50 percent of the students are from cities with populations less than 40,000. Eighty percent of the students come from families whose average income is less than $5,000 annually.

Subjects in the Study

The students who served as subjects for this study were first semester freshmen, with twelve or more credit hours, who entered college in September of 1972. For a student to be eligible to participate in the study, he must have completed both the OMAIS and the ACT.

The 1972-73 freshman class had an enrollment of 215 students. One hundred fifty-two or 77 percent of the students were eligible to participate in the study and of these 87 were females and 65 were males. On the basis of the number of students who were eligible to participate in the study, it seemed logical to conclude that they were representative of the 1972-73 freshman class.
Description of the Instruments

Two instruments were employed in this study. These instruments were: (1) the Opinion Attitude and Interest Survey (OAIS) and (2) the American College Test (ACT). Each of these instruments will be described briefly.

Opinion Attitude and Interest Survey (OAIS)

This instrument was designed by Benno G. Fricke at the University of Michigan to improve student assessment for guidance and selection purposes. It was developed for the purpose of measuring individual characteristics not reflected in traditional academic aptitude tests, such as personality and motivational factors. The instrument measures such non-intellective factors as motivation, attitudes, and self-perceptions important in academic success, personal adjustment, and creativity.

The fourteen scales are organized into four groups: three bias, three academic potential, three psychological adjustment, and five educational-vocational interest scales (OAIS Handbook, Fricke, 1965).

American College Test (ACT)

The ACT battery consists of four tests in English, mathematics, social science, and natural sciences. These tests were developed to measure as directly as possible the abilities the student has that can be applied in his college work. The tests were designed to measure the student's
ability to perform the intellectual tasks typically performed by college students. These four tests of educational development and academic potential, a set of self-reported high school grades, and a student information blank make up the ACT student assessment program (Using ACT on the Campus, 1971).

**Data Collection and Processing Procedures**

As part of the college's Freshman Orientation Program 203 out of a total of 215 freshmen were administered the OAIS by the investigator. Twelve students were absent the day that the OAIS was administered. Fifty-one of the 203 students were excluded from the study for: (1) incomplete answer sheets and (2) unavailable ACT results. The answer sheets for the OAIS were scored by the Measurement Research Center, Iowa City, Iowa.

The students' ACT scores and high school average were obtained from the records of the Office of Admissions. Their first semester grade-point averages were obtained from the Office of the Registrar.

For each student participating in this study, the following data were punched on data cards: (1) sex, (2) ACT scores, (3) high school average, (4) OAIS scores, and (5) first semester grade-point average. All data were subjected to computer analysis in order to maximize accuracy.
and time usage.

Findings

The over-all null hypothesis of the investigation was that no relationship exists between college performance and non-intellectual factors, as measured by the OAIS, for college freshmen at a private Black college during the 1972-73 academic year. Testing of the over-all hypothesis was accomplished by formulating four sub-hypotheses. These sub-hypotheses were stated in statistically testable null form at the .05 level of significance. The major findings will be presented after each stated hypothesis.

Hypothesis I.--There is no significant relationship between scores obtained on the OAIS and college performance based on first semester grade-point average for the total group of Black college freshmen.

Finding.--Three of the eleven OAIS scales (Int Q, Cre P, and Soc Sci) correlated positively with first semester grade-point average for the total group at .05 level of significance.

Hypothesis II.--There is no significant difference between the multiple correlation for Black male and female college freshmen when the OAIS is used as a predictor of first semester grade-point average.

Finding.--No significant difference was found between the multiple R's for males (R = .360) and females.
(R = .418) when the OAIS was used alone as the predictor of first semester grade-point average.

**Hypothesis III.**--The multiple correlation for the total group when the OAIS is used in concert with ACT and high school average as a predictor of first semester grade-point will not be significantly different from zero.

**Finding.**--The multiple R for the total group was significant at the .05 level of confidence. The multiple R of .609 was significantly different from zero when the OAIS was used in concert with ACT scores and high school average.

The zero-order correlation of .107 for the Ach P scale for 152 freshmen was much lower than the median r's of .19 to .43 for college students in general (Graff and Hanson 1970; Donnan 1969; Dohner 1968; Webb 1968; and Fricke 1965). In terms of a sample of Black college students Fricke (1965) reported a zero-order correlation of .32 between Ach P and grade-point average for 62 students, while this study found a zero-order correlation of .116 and -.124 for Black males and females respectively.

**Hypothesis IV.**--The multiple correlation will not be significantly different for male and female college freshmen when the OAIS is used in conjunction with ACT scores and high school average in predicting first semester
grade-point average.

Finding.--There was no significant difference found between the multiple R's for males (R = .558) and females (R = .533) when the OAIS was used in concert with ACT scores and high school averages. For males, the best single predictor was high school average, followed by Cre P. For females, ACT Comp, High School average, Soc Sci, and Soc were the most efficient predictors. In general, the accuracy of prediction is improved very little by adding more variables to the two or three making the greatest contribution to the regression equation.

None of the OAIS scales, even though a few were statistically significant, produced an increase in the multiple R. Also the amount of variance in the grade-point average accounted for by these variables is relatively small when combined with intellectual predictors. It might be: (1) that the non-intellectual factors related to college performance cannot be adequately measured by paper and pencil tests, (2) that these non-intellectual factors are reflected in intellectual factors such as High School average and achievement tests, (3) that the criterion measure has a low coefficient of reliability, or (4) that these measures of non-intellectual factors are invalid when used with Black students.

On this basis, the ACT and high school average are
good predictors of college performance. And the addition of the OAIS scales to these intellectual predictors failed to add significantly to the prediction of college performance of Black entering freshmen.

**Conclusions**

A consideration of the findings which resulted from the analysis of the data suggest the following three conclusions.

1. The OAIS scales did not contribute significantly to the prediction of college performance of Black college freshmen. The multiple R using the eleven scales of OAIS was .371. Three of the eleven scales made a statistically significant contribution to the regression equation for the 152 freshmen. Investigation of the males and females separately, revealed Multiple R's of .360 and .418, respectively.

2. The intellectual predictors, high school average and ACT were better predictors of college performance than the OAIS scales. These two intellectual predictors made significantly greater contribution to the regression analysis for females than
for males.

3. When the OAIS scales were combined with high school average and ACT scores, the multiple correlation coefficients for the total group of freshmen was .609, for the males .553, and .558 for the females. The most efficient predictors for the total group were the high school average, ACT Comp, Eng, and the Cre P.

Recommendations

This study did not reveal adequately information about the relationship of OAIS and college performance of Black college freshmen. It is therefore recommended that further research be conducted using measures of non-intellectual behaviors.

The findings in this study indicate that even though the contribution of OAIS to the prediction of college performance for Black freshmen was limited. The inventory merits consideration for use with other samples of Black college students.

It is recommended that the OAIS be used in future research with Black college students and that other variables be considered such as: (1) college major, (2) socio-economic level, and (3) quality of high school attended.
APPENDIX

BMDO2R--STEPWISE REGRESSION

COMPUTATIONAL PROCEDURE

Step 1. The data are read and transgenerated (see Introduction, Section III-B). Let \( p \) denote the number of variables after transgeneration, \( n \) the number of cases and \( x_{ki} \) the value of the \( j^{th} \) variable, after transgeneration, for the \( i^{th} \) case. The means

\[
\bar{x}_i = \frac{1}{m} \sum_{k=1}^{n} x_{ki}
\]

are computed and, if called for, printed. If a zero regression intercept is not requested on the Problem Card, the matrix \( A \)

\[
a_{ij} = \sum_{k=1}^{n} (x_{ki} - \bar{x}_i)(x_{kj} - \bar{x}_j) \quad i, j = 1, \ldots, p
\]

is computed. If a zero regression intercept is requested, the matrix \( A \)

\[
a_{ij} = \sum_{k=1}^{n} x_{ki} x_{kj} \quad i, j = 1, \ldots, p
\]

is computed instead.

Step 2. The covariances, standard deviations, and correlations

\[
s_{ij} = a_{ij}/(n-1) \quad i, j = 1, \ldots, p
\]

\[
s_i = \sqrt{s_{ii}} \quad i = 1, \ldots, p
\]
\[ r_{ij} = s_{ij} / s_i s_j \quad i, j = 1, \ldots, p \]

are computed and, if called for, printed. It should be noted that if the zero regression intercept option is chosen, these statistics will not be centered about the mean. A similar statement applies to all the computations which follow.

**Step 3.** At each step in the stepwise regression procedure the variables \( x_1, \ldots, x_p \) are divided into two disjoint sets:

\[
x_{i1}, \ldots, x_{iq} : \text{The independent variables in the regression equation.}
\]

\[
x_{j1}, \ldots, x_{jr} : \text{The remaining variables including the dependent variable } y = x_d.
\]

For purposes of exposition, assume that \( x_{i1}, \ldots, x_{iq} \) are the first \( q \) variables \( x_1, \ldots, x_q \). The regression equation at a typical step then has the form

\[ y = \alpha + \beta_1 x_1 + \cdots + \beta_p x_p + e \]

Let

\[
A = \begin{bmatrix}
A_{11} & A_{12} \\
A_{21} & A_{22}
\end{bmatrix}
\]

where \( A_{11} \) is \( q \times q \)

be a partition of the matrix \( A \) from Step 1; let

\[
B = \begin{bmatrix}
A_{11}^{-1} & A_{11}^{-1} A_{12} \\
A_{21} A_{11}^{-1} A_{22} - A_{21} A_{11}^{-1} A_{12}
\end{bmatrix}
\]

let \( m = n - 1 \) if a zero regression intercept is not requested; and let \( m = n \) if it is requested. For each step in the stepwise procedure the following are computed and printed:
The residual degrees of freedom, sum of squares, and mean square.

\[ df = m - q, \quad SS = b_{dd}, \quad MS = SS/df \]

The regression degrees of freedom, sum of squares, mean square, and \( F \) value.

\[ rdf = q, \quad RSS = a_{dd} - b_{dd} \]
\[ RMS = RSS/rdf, \quad F = RMS/MS \]

The standard error of estimate and multiple correlation coefficient.

\[ S = \sqrt{MS}, \quad R = \sqrt{RSS/a_{dd}} \]

For each independent variable \( x_i \) in the regression equation, the following are computed and printed:

The regression coefficient, its standard error, and \( F \) value.

\[ \beta_i = b_{id}, \quad s_i = b_{ii}^{1/2} S, \quad r_i = \left( \frac{\beta_i}{s_i} \right)^2 \]

If a zero regression intercept is not requested, the intercept \( \alpha \) is computed.

\[ \alpha = \sum_{i=1}^{q} \beta_i \overline{x_i} \]

For each independent variable \( x_i \) not in the regression equation, the following are computed and printed:

The tolerance level, partial correlation coefficient, and \( F \) value.

\[ T_i = b_{ii}/a_{ii}, \quad R_i = \frac{b_{id}}{\sqrt{b_{ii} b_{dd}}} \]
\[ F_i = \frac{b_{id}^2 (m-q-1)}{b_{ii} b_{dd} - b_{id}^2} \]

Step 4. To move from one step to the next, an independent variable is added to or removed from the regression equation according to the following three
rules:

(1) If there are one or more independent variables in the regression equation whose control value, as specified by the Control-Delete Card, is 2 (i.e., a free variable) and whose F value is less than the "F-to-remove" value specified on the Sub-problem Card, the one with the smallest F value will be removed.

(2) If no variable is removed by (1) and there are one or more independent variables not in the regression equation which pass the tolerance test and have control values of 3 or more (i.e., forced variables), the one which has the highest control value and the highest F value among all with the same control value will be added.

An independent variable $x_i$ not in the regression equation is said to pass the tolerance test if its tolerance value $T_i$ is greater than or equal to the "minimum tolerance value" specified on the Sub-problem Card.

(3) If no variable is removed by (1) or added by (2) and there are one or more independent variables not in the regression equation which pass the tolerance test, have a control value of 2 (i.e., a free variable), and an F value greater than or equal to the "F-to-enter" value specified on the Sub-problem Card, the one with the highest F value will be added.

If no variable is added or removed by (1), (2), or (3), the stepwise procedure is terminated.

Step 5. If a list of residuals is called for on the Sub-problem Card, the residuals

$$r_i = y_i - \alpha - \sum_j \beta_j x_{ij} \quad i=1, \ldots, n$$

are computed and printed. The summation is over all indices $j$ of independent variables $x_j$ in the regression equation at the last step.
For each variable $x_j$ specified on the Index-Plot Card, the points

$$(r_i, x_{ij})$$

$i=1, \ldots, n$

are computed and plotted.
BIBLIOGRAPHY


Boney, Don J. "Predicting the Academic Achievement of


Cherdack, A. N. "The Predictive Validity of the SAT for Disadvantaged College Students Enrolled in a


Cosand, John P. "Admission Criteria (Review of the Literature)". College and University, XXVIII, (April, 1953), 338-64.


Dixon, W. J. Biomedical Computer Programs, Los Angeles, California: Health Sciences Computing Facility, Department of Preventive Medicine and Public Health, School of Medicine, 1965.


Punches, Delars. "A Correlation Between the ACT Scores and the Grade Point Averages of Freshmen at Jackson State College," College and University, (Spring, 1965), 324-326.


, and Hansen, James C. "Relationship of OAIS Scores to College Achievement and Adjustment," Journal of College Student Personnel, X (March, 1970), 129-134.

Graves, Grant O. and Ingersoll, Ralph W. "Comparison of Learning Attitudes," Journal of Medical Education, XXXIX (February, 1964), 100-110.

, "Predictability of Success in the First Year of Medical School," Journal of Medical Education, XL (April, 1965), 351-363.


Grossack, Martin M. "Some Personality Characteristics


Lewis, John W. "Utilizing the Stepwise Multiple Regression


Pfeifer, Micheal and Sedlacek, William E. "Non-intellectual Correlates of Black and White Students' Grades at University of Maryland," Microfiche ED 05680 (1971).


Stanley, Julian C. "Predicting College Success of the Educationally Disadvantaged." Science 171 (February 19, 1971), 640-47.


