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OF PROBATIONARY AND NONPROBATIONARY STUDENTS
AT SOUTHWESTERN STATE COLLEGE.

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GRADUATE COLLEGE

AN ANALYSIS OF PERSONALITY CHARACTERISTICS OF PROBATIONARY AND NONPROBATIONARY STUDENTS AT SOUTHWESTERN STATE COLLEGE

A DISSERTATION

SUBMITTED TO THE GRADUATE FACULTY

in partial fulfillment of the requirements for the

degree of

DOCTOR OF EDUCATION

By

WILLIAM ROBERT BROWN, JR.

Norman, Oklahoma

1972

AN ANALYSIS OF PERSONALITY CHARACTERISTICS

OF PROBATIONARY AND NONPROBATIONARY STUDENTS

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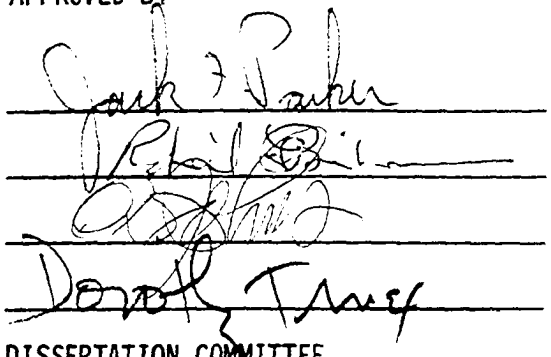

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TABLE OF CONTENTS

	Page
ACKNOWLEDGMENTS	iii
LIST OF TABLES	vi
Chapter	
I. INTRODUCTION	1
Need for the Study	3
Definition of Terms	6
Statement of the Problem	8
The Hypotheses	8
Treatment of Data	9
Limitations of the Study	10
Organization of the Study	11
II. REVIEW OF RESEARCH AND RELATED LITERATURE	12
Research and Literature Related to Intellective Factors as Predictors of Academic Success	13
Research and Literature Related to Nonintellective Factors as Predictors of Academic Success	17
Research and Literature Related to the MMPI as a Predictor of Academic Success	32
Summary	36
III. DESIGN OF THE STUDY	39
Instrumentation	40
Population	45
Treatment of Data	49
IV. PRESENTATION AND ANALYSIS OF DATA	51
Comparison of Probationary and Nonprobationary Students on the Clinical Scales of the MMPI	52
Comparison of Male Probationary and Nonprobationary Students on the Clinical Scales of the MMPI	54

Chapter Page

Comparison of Female Probationary and Nonprobationary Students on the Clinical Scales of the MMPI 56
Comparison of Probationary and Nonprobationary Graduates of Small High Schools. 58
Comparison of Probationary and Nonprobationary Graduates of Medium High Schools 60
Comparison of Probationary and Nonprobationary Graduates of Large High Schools. 61
Summary 62

V. SUMMARY, FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS. 64

Summary of Findings. 65
Conclusions. 67
Recommendations. 68

BIBLIOGRAPHY 70

APPENDIX A 76

APPENDIX B 83

APPENDIX C 85

APPENDIX D 92

LIST OF TABLES

Table		Page
1.	Chi Square Values for Probationary and Nonprobationary Students on the Clinical Scales of the MMPI	53
2.	Chi Square Values for Probationary and Nonprobationary Male Students on the Clinical Scales of the MMPI	55
3.	Chi Square Values for Probationary and Nonprobationary Female Students on the Clinical Scales of the MMPI	57
4.	Chi Square Values for Probationary and Nonprobationary Students Who Graduated from Small High Schools	59
5.	Chi Square Values for Probationary and Nonprobationary Students Who Graduated from Medium High Schools	60
6.	Chi Square Values for Probationary and Nonprobationary Students Who Graduated from Large High Schools	62

AN ANALYSIS OF PERSONALITY CHARACTERISTICS OF PROBATIONARY AND NONPROBATIONARY STUDENTS AT SOUTHWESTERN STATE COLLEGE

CHAPTER I

Introduction

American higher education institutions suspend over 350,000 students each year because of poor academic performance.[1] An even greater number of students is placed on academic probation each semester. This large number of failouts and near failouts represents a tremendous loss of potential to the American society and is often a source of disappointment and frustration to the student and his family.

Fortunately, many students who find themselves on the academic probation list improve their academic performance to a level that allows continued participation and attainment of educational objectives. This fact is of little comfort to the students who are suspended from college or to those who cannot raise their overall grade-point average to the minimum level required for graduation.

The case of the college failout has received little attention from the academic community.[2] Many college administrators and faculty members

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[1]Alexander W. Austin, Predicting Academic Performance in College (New York: The Free Press, 1971), pp. 4-5

[2]G. Kerry Smith, Stress and Campus Response (San Francisco: Jossey-Bass Inc., Publishers, 1968), pp. 233-234.

believe that this phenomenon is a part of the natural selection process, the survival of the fittest, and should not be disturbed by outside influences. This point of view is based upon one of two assumptions; either the failout does not have adequate potential or, if he has, he does not want an education enough to work hard. In both cases, it is often assumed that he should not be in college. These two assumptions are accurate when applied to a minority of failouts.[1]

Failouts exhibit the full range of academic potential, from very low to very high.[2] Many students have sufficient intelligence to place in the top ten percent of the college population and ostensively want to be successful. Their efforts may be thwarted by such problems as low self-concepts, inadequate basic skills, lack of ability to make sound decisions, lack of meaningful goals, and psychological disturbances.[3]

Many colleges and universities have an admission process designed to evaluate academic potential. Students who meet minimum standards on high school grades and admission tests are granted access to the academic program of the institutions. All others, except those admitted to special programs for minority groups or underachievers, are denied enrollment because their high school grades and test performance indicate that they are not as capable as students selected to fill the admission quota or

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[1]Robert W. Pitcher, "Helping to Salvage the College Failout." (Paper Presented at the 24th. National Conference on Higher Education, Chicago, Illinois, March 4, 1969), p. 1.

[2]Ibid.

[3]Ibid.

that their potential for academic success is not sufficient to justify admission.

The number of students who are placed on academic probation or leave college because of academic suspension is significant to the point that it may be assumed that selective admission policies are not sufficiently effective in screening college applicants.[1] Since some evidence exists to indicate that a majority of the students who are admitted to college have the academic background and potential to succeed, it would appear that other important success characteristics are not seriously considered in admission evaluations.[2]

Need for the Study

Mayer[3] stated that the probabilities are 50 percent or less that an entering college freshman will graduate. If it were possible to predict what kind of student is likely to have what kind of success in what college, much saving in time, money, and emotional strain would result.

Efforts to predict college success have met with very limited success. For the past 50 years, correlations between college success and the most popular predictors have hovered around .50. When several factors are combined, the gain in multiple correlation is minimal.[4]

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[1]Wilbur B. Brookover, The College Student (New York: The Center for Applied Research in Education, 1965), p. 52.

[2]Pitcher, op. cit., p. 3.

[3]Lawrence A. Mayer, "Young America: By the Numbers," Fortune (January, 1969), p. 73.

[4]J. A. Fishman, "Social-Psychological Theory for Selecting and Guiding College Students," American Journal of Sociology, LXVI (March, 1961), p. 473.

The U.S. Office of Education projection of educational statistics to 1974-75 points out that about 8,700,000 degree-seeking students will be enrolled in American institutions of higher learning by 1974-75.[1] If present dropout and failout trends continue, approximately 4,350,000 college students enrolled during the 1974-75 academic year will fail to receive a degree.

Concern with the prediction of academic performance has increased gradually during recent years.[2] The rapid growth in the college student population and the present financial crisis facing most colleges and universities is causing the emergence of a more selective admission process in many institutions that do not have an open admissions policy.[3] For college admissions officers, the selection of students is more difficult than ever before because the increasing number of applicants is paralleled by a growth in the number of academically qualified candidates.[4] Thus, the responsibility of traditional colleges to be certain that the students they select will do better than those they exclude is becoming increasingly difficult to fulfill.[5]

Colleges and universities should continue to improve their ability to predict academic success by utilizing a variety of student data in the

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[1]United States Department of Health, Education, and Welfare, Projection of Educational Statistics to 1974-75 (Washington, D.C.: U.S. Government Printing Office, 1965), p. 2.

[2]Brookover, op. cit., p. 41.

[3]David E. Lavin, The Prediction of Academic Performance (New York: Russel Sage Foundation, 1965), p. 11.

[4]Ibid.

[5]Ibid.

admission process.[1] Early research on the prediction of academic success focused primarily on intellective and academic ability factors. There is now an important shift in emphasis and conceptualization of the problem due to the recognition that some students perform better and some perform worse than predicted by ability tests and high school grades.[2] Efforts to explain differences in the academic performance of students with similar academic background and ability has led to the consideration of personality characteristics as causative factors.

Many investigators have studied academic performance by focusing upon personality characteristics as explanatory variables. Two basic methods of analysis have been used in previous studies.[3] The correlational method has been used to measure the relationship between personality and academic performance. In correlational studies, ability is controlled either by means of partial correlation analysis or by multiple correlation in which the contribution of a personality variable to a battery of intellective factors is assessed. By the second technique, performance is studied by composing groups of high and low achievers and assessing possible personality differences between such groups.

After a comprehensive review of the literature associated with the use of personality factors as predictors, Lavin[4] emphasized that we cannot be very confident about the state of knowledge regarding the relationship

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[1] Ibid., p. 58.

[2] Ibid., p. 12.

[3] Ibid., p. 65.

[4] Ibid., p. 111.

between personality characteristics and academic performance. Lavin further stated:

> In most cases the relationships are quite weak and the findings are often inconsistent. Essentially, we think that the literature presents a somewhat disappointing picture. Yet we do not conclude that personality variables are simply not very useful predictors.[1]

Research findings indicate the presence of some type of relationship between personality characteristics and academic performance. Since the findings are inconclusive and inconsistent, additional research studies should be conducted in an effort to discover positive and specific relationships between personality factors and the academic performance of students attending a wide range of college types and sizes.

Definition of Terms

Minnesota Multiphasic Personality Inventory: A psychometric device which provides data on a variety of personality dimensions from a set of 566 items covering a wide range of topics. These items are applied in the study of personality by the use of ten clinical scales and four validating scales which provide the standard MMPI profile. These profiles reveal the self-perceptions of the subjects in relation to others in his social world as well as some of the various roles he plays. The individual's MMPI profile constitutes a personal and social self-evaluation.

MMPI Clinical Scales: The ten scales of the MMPI based primarily on the Kraepelinian categories of mental disorders.

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[1] Ibid.

MMPI Validity Scales: The four validity scales (cannot say, lie, infrequency, and defensiveness) developed to enhance the clinical usefulness of the MMPI.

Personality:[1] Those enduring characteristics of a person which are significant for his interpersonal behavior.

Probationary Student: A student who completed a minimum of 24 credit hours during his freshman year at Southwestern State College and attained a grade-point average of less than 1.5 on a 4.0 scale.

Nonprobationary Student: A student who completed a minimum of 24 credit hours during his freshman year at Southwestern State College and attained a grade-point average of 1.5 or above on a 4.0 scale.

Failout: A student who voluntarily or involuntarily dropped out of college because of poor academic performance.

American College Test: A student assessment program using four tests of educational development and academic potential, a set of self reported high school grades, and a student information blank. The tests and grade reports provide information on the student's potential for academic achievement in various areas.

Otis Quick-Scoring Mental Ability Test: A self-administering test designed to measure the effect mental ability has had in enabling the individual to acquire certain knowledge and mental skills.

Small High School: A high school with an average daily attendance of less than 125 students.

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[1]Richard I. Lanton and Leonard D. Goodstein, Personality Assessment (New York: John Wiley and Sons, Inc., 1971), p. 27.

Medium High School: A high school with an average daily attendance between 300 and 600 students.

Large High School: A high school with an average daily attendance in excess of 1000 students.

Statement of the Problem

The problem of this study was to determine whether a personality difference existed between probationary and nonprobationary college students, of like academic potential, who completed the freshman year at Southwestern State College. Three questions the research proposed to answer were:

(1) Do personality differences exist between probationary and nonprobationary students at Southwestern State College?

(2) Do personality differences exist between male probationary and nonprobationary students and female probationary and nonprobationary students?

(3) Do personality differences exist between probationary college students who graduated from small, medium, and large high schools and nonprobationary college students who graduated from small, medium, and large high schools?

The Hypotheses

The following null hypotheses provided the means for investigating the problem of this study:

Ho_1 There is no statistically significant difference between probationary and nonprobationary freshmen students at Southwestern State College on the ten clinical scales of the Minnesota Multiphasic Personality Inventory.

Ho_2 There is no statistically significant difference between male probationary and nonprobationary students on the ten clinical scales of

the Minnesota Multiphasic Personality Inventory.

Ho_3 There is no statistically significant difference between female probationary and nonprobationary students on the ten clinical scales of the Minnesota Multiphasic Personality Inventory.

Ho_4 There is no statistically significant difference between probationary and nonprobationary students, who graduated from small high schools, on the ten clinical scales of the Minnesota Multiphasic Personality Inventory.

Ho_5 There is no statistically significant difference between probationary and nonprobationary students, who graduated from medium high schools, on the ten clinical scales of the Minnesota Multiphasic Personality Inventory.

Ho_6 There is no statistically significant difference between probationary and nonprobationary students, who graduated from large high schools, on the ten clinical scales of the Minnesota Multiphasic Personality Inventory.

Treatment of Data

A sign test for independent samples, as described by Ferguson,[1] was used to test the hypotheses of this study. This test is known as the median test and compares the medians of two or more independent samples. The null hypothesis was that no difference existed between the medians of the populations from which the samples were drawn. The data consist of two independent samples of n_1 and n_2 observations. The median of the combined

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[1]George A. Ferguson, Statistical Analysis in Psychology and Education (New York: McGraw Hill Book Co., 1966), pp. 357-358.

$n_1 + n_2$ observations was calculated. For each sample, observations above the joint median were assigned a + and those either at or below the joint median, a -. The data were arranged in a 2 x 2 contingency table and a chi square test applied.

Limitations of the Study

The research procedures of this study were such that the investigation be of ex post facto design. Kerlinger defines ex post facto research as:

> Research in which the independent variable or variables have already occurred and in which the researcher starts with the observation of a dependent variable or variables. He then studies the independent variables in retrospect for their possible relation to and effect on the dependent variable or variables.[1]

The most serious limitations were those inherent in an ex post facto design. The limitations are the inability to manipulate independent variables and to exercise proper control over the randomization of the subjects.

Kerlinger states that despite its weaknesses, much ex post facto research must be done in psychology, sociology, and education simply because many research problems in social science and education do not lend themselves to experimental inquiry.[2]

This study was limited to freshmen students at one college and the results may not apply to other colleges and universities. The transactional

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[1]Fred N. Kerlinger, Foundations of Behavior Research (New York: Holt, Rinehart, and Winston, 1964), p. 360.

[2]Ibid., p. 373.

relationship between the individual and his environment may be such that personality factors contributing to academic failure at one college may not significantly affect the subject's performance at a different college.

This study was further limited by the use of only one personality assessment instrument. Characteristics measured by the Minnesota Multiphasic Personality Inventory may not include some personality traits which could have impact on the success or failure of freshmen college students.

Organization of the Study

This dissertation is organized into five chapters. Chapter I is a description of the study and includes the introduction, need for the study, definition of terms, statement of the problem, hypotheses, a brief description of data treatment, and limitations of the study. Chapter II contains the review of research and related literature. Chapter III contains the design of the study. The presentation and analysis of data are contained in Chapter IV. A summary of the study, findings, conclusions, and recommendations are presented in Chapter V.

CHAPTER II

REVIEW OF RESEARCH AND RELATED LITERATURE

The increased concern for the development of individual talent has been paralleled by a growing interest in the prediction of academic success. This concern is deeply rooted in the American culture and finds expression in the belief that education is essential not only to individual fulfillment, but to the vitality of our national life.

A wide variety of educational institutions, both public and private, has been provided for individuals who wish to pursue educational objectives beyond the high school. A wide range of educational programs available to individuals with diverse interests and abilities is a positive feature of the American educational system. The diversity has, however, created a major problem of properly matching individual academic ability, interest, and personality characteristics with the role and characteristics of the institution.

Concern with the development of individual talent, the shortage of space in some educational institutions, and the shortage of funds in most educational institutions have provided the impetus for additional research seeking solutions to the problem of matching students and schools.

Research and Literature Related to Intellective Factors As Predictors of Academic Success

Early efforts to predict academic achievement through a highly organized examination system can be traced far back in recorded history. The Chinese Civilization began an informal evaluation system in 225 B.C. that evolved into a definite examination system in 29 B.C. The system, described as being thoroughly democratic, ruthless, invariable, and orthodox has had profound effects, not only upon the educational system of China, but also upon her whole civilization.[1]

Early attempts to predict academic achievement in the United States concentrated almost entirely on high school grades, ability test scores, and other ability measures. Intelligence testing began to gain a prominent place in 1905 when Alfred Binet developed the first scale for the measurement of intelligence.[2] The Binet scale served as the pattern for subsequent tests and scales the world over. Dr. Edward L. Thorndike[3] was a pioneer in the achievement testing movement. He developed one of the first intelligence tests for college entrance and, with the aid of his students, was responsible for most of the early standard tests and scales for measuring achievement.

A factor which served as a strong stimulus to the development of standard achievement tests was the recognition of the unreliability of

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[1]Paul F. Cressey, "The Influence of the Literary Examination System on the Development of Chinese Civilization," American Journal of Sociology, XXXV (September, 1929), p. 255.

[2]C. C. Ross and Julian C. Stanley, Measurements in Today's Schools (Englewood Cliffs, N. J.: Prentice-Hall, Inc., 1954), p. 32.

[3]Ibid., p. 39

school marks and examinations. The need for reform in grading was brought to public attention by Max Meyer[1] when he reported on marks collected over a five year period from 40 instructors at the University of Missouri. He found such variations as 55 percent A's in philosophy and only one percent A's in chemistry III, while there were 28 percent failure in English II and none in Latin I.[2] Although variations among the final marks in different departments were probably proof that college grades are highly subjective and often more a function of the personality of the instructor than of the performance of the students, they could be accounted for by variations in the background, intelligence, and application of the students in the different departments. However, the variations in ability did not account for grade differences occurring when several persons marked the same student's paper or when the same person marked the same paper on more than one occasion.[3]

The partial loss of confidence in high school and college grades as valid predictors of further academic success led to the development of standard college admissions tests. These tests have the advantage of removing the subjective teacher evaluation from a primary role in determining admission to college. Entrance examinations, such as the American College Test and the College Entrance Examination Board, have allowed admission decisions to be based on standard instruments which measure

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[1]Max Meyer, "The Grading of Students," Science,XXVIII (August, 1908), pp. 243-250.

[2]Ibid., p. 247.

[3]Ross and Stanley, op cit., p. 40.

academic achievement and provide some basis for predicting success in a college or university program.

High school grades, ability test scores, and other ability measures are presently the best single type of predictor. However, they account for less than one-half of the variation in academic performance.[1]

An early study at the University of Syracuse produced a correlation of .60 when high school grades, the college grade-point average for the first semester, and an intelligence measure were used.[2] The researcher concluded that if higher correlations are to be reached, it will be necessary to measure some of the character and personality traits in addition to intellective factors.[3]

Freeman[4] believed that group intelligence tests were inadequate if used as a single factor for predicting college success. He suggested that intelligence tests be combined with other factors to obtain more useful predictive data.

Rhum[5] investigated the relationship between high school grade-point averages, Iowa Tests of Educational Development composite scores, percentile rank in the high school graduating class, and college success. This study,

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[1]Lavin, op cit., p. 64.

[2]Mark A. May, "Predicting Academic Success," Journal of Educational Psychology, XIV (September, 1923), p. 440.

[3]Ibid.

[4]Frank S. Freeman, "Predicting Academic Survival," Journal of Educational Research, XXIII (February, 1931), p. 123.

[5]Gordon J. Rhum, A Study of the Interrelationships Among the Iowa Tests of Educational Development and of their Relationship to College Grades and College Entrance, (Unpublished Doctoral Dissertation, University of Iowa, 1949).

with a sample of 1090 college freshmen students, revealed that the high school grade-point average had the highest correlation with college success, r=.66. The percentile rank in the high school graduating class was the second best predictor with a correlation of .62.

Beginning freshmen at the University of Oklahoma were the subjects of a study by Staton.[1] The American College Test area and composite scores, high school grades, sex, occupation of parents, size of high school, and type of high school curriculum were variables used in an effort to predict college success. The most significant findings of the study were:[2]

1. Scores obtained on the American College Test and high school grade-point averages showed significant relationships to college grade-point averages of students who attained at least a "B" average during their freshman year.

2. Scores on the ACT had no significant relationship to college grade-point averages of students who attained a freshman grade average less than a "B".

3. High school grade-point averages were not significantly related to the college grade-point averages of students who attained a freshman grade average less than a "B".

On the basis of the study, the researcher concluded that there was not sufficient evidence to establish criteria for predicting college success.

A study by Adkin[3] was designed to determine the most accurate predictors from the following variables: (1) size of high school; (2) high

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[1]Jon Tom Staton, The Relationship of Selected Factors to Academic Success for Beginning Freshmen (Unpublished Doctoral Dissertation: University of Oklahoma, 1962).

[2]Ibid.

[3]Arlie Andrew Adkins, "Prediction of College Success at Middle Tennessee State College", (Unpublished Doctoral Dissertation: University of Florida, 1963). Dissertation Abstracts, Vol. XXV, 1963, p. 211.

school grade-point average; (3) size of student's home community; (4) father's educational level; (5) father's primary occupation; (6) number of siblings; (7) ACT English subtest; (8) ACT mathematics subtest; (9) ACT social studies subtest; (10) ACT natural science subtest; and (11) the Otis Self-Administering Test of Mental Ability. Adkin concluded that the most valid predictor of achievement in college was the average grade in high school. He stated that in spite of differences in computational procedures, varying standards, and size of high school; the high school average grades forecast college grades better than aptitude tests or any other college entrance requirement.

Research and Literature Related to Nonintellective Factors As Predictors of Academic Success

Although high school grades, ability test scores, and other ability measures are presently the best single type of predictor, they account for less than one-half of the variation in academic performance.[1] Thus, educators are led to a consideration of nonintellective factors. In this effort, many investigators have studied academic performance by focusing upon personality characteristics as explanatory variables. The personality factors that have received the most attention from researchers are variables relating to motivational states, interests, personality styles, self-concepts, study habits, and manifestations of pathology.[2] These factors are often interrelated; but frequently studied as single variables.

The concept of achievement motivation refers to the need of an

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[1] Lavin, op. cit., pp. 64-65.

[2] Ibid., p. 64.

individual to perform according to a high standard of excellence.[1] It has been measured mainly by projective techniques and by pencil and paper questionnaires. McClelland uses a method in which the subject is presented a series of pictures and asked to compose a story in response to each of them.[2] The stories are scored according to the frequency of the achievement theme. McClelland found a .39 correlation between grades and motivation as measured by the thermatic apperception test.[3]

A more conclusive study by Burgess[4] indicated that there was a significant difference between overachievers and underachievers in their need for achievement. Other studies have yielded a positive correlation between achievement motivation and achievement. However, the value of using projective measures to determine achievement motivation for predictive purposes has been diminished by the inconsistency in research findings. One factor possibly contributing to the inconsistency is the low reliability of projective measures.[5]

Paper and pencil questionnaires have been more successful than projective techniques in establishing a relationship between the achievement

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[1]David C. McClelland, The Achievement Motive (New York: Appleton-Century-Crofts, Inc., 1953).

[2]Ibid.

[3]Ibid.

[4]Elva Burgess, "Personality Factors of Over- and Underachievers in Engineering," Journal of Educational Psychology, XLVII (February, 1956), pp. 88-89.

[5]Lavin, op. cit., p. 77.

motive and academic success. Bendig[1] and Kruge[2] found that the need achievement scale of the Edwards Personal Preference Schedule had a significant positive correlation with academic achievement. Hill[3] observed a .30 correlation between questionnaire tests of achievement motivation and some criteria of academic success in law school.

Six thousand students from seven Connecticut colleges were the subjects of an achievement motivation study by Curran.[4] He found a .23 correlation between the academic motivation score on the Comparative Guidance and Placement Test and college grades. A correlation of .39 was obtained when high school grades were used as the variable.

DeVecchio[5] compared scholastic aptitude, academic motivation, personality, and biographical characteristics of nonreturning and returning community college students. His findings indicated that students with a high extroversion score and students from small high schools were less

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[1]Albert W. Bendig, "Comparison of the Validity of Two Temperament Scales in Predicting College Achievement," Journal of Educational Research, LI (April, 1958), pp. 605-609.

[2]Robert E. Kruge, "Over- and Underachievers and the Edwards Personal Preference Schedule," Journal of Applied Psychology, XLIII (April, 1957), pp. 133-136.

[3]John R. Hill, "Needs for Achievement, Aspirations, and College Criteria," Journal of Educational Psychology, XLIX (June, 1958), pp. 156-161.

[4]Eugene E. Curran, "An Evaluation of the Significances of Selected Personal Characteristics of Community College Students as Determiners of Achievement in College" (Unpublished Doctoral Dissertation, University of Connecticut, 1971). Dissertation Abstracts, Vol. XXXII, 1971, p. 2431.

[5]Richard C. DeVecchio, "Scholastic Aptitudes, Academic Motivation, Personality, and Biographic Characteristics of Nonreturning and Returning Community College Freshmen" (Unpublished Doctoral Dissertation, University of Virginia, 1971). Dissertation Abstracts, Vol. XXXII, 1971, pp. 4371-4372.

likely to return to college after their freshman year. There was no difference between the academic motivation score of returners and nonreturners.

Study habits and attitudes are frequently used to predict academic achievement. Some measures assess the mechanics of studying, others examine the students' attitude toward study, and still others use a combination of mechanics and attitude. Burgess,[1] Maher,[2] and Schutter[3] conducted studies which revealed that, when academic ability is properly controlled, study habits are positively related to academic performance.

In an assessment of attitudes toward school and studying, Kerns[4] found a tendency for overachievers to attend college for intellectual reasons and underachievers to attend for reasons such as getting away from home. Brown and Holtzman[5] developed an original 188 item inventory to assess both study habits and study attitudes. They suggest that attitudes brought into the study situation may be more important than the actual mechanics of study. The Brown and Holtzman Survey of Study Habits and

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[1]Burgess, op. cit.

[2]Howard Maher, "Follow-up on the Validity of a Forced-Choice Study Activity Questionnaire in Another Setting," Journal of Applied Psychology, XLIII (October, 1959), pp. 293-295.

[3]Genevieve Schutter and Howard Maher, "Predicting Grade-Point Averages with a Forced-Choice Study Activity Questionnaire," Journal of Applied Psychology, XL (August, 1956), pp. 253-257.

[4]Byron L. Kerns, "A Study of Underachieving and Overachieving First Semester College Freshmen as Revealed by the Way in Which They View the College Situation and Themselves as College Students" (Unpublished Doctoral Dissertation, University of Illinois, 1957). Dissertation Abstracts, Vol. XVII, 1957, p. 2500.

[5]William F. Brown and Wayne H. Holtzman, "A Study-Attitude Questionnaire for Predicting Academic Success," Journal of Educational Psychology, XLVI (February, 1955), pp. 75-84.

Attitudes had a .40 correlation with grades and multiple correlation of .70 when an ability measure was combined for the prediction of grades.[1] The findings of Jain and Robson[2] lend support to the studies cited above. Their study of high, middle, and low achievers resulted in a direct correlation between good study practices and attainment.

Measures of interest have been used in the prediction of academic performance by comparing interest, as measured by a standardized inventory, with achievement in areas where the student's interest was determined to be either high or low. It was assumed that a student would achieve well in areas where a high corresponding interest was indicated and would not perform well in academic areas where little interest was demonstrated.

Cronbach[3] states that although they have low correlations with grades, substantive interest measures improve the prediction obtained by using ability measures alone. He also states that specific keys of the Dunlap Academic Preference Blank predict grades in corresponding courses from .50 to .70.[4] In a study by Collins,[5] the school subject section of the Strong Vocational Interest Blank correlated .19 with grade-point averages.

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[1] Ibid., p. 83.

[2] S. K. Jain and C. J. Robson, "Study Habits of High, Medium, and Low Attainers," Proceedings of the 77th Annual Convention of the American Psychological Association, 1969, pp. 633-634.

[3] Lee J. Cronbach, Essentials of Psychological Testing (New York: Harper and Brothers, 1949), p. 97.

[4] Ibid.

[5] Charles C. Collins, "The Relationship of Breadth of Academic Interest to Academic Achievement and Academic Aptitude," (Unpublished Doctoral Dissertation, Stanford University, 1955). Dissertation Abstracts, Vol. XV, 1955, pp. 1782-1783.

Another area where the interests of students has been studied is related to clarity and intensity of interest. Cronbach[1] found that the intensity of interest, as measured by the Strong Vocational Interest Blank, was directly related to grades. This indicates that interest measures also may be tied to motivational factors.

Bloomberg[2], McQuary[3], and Sherwood[4] investigated clarity of vocational or educational choice as a predictor of scholastic performance. They found that students who seem certain of their occupational choice or who have definitely chosen a major field of study are more likely to perform at a higher level than students who are unsure of their goals.

Weigand[5] compared the academic success of students who had chosen their own goals with students who had goals established for them by parents or other influential people. He found that students who set their own

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[1]Cronbach, op. cit.

[2]Marvin Bloomberg, "The Prediction of Scholastic Success Through the Use of a Forced-Choice Problem-and-Attitude Inventory". (Unpublished Doctoral Dissertation, Purdue University, 1955). Dissertation Abstracts, Vol. XV, 1955, p. 2566.

[3]John P. McQuary, "Some Differences Between Under- and Overachievers in College," Educational Administration and Supervision, XL (February, 1954), pp. 117-120.

[4]Emily J. Sherwood, "An Investigation of the Relationship Between the Academic Achievement and Goal Orientation of College Students" (Unpublished Doctoral Dissertation, Temple University, 1957). Dissertation Abstracts, Vol. XVII, 1957, p. 2924.

[5]George Weigand, "Goal Aspirations and Academic Success," Personnel and Guidance Journal, XXXI (April, 1953), pp. 458-461.

goals appeared to achieve at a higher level. A study by Armstrong[1] produced results similar to those found by Weigand. The results of his study indicated that underachievers were more likely to accept goals set for them by others and those goals were not in line with their interests as measured by standardized tests.

Studies involving students classified as introverts or extroverts generally provide evidence of a positive relationship between introversion and academic success. Travers[2] states that small positive relations have been found between the degree of introversion and academic success. A study by Kerns[3] indicated that underachievers derive their greatest pleasure from social activities while overachievers obtain most of their pleasure from academic activities.

Studies of the relationship between academic performance and introversion/extroversion clearly suggest that introversion is positively related to high achievement. While the findings are consistent, their significance is not clear. Lavin[4] suggests that extroverts may have less time to study because they are more preoccupied with social affairs. He

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[1]Marion E. Armstrong, "A Comparison of the Interests and Social Adjustment of Underachievers and Normal Achievers at the Secondary School Level" (Unpublished Doctoral Dissertation, University of Connecticut, 1955). Dissertation Abstracts, Vol. XV, 1955, p. 1349.

[2]Robert M. Travers, "Significant Research on the Prediction of Academic Success," The Measurement of Student Adjustment and Achievement, edited by W. T. Donahue (Ann Arbor: University of Michigan Press, 1949).

[3]Kerns, op. cit.

[4]Lavin, op. cit., p. 90.

also believes that the relationship may be more complex, involving the student's value system regarding the importance of academic work and the degree to which holding a particular value position on the issue is related to sociometric position within the student culture.[1]

Several studies have examined the relationship between academic performance and the self-image of the performers. Terms such as self-acceptance, self-esteem, and self-confidence are used to discuss the way an individual feels about himself.

Brim[2] found that students with high self-estimates of intelligence had higher grade-point averages than students of equal measured intelligence, but lower self-estimates of intelligence. Stevens[3] studied the relationship between the self-image and academic achievement, using a sample of bright college students. He discovered that high achievers exhibited greater self-acceptance. This finding was substantiated by McDavid[4] in a study indicating that high achievers have higher self-evaluations than low achievers.

A study of self-conception and college scholastic achievement was

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[1] Ibid.

[2] Orville G. Brim, Jr., "College Grades and Self-Estimates of Intelligence," Journal of Educational Psychology, XLV (December, 1954), p. 480.

[3] Peter H. Stevens, "An Investigation of the Relationship Between Certain Aspects of Self-Concept Behavior and Students' Academic Achievement" (Unpublished Doctoral Dissertation, New York University, 1956). Dissertation Abstracts, Vol. XVI, 1956, pp. 2531-2532.

[4] John McDavid, "Some Relationships Between Social Reinforcement and Scholastic Achievement," Journal of Consulting Psychology, XXIII (April, 1959), p. 153.

conducted by Coombs and Davies[1] to determine the effects of the self-image on academic performance. They concluded that formal and informal evaluations of scholastic ability by significant others provide the "looking-glass" by which students come to view themselves and gear their behavior accordingly.[2] The data indicated that those with high scholastic records had lofty conceptions of their scholastic ability, expected and usually attained high college grades, and realized their social and self-expectations.

Jones and Grieneek[3] administered Identity Rating Scales, a Self-Concept of Ability Inventory, and a Self-Expectations Inventory to 411 female and 466 male students at the University of Oklahoma. The findings indicated that all variables studied were positively associated with achievement and all, with the exception of self-expectation and scholastic aptitude, were positively associated with each other. The researchers suggested that self-perception appears to be an accurate predictor of academic achievement.[4]

Most of the studies dealing with self-image and academic achievement point to a significant relationship between high self-esteem and high academic performance. There is some evidence to indicate the possibility of a pyramid effect caused by the students' self-image. It has been

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[1]Robert H. Coombs and Vernon Davies, "Self-Conception and the Relationship Between High School and College Scholastic Achievement," Sociology and Social Research, L (May, 1966), pp. 470-471.

[2]Ibid.

[3]John G. Jones and Laurabeth Grieneeks, "Measures of Self-Perception as Predictors of Scholastic Achievement," Journal of Educational Research, Vol. LXIII (January, 1970), pp. 202-203.

[4]Ibid.

hypothesized that a student with a high self-image is more likely to participate in class discussions, work harder and longer on difficult problems, and approach other academic challenges with a greater degree of confidence. The self-confidence generated by this type of behavior and the favorable reaction from teachers and peers is likely to increase the level of self-confidence and set off additional types of favorable behavior. Research evidence seems to validate the view that success breeds success and failure breeds more failure.

Studies dealing with the relationship between personality characteristics of college students from different sizes of high school and academic success are somewhat limited in number. Nelsen and Storey[1] administered the Mooney Problem Check List to rural, town, and urban students. Their data support the hypothesis that rural students are the most poorly adjusted, followed by town and then urban youth. The researchers did not include achievement variables in the study.

Lamberty's[2] study compared academic achievement among students from small, medium, and large high schools, but did not include the personality variables. He did not find a difference among the groups in mental maturity scores, but found more students from small high schools enrolled in remedial

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[1]Hart M. Nelsen and Stuart E. Storey, "Personality Adjustment of Rural and Urban Youth: The Foundation of Rural Disadvantaged Subculture," Rural Sociology, Vol. XXXIV (March, 1969), pp. 54-55.

[2]L. J. Lamberty, "College Achievement in Relation to Size of High School from which the Student Graduated" (Unpublished Doctoral Dissertation, University of Nebraska, 1967). Dissertation Abstracts, Vol. XXVI, 1967, pp. 170-171.

English and mathematics. The mean grades earned during the first semester of the freshman year increased with the size of high school. Students from large high schools made significantly higher grades than students from small high schools.

Iglinsky[1] studied the relationship of the academic success of college freshmen to three intellectual factors; high school curriculum, high school grade-point average, and American College Test scores and three non-intellectual factors; size of high school, Tennessee Self-Concept Scale scores, and Interpersonal Orientation Scale scores. The study was based on data obtained from academic probationary and nonprobationary students and their parents. The researchers concluded that students with college preparatory backgrounds are more likely to be successful in college, partly because the more capable students selected that type of high school program. A further conclusion was that college academic success could not be predicted on the basis of the size of high school from which the student graduated.

Nelson[2] stated that the Ohio State University Psychological Examination holds little promise in determining differential predictability of the college grade-point average. Subgrouping by school classification, school size, and community size did not result in increased predictability.

A study of probationary and nonprobationary matriculants at Indiana

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[1]Clyde Lee Iglinsky, "Intellectual and Non-Intellectual Factors Affecting Academic Success of College Freshmen" (Unpublished Doctoral Dissertation, East Texas State University, 1968). Dissertation Abstracts, Vol. XXVIII, 1968, p. 1423.

[2]Arvid Kaye Nelson, "Differential Predictability of Academic Success" (Unpublished Doctoral Dissertation, University of Missouri, 1968). Dissertation Abstracts, Vol. XXVIII, 1968, p. 3975.

University indicated that rank in high school graduating class and SAT verbal and quantitative scores were valid predictors for regular, but not for probationary matriculants.[1] The size of high school from which the students graduated was significantly related to persistence of both groups, but had more predictive value for the probationary group. Students from small high schools did not persist as long as other students.

A study by Shields[2] did not consider high school size, but evaluated the college academic success of students from ten large feeder high schools for the University of Maryland. Her findings demonstrated that there was a significant difference between college academic success and high school origin.

A unique study by Peterson[3] evaluated the amount of interaction between energy expenditure and discharge control with respect to academic productivity of college males. The difference in academic and non-academic productivity was hypothesized to be a function of the interaction between the degree of expenditure of psychic and physical energy and the degree to which the energy was controlled. Significant findings of the study indicated

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[1]James Robert Schellhammer, "A Longitudinal Analysis of the Academic Performance of Probationary Matriculants at Indiana University" (Unpublished Doctoral Dissertation, Indiana University, 1971). Dissertation Abstracts, Vol. XXXII, 1971, pp. 1885-1886.

[2]Joseph Francis Shields, "High School Origin as a Variable in Predicting Freshman Grades for the Purpose of Admissions," (Unpublished Doctoral Dissertation, University of Maryland, 1970). Dissertation Abstracts, Vol. XXXI, 1970, p. 5803.

[3]Gary Winston Peterson, "Interaction Between Energy Expenditure and Discharge Control with Respect to Academic and Non-Academic Productivity of College Males" (Unpublished Doctoral Dissertation, Duke University, 1970). Dissertation Abstracts, Vol. XXXI, 1970, p. 1281.

that the medium energy, high control group was the most academically productive while the low energy, high control group was the least productive.

Clough[1] analyzed data obtained from CAUSE Personality Test scores in a study of variables related to female college achievement. Major findings of the study were:[2]

1. High achieving students considered themselves as active participating members of homes that allowed them to explore a wide range of behaviors and evaluate these actions with parental guidance.

2. Students who indicated they were independent, self-actualizers, and who based decisions for projected behavior on strong personal convictions were the highest achievers.

3. Low achievers tended to lack the ability to candidly criticize themselves and to make decisions based on objective facts. Their difficulty in testing reality led to greater reliance on preaccepted solutions, prejudices, and more rigid responses.

4. Students who were less inclined to feel threatened by others as a result of the friction normally a part of daily interpersonal relations and who had little concern for retaliation or the punishment of others tended to achieve better grades.

A study of the relationship of non-intellectual variables to academic achievement was reported by Herridge.[3] Her findings were in sharp contrast to most research reported in this area:

1. Low achievers, with a grade-point average between 0.00 and 2.00, were younger, predominantly single, daytime attenders, worked part or full time, and received more encouragement

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[1]L. Bradley Clough, "A Factor Analysis of Variables Related to Female College Achievement" (Unpublished Doctoral Dissertation, University of Connecticut, 1966). Dissertation Abstracts, Vol. XXVI, 1966, pp. 5221-5222.

[2]Ibid.

[3]Eileen Louise Herridge, "The Relationship of Selected Non-Intellectual Variables to Academic Achievement of Students at an Open-Door Community College" (Unpublished Doctoral Dissertation, University of Michigan, 1971). Dissertation Abstracts, Vol. XXXII, 1971, pp. 3689-3690.

from parents to attend college. This group had the highest academic and career aspirations despite the fact that they studied least and had the poorest attendance record. They were highly impulsive, inclined to be unrealistic about themselves and the world around them, and tended to deny feelings of inadequacy and uncertainty.

2. Middle achievers, with an average grade-point between 2.46 and 2.84, had little distinctiveness as a group. They had many characteristics of both the high and low achievers.

3. The high achieving group had an average grade-point above 3.00. They were several years older, predominantly white, were mostly married, and usually part-time students attending evening classes in a terminal curriculum. Their parents had less education than parents of the lower achieving groups and put less emphasis on the importance of education. Despite generally successful achievement in high school, the high achieving group had the lowest educational aspirations at the time. However, they were more self-confident, more intellectually inclined, more autonomous, more stable, and more realistic. They were also more open to change and more accepting of people who are different.

The Edwards Personal Preference Schedule has been used in several college-level studies of personality factors and academic achievement. Demos and Spolyar[1] did not find a significant personality difference between achieving and nonachieving students. Krug[2] reported that over-achievers were higher on needs for achievement, order, and endurance, but lower on need for affiliation and heterosexuality. An investigation by Merrill and Murphy[3] found that low-ability students, whose academic

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[1]George D. Demos and Ludwig J. Spolyar, "Academic Achievement of College Freshmen in Relation to the Edwards Personal Preference Schedule," Educational and Psychological Measurements, Vol. XXI, (No. 2, 1961), p. 476.

[2]Kurg, op. cit.

[3]Reed M. Merrill and Daniel T. Murphy, "Personality Factors and Academic Achievement in College," Journal of Counseling Psychology, Vol. VI (No. 3, 1959), p. 209.

performance was acceptable, were higher on need for deference, endurance, and dominance, but lower on autonomy, exhibitionism, and affiliation, as compared with low-ability students who were failing. Another Edwards Personal Preference Schedule study revealed that male freshmen overachievers were higher than underachievers on the needs for achievement, order, intraception, and consistency, but were lower on needs for nuturance, affiliation, and change.[1]

Holland[2] used the California Psychological Inventory and an aptitude test to study a group of high-ability male and female college freshmen. He found that mathematics scores from the aptitude test and personality scores on socialization, social presence, and femininity had the highest correlation with grades for the group of male students. Verbal aptitude scores and scores on social presence, responsibility, achievement via conformance, and femininity were the best predictors of academic success for female students. Holland noted that there was a considerable variability among colleges in the level of correlation between the personality test and academic performance.[3]

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[1]Gary G. Gebhart and Donald P. Hoyt, "Personality Needs of Under- and Overachieving Freshmen," Journal of Applied Psychology, XLII (April 1958), p. 126.

[2]John L. Holland, "The Prediction of College Grades from the California Psychological Inventory and the Scholastic Aptitude Test," Journal of Educational Psychology, Vol. L (June, 1959), p. 141.

[3]Ibid.

Stone[1] used 20 measures of ability, interest, personality, and temperament to study factors associated with success in a physical science and mathematics curriculum. He reported that measures of general intelligence, mechanical interest, morale, stability, and activity level differentiated the achieving students from nonachievers. Stone concluded that the addition of personality factors more than doubled the efficiency of prediction using ability measures alone.

Research and Literature Related to the MMPI as a Predictor of Academic Success

A number of investigators have studied the relationship between adjustment and academic performance, using the Minnesota Multiphasic Personality Inventory as the measure of adjustment. Hoyt and Norman[2] hypothesized that students with normal MMPI profiles would achieve higher grades during their freshman year in college than maladjusted students. The hypothesis was accepted, but the difference in grades was not as great as was expected.

Stone and Ganung[3] studied female students using MMPI scores as independent variables to select two groups. One scored within the normal range and the other had T scores of 70 or higher on one or more clinical

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[1]Solomon Stone, "The Contribution of Intelligence, Interest, Temperament and Certain Personality Variables to Academic Achievement in a Physical Science Curriculum" (Unpublished Doctoral Dissertation, New York University, 1958). Dissertation Abstracts, Vol. XVIII, 1958, pp. 669-670.

[2]Donald P. Hoyt and Warren T. Norman, "Adjustment and Academic Predictability," Journal of Counseling Psychology, Vol. 1 (No. 2, 1954), p. 98.

[3]David R. Stone and G. R. Ganung, "A study of Scholastic Achievement Related to Personality as Measured by the Minnesota Multiphasic Personality Inventory," Journal of Educational Research, Vol. L (October, 1956), p. 156.

scale. The latter group received significantly lower grade-point averages and a larger number did not graduate from college.

Yeomans and Lundin[1] administered the MMPI to the top and bottom quarter of the freshman class at Hamilton College. Poorer students were more maladjusted, particularly on the psychopathic deviate and hypomania scales. The researchers assumed that the maladjusted students were more poorly motivated, irresponsible, and too active in other affairs to spend the necessary time and effort in their scholastic endeavors.

Drake[2] found that MMPI profiles of male counselees who were judged to be lacking in academic motivation by their counselors could be differentiated from the MMPI profiles of other counselees. Their profiles were distinguished by a pattern where the schizophrenia and mania scales were paired among the three highest coded scales and the social introversion scale was coded among the two lowest scales. Drake also found that those students who were judged as lacking in academic motivation did not score high on the masculinity-femininity scale.[3]

Lundin and Yeomans[4] found that high achievers scored significantly higher on the masculinity-femininity scale of the MMPI than did men in the

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[1]W. N. Yeomans and R. W. Lundin, "The Relationship Between Personality Adjustment and Scholarship Achievement in Male College Students," Journal of Genetic Psychology, Vol. LVII (1957), pp. 213-218.

[2]L. E. Drake, "Interpretation of MMPI Profiles in Counseling Male Clients," Journal of Counseling Psychology, Vol. III (No. 2, 1955), pp. 86-87.

[3]Ibid.

[4]Lundin and Yeomans, op. cit.

general population. Lundin and Kuhn[1] studied a group of students for a four year period and discovered that there was a strong tendency for feminine interests to increase over that period of time and most particularly for the better students.

Hackett[2] isolated all items discriminating high and low achievers. On a cross-validation sample, these items correlated .61 with grade-point averages. An analysis of the items indicated that low achievers, unlike high achievers, were emotionally labile, defensive about revealing weaknesses, admired strength and power, and lacked warmth and acceptance of others.

Jensen[3] investigated the personality correlates of academic performance at different ability levels for a group of freshmen students. The data indicate that low achievers score higher on the schizophrenia and hypomania scales than do high achievers.

MMPI profiles of 1004 entering male freshmen students were evaluated in a study by Drake.[4] All subjects in the study scored in the upper one-half of the freshman class on an entrance examination. He found that the psychopathic deviate and mania scales differentiated the high achievers and

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[1]R. W. Lundin and J. P. Kuhn, "The Relationship Between Scholarship Achievement and Changes in Personality Adjustment in Men After Four Years of College Attendance," Journal of Genetic Psychology, Vol. LXIII (1960) pp. 35-42.

[2]Herbert R. Hackett, "The Use of MMPI Items to Predict College Achievement," Personnel and Guidance Journal, Vol. XXXIX (November, 1960), pp. 216-217.

[3]Vern H. Jensen, "Influences of Personality Traits on Academic Success," Personnel and Guidance Journal, Vol. XXXVI (March, 1958), p. 500.

[4]Drake, op. cit.

low achievers when the masculinity-femininity scale was not sufficiently high to act as a suppressor variable.

Solkoff[1] compared MMPI scores, attitude scale scores, and I.Q. scores of the 208 highest and 123 lowest ranked freshmen and sophomore students in pre-law and pre-medical programs. Several significant differences were found, but were not consistent enough with other findings to warrant routine administration of the instrument to incoming students.

MMPI profiles, the Cornell Medical Index, age, and level of civilian education were used by Johnson, Plag, and Pollard[2] in an attempt to predict the academic performance of Naval hospital corpsmen. Their findings indicated that age and level of civilian education were useful predictors of academic performance. The MMPI and Cornell Medical Index did not differentiate between successful and unsuccessful students.

Barger and Hall[3] analyzed MMPI scores of 3660 students at the University of Florida. Their study provided evidence that both male and female students with high psychopathic deviate and mania scales performed poorly and dropped out of college more frequently than the average student. Males with a high masculinity-femininity scale and females with a high hysteria scale had a better record of achievement and a lower dropout rate.

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[1]Norman Solkoff, "The Use of Personality and Attitude Tests in Predicting the Academic Success of Medical and Law Students," Journal of Medical Education, Vol. XLIII (1968), pp. 1250-1253.

[2]Laverne C. Johnson, Jo Ann Pollard, and John A. Plag, "Predicting the Academic Performance of Naval Hospital Corpsmen," USN/MNRU Report, No. 67-29 (1967), p. 9.

[3]Ben Barger and Everette Hall, "Personality Patterns and Achievement in College," Educational and Psychological Measurement, Vol. XXIV (No. 2, 1964), pp. 343-344.

Several studies have found that the MMPI is not related to academic performance. Burgess[1] used a sample of male students and found the MMPI to be unrelated to performance. Quinn[2] reported that MMPI items were unrelated to academic performance when ability was controlled. Clark[3] found that items differentiating over-and underachievers in one sample failed to do so in a second sample.

Summary

The volume of research and literature dealing with the prediction of academic achievement provides some insight into the importance that educators and social scientists have placed on the admission and retention of college students. The literature was characterized by much diversity. Studies differed from each other in criteria, procedures, characteristics of students studied, instrumentation, variables, and the extent to which basic data were reported.

The best single predictor of performance on the college level is the high school academic record. This is due in part to the fact that high school grades are determined by many factors in addition to measured intellectual ability. The correlation of college academic success to high school grades is improved when additional intellective factors, such as I.Q.

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[1]Burgess, op. cit.

[2]Stanley B. Quinn, Relationship of Certain Personality Characteristics to College Achievement," (Unpublished Doctoral Dissertation, University of Wisconsin, 1957). Dissertation Abstracts, Vol. XVII, 1957, p. 809.

[3]John H. Clark, "Grade Achievement of Female College Students in Relation to Non-Intellective Factors: MMPI Items," Journal of Social Psychology, Vol. XXXVII (May, 1953), p. 280.

scores and achievement tests scores are utilized. Measures of ability on the average account for 35 to 45 percent of the variation in academic performance. While no other single type of factor accounts for this much variation, more than one-half still remains unexplained.

Many researchers have studied factors of a nonintellective nature in an effort to discover the cause of variations in academic performance that are not attributable to academic ability and achievement. Several studies indicate that a small positive relationship exists between achievement motivation and actual achievement. However, these relationships did not appear to be strong or consistent, especially when projective techniques were used. Research dealing with study habits and attitudes indicate that both the mechanics of study and the attitude brought into the study situation are important to academic success. These variables, however, are not important single predictors and should be used in multivariate studies. Measures of interest improve the prediction of academic success when combined with other factors. Most researchers agreed that students achieved higher grades in college if the major area of study was also the area of highest interest for the student. Clarity and intensity of interest relate directly to academic achievement. A positive relationship between introversion and academic success has been established by research. Several researchers hypothesized that extroverts have less time to study because of their preoccupation with social affairs. Most of the studies dealing with self-image and academic achievement point to a significant relationship between high self-esteem and high academic performance. A consistent relationship among personality characteristics, size of high school attended, and college academic success has not been established. Most of the limited number of

studies in this area indicate that students from large high schools usually perform better in college than students from small high schools. Many researchers attribute this phenomenon to academic background and not to personality characteristics.

A number of investigators have studied the relationship between adjustment and academic performance, using the Minnesota Multiphasic Personality Inventory as the measure of adjustment. Many of the studies did not find a significant relationship between personality factors and college success. Two studies reported that low achievers were characterized by MMPI profiles with schizophrenia and mania scales among the three highest coded scales and the social introversion scale coded among the two lowest. Another study reported that elevated psychopathic deviate and mania scales were indicators of low achievement. Most of the MMPI research dealing with the relationship between personality characteristics and college achievement failed to control ability variables. This reduced the reliability of the findings since the causative factor for low grades could be attributed to lack of ability instead of problems associated with adjustment.

CHAPTER III

DESIGN OF THE STUDY

The major purpose of this study was to determine whether a significant difference existed between the Minnesota Multiphasic Personality Inventory clinical scales of Southwestern State College students who were placed on academic probation at the end of their freshman year and Southwestern State College students who possessed academic ability similar to the probation group, but who were not on academic probation at the end of their freshman year. A further analysis was made by comparing personality characteristics of probationary and nonprobationary students according to their sex and size of high school from which they graduated.

An ex post facto design was utilized in this study in order to include all students at Southwestern State College who completed their freshmen year during a five year period. The five year population was necessary to insure adequate sample size. The most serious limitations of an ex post facto design, the inability to manipulate independent variables and to exercise proper control over the randomization of subjects, were not considered as liabilities in this study. Although all variables had already occurred before the initiation of this study, the relationships between independent and dependent variables were not affected by an ex post facto design. Kerlinger stated that sociological problems of education, such as

deviations in group behavior and their effects on educational achievement, are mostly ex post facto in nature.[1]

Instrumentation

Scores on the American College Test and the Otis Quick-Scoring Mental Ability Test were used to match the probation and nonprobation groups on academic ability and academic achievement. Only those students scoring within an I.Q. range of 103 to 121 and an ACT composite score range from 17 to 21 were included in the population. This selection process was considered necessary because the usefulness of any personality factor as a predictor cannot be evaluated unless it is shown to be independent of ability.[2]

The American College Testing Program[3] was established in 1959 to serve as a central agency for the collection, analysis, processing, and reporting of information for use in educational planning by college bound students, high school counselors, college administrators, and teachers. The ACT student assessment program includes a test battery administered on five national test days each year. The four tests in the ACT battery- English, mathematics, social science, and natural science- were designed to measure the student's ability to perform the kinds of intellectual tasks typically required of a college student. More than 1500 institutions of higher education participate in the ACT program by requiring or recommending that prospective students write the ACT. Participants include universities,

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[1] Kerlinger, op. cit., p. 373.

[2] Lavin, op. cit., p. 65.

[3] Using ACT in the Secondary School: A Handbook for Counselors (Iowa City: American College Testing Program, Inc., 1967), pp. 1-6.

teachers colleges, and community colleges.

The Otis Quick-Scoring Mental Ability Test[1] is designed to measure mental ability, thinking power, or the degree of maturity of the mind. Since it is not possible to measure mental ability directly, the Otis Quick-Scoring Mental Ability Tests measure the effect mental ability has had in enabling the individual to acquire certain knowledge and mental skills. The Otis Gamma Test was designed to measure the mental ability of high school and college students.

Construction of the Minnesota Multiphasic Personality Inventory was started in the last one-third of the 1930's by S. R. Hathaway and J. C. McKinley. They were motivated by their recognition of a need in both clinical psychiatric research and practice for an objective multidimensional instrument to assist in the identification of psychopathology. Their major goal was the development of an instrument that would provide for comprehensive sampling of behavior of significance to the psychiatrist.[2]

Hathaway and McKinley compiled more than 1000 items from psychiatric examination forms, psychiatry textbooks, and previously published attitude and personality scales. The number of items was reduced to 566 and placed in a true or false, self-report format. The items are presented in either a printed booklet with machine scored answer sheets or singly in a group of item cards which the subject sorts into three slots in a box; marked true, false, and can't say. The inventory was published in 1943.

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[1]D. Welty LeFeaver, The Fifth Mental Measurements Yearbook, edited by Oscar K. Buros (Highland Park: The Gryphon Press, 1959), p. 362.

[2]Richard I. Lanyon and Leonard D. Goodstein, Personality Assessment (New York: John Wiley and Sons, Inc., 1971), pp. 75-76.

Each clinical scale was empirically developed by contrasting the response of nonpsychiatric control subjects with patients in a particular psychiatric diagnostic category. During the construction of the basic MMPI scales, every effort was made to utilize only those responses from psychiatric patients whose symptoms were clear-cut and relatively free from psychiatric signs other than those qualifying them for their particular diagnostic category.[1]

The categories and resultant scales are as follows:[2]

Scale 1 - Hypochondriasis (Hs): These patients exhibited an exaggerated concern about their physical health, often with complaints about physical problems which in fact had a psychological basis. The patients exaggerated the importance of any organic malfunctioning.

Scale 2 - Depression (D): Patients were characterized by intense unhappiness, poor morale, lack of hope about the future, excessive worry, and pessimism.

Scale 3 - Hysteria (Hy): These patients, who had been diagnosed "Psychoneurosis-Hysteria", had psychologically based physical symptoms coupled with indifference or bland unconcern about their condition. Among normals, high scores on the hysteria scale suggest sociability, enthusiasm, immaturity, suggestibility, and egocentrism.

Scale 4 - Psychopathic Deviant (Pd): All the criterion subjects used in developing this scale had shown notable difficulties in social

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[1] Ibid., pp. 76-77.

[2] Richard I. Lanyon, A Handbook of MMPI Group Profiles (Minneapolis: University of Minnesota Press, 1968), pp. 6-9.

adjustment, with histories of delinquency and other antisocial behavior. Patients in this category were unable to form satisfactory emotional relationships, could not appreciate the feelings of others, and were not able to anticipate the consequences of their own behavior. Psychopathic deviate behavior is often characterized by stealing, lying, truancy, sexual promiscuity, alcoholic overindulgence, and forgery.

Scale 5 - Masculinity-femininity (Mf): High scores on the Mf scale indicate feminine interests in men and masculine interests in women. Although homosexual men tend to show high scores, so do other groups, in particular those with artistic or literary interests. Higher scores in men indicate emotional sensitivity, cultural interests, and some degree of passivity, as opposed to the more mechanical, scientific, outdoor, athletic interests of lower scorers. To some extent the reverse descriptions are true of women. Low scoring women often demonstrate a strong feminine interest pattern.

Scale 6 - Paranoia (Pa): Although rarely diagnosed as paranoia, these patients showed paranoid symptoms such as ideas of reference, suspiciousness, interpersonal sensitivity, feelings of persecution, delusions of grandeur, and a tendency to blame others for their misfortunes.

Scale 7 - Psychasthenia (Pt): The subjects in this criterion group, mainly patients, showed unreasonable fears, high general anxieties, feelings of guilt, excessive doubts, obsessions, and compulsions.

Scale 8 - Schizophrenia (Sc): Criterion patients for this scale were those diagnosed schizophrenia in its various subtypes. High scorers in the normal population often tend to be somewhat emotionally isolated, nonconforming, and withdrawn. They are also characterized by anxieties and

internal conflicts.

Scale 9 - Hypomania (Ma): High scoring patients on the mania scale are hyperactive, impulsive, unpredictable, elated but unstable in mood, restless, overoptimistic, and easily distractible.

Scale 0 - Introversion-Extroversion (Si): High scorers on the Si scale tend to be introverted, shy, and socially inept. They prefer to avoid social activity. Low scorers are gregarious, outgoing, sociable, enthusiastic, assertive, talkative, and adept at interpersonal manipulation.

The four validity scales developed in order to enhance the clinical usefulness of the Minnesota Multiphasic Personality Inventory were constructed as follows:[1]

Cannot Say Scale (?): The cannot say or ? score is simply the number of items not responded to as true or false. The more items omitted, the more distorted the profile will become, especially if the omissions tend to be in one area of personality.

Lie Scale (L): This scale was designed to provide a basis for evaluating the subject's general frankness. It contains 15 rationally selected items reflecting socially desirable, but rather improbable behavior.

Infrequency Scale (F): The F scale is intended as an aid to recognition of random or other invalid responses. It contains items that are answered in the same direction by at least 90 percent of the normal subjects, and is thus a measure of how similar the subject's responses are to those of people in general.

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[1] Ibid.

Defensiveness Scale (K): This scale was developed as a correction or suppressor scale to improve the discriminating power of several of the clinical scales by correcting for varying degrees of subtile test-taking defensiveness.

A typical item is a statement that might have been taken from a psychiatric interview. Some are frank statements of rather extreme psychotic symptoms ("My soul sometimes leaves my body"; "I see things or animals or people around me that others do not see"). Some represent milder psychological and physical symptoms ("I have a great deal of stomach trouble"; "I brood a great deal"; "I feel weak all over much of the time"). Some items describe past history ("In school, I found it very hard to talk before the class") and some are statements of belief or attitude ("I like science"; "I am entirely self-confident"; "Horses that don't pull should be beaten or kicked"). Many are quite innocuous, whichever way one answers them ("I used to keep a diary"; "I enjoy detective or mystery stories").[1]

In practice, the examiner rarely looks to see whether a subject answers any one item true, false, or can't say. Instead, he scores the answers on the empirical scales and then draws inferences from the resulting profile.

Population

The population of this study included all students who completed their freshman year at Southwestern State College between 1966 and 1971 and met the following criteria:

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[1]Robert R. Holt, Assessing Personality, (New York: Harcourt, Brace, and Jovanovich, Inc., 1971), p. 70.

a. Enrolled in a minimum of 24 credit hours during the freshman year.

b. Scored within a range from 103 to 121 on the Gamma form of the Otis Quick-Scoring Mental Ability Test. The range selected included all scores that fell within one standard deviation of the mean score for all entering freshmen at Southwestern State College between 1966 and 1971.

c. Scored within a range from 17 to 21 on the composite score of the American College Test. The range selected included all scores that fell within one-half standard deviation of the mean score for all entering freshmen at Southwestern State College.

d. Completed the Minnesota Multiphasic Personality Inventory at the beginning of the freshman year and received valid scores as indicated by the four validity scales. Profiles with L scores below 10, F scores below 16, ? scores below 100, and K scores below 23 were classified as valid.

Criteria data were obtained from student personnel records maintained in the office of the Dean of Students. All entering freshmen students completed the American College Test during their senior year in high school and individual scores were mailed to Southwestern State College by the American College Testing Program. An ACT class profile, including local norms, was provided for each freshman class.

The Otis Quick-Scoring Mental Ability Test was administered to students during summer freshmen orientation and advisement clinics. The tests were hand scored and local norms were established for each class.

All students completed the Minnesota Multiphasic Personality Inventory during freshmen clinics and the answer sheets were machine scored by the Psychological Corporation. The results were provided in a profile form that included T scores on four validity scales and ten clinical scales.

Information pertaining to the number of hours attempted during the freshman year was obtained from student personnel folders and academic

probation lists. Matriculation records were examined to insure that all students included in the population attempted 24 or more hours during a two consecutive semester freshman year.

The population of the academic probation group was selected from an official academic probation list that is published each semester by the Academic Dean. Freshman students were included on the probation list if they failed to maintain an overall grade-point average of 1.5 on a 4.0 scale.

The names of all freshman students appearing on the academic probation lists between 1966 and 1971 were recorded if they attempted a minimum of 24 semester hours during the freshman academic year. Student personnel records were used to obtain American College Test scores, Otis Quick-Scoring Mental Ability Test scores, and MMPI profiles for the 304 male and 136 female freshman students who were selected from the academic probation lists. Tests and inventory data were examined and all students meeting the general population criteria were included in the academic probation population. This population consisted of 104 male and 30 female students. Since the population of female academic probation students was small, all 30 women were included in the study. A random selection of 70 men students was made from the male population.

The population of the academic nonprobation group included all students at Southwestern State College who met the general population criteria and were not placed on academic probation at the end of the freshman year. Students in this group maintained an overall grade-point average above 1.49 during their freshman year.

Data were recorded for 529 students in the nonprobation population. Thirty students were selected at random from a population of 183 female

students and 70 students were selected at random from a population of 346 male students. The sample sizes for male and female nonprobation students were selected to match the sample sizes of the probation groups.

The probationary and nonprobationary samples from small, medium, and large high schools were selected from the samples described above. Most of the student body at Southwestern State College can be divided into three rather distinct groups by using the size of high school attended as the criterion.

Students who matriculated from high schools in the following size ranges were used to test the hypothesis that there is no significant difference between probationary students from small, medium, and large high schools and nonprobationary students from small, medium, and large high schools on the ten clinical scales of the Minnesota Multiphasic Personality Inventory:

a. Small High Schools: Average daily attendance below 125 students.

b. Medium High Schools: Average daily attendance between 300 and 600 students.

c. Large High Schools: Average daily attendance above 1000 students.

The ranges selected for high school sizes follow, to a large extent, the natural classification according to high school origin and allowed reasonable efficiency of data. Approximately 75 percent of the original samples fit into one of the high school size categories listed above. The actual sample sizes used to test the null hypotheses related to high school

size were:

a.	Small High School, Probation	n=25
b.	Small High School, Nonprobation	n=24
c.	Medium High School, Probation	n=24
d.	Medium High School, Nonprobation	n=24
e.	Large High School, Probation	n=24
f.	Large High School, Nonprobation	n=23

Treatment of Data

A sign test for two independent samples was used to test the hypotheses of this study. The sign test is known as the Median Test and compares the medians of two independent samples. The null hypothesis is that no difference exists between the medians of the populations from which the samples were drawn. The median test is based on the idea that in two samples drawn from the same population, the expectation is that as many observations in each sample will fall above as below the joint median.[1] The data consist of two independent samples of n_1 and n_2 observations.

The procedure for testing each hypothesis was:

1. The T scores of each clinical scale for probation and nonprobation students were arranged in ascending order.
2. The median of the combined $n_1 + n_2$ observations was calculated.
3. In each sample, observations above the joint median were assigned a plus (+) and those at or below it, a minus (-).
4. The number of + and - signs for each sample was ascertained.
5. A chi square test was used to determine whether the observed frequency of plus and minus signs departed significantly from expectations under the null hypothesis.

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[1]Ferguson, op. cit., p. 355.

The level of significance was selected as α=0.05. The .05 level of confidence is customary for this type of study and means that only five percent of the time will the condition studied have occurred by chance.

CHAPTER IV

PRESENTATION AND ANALYSIS OF DATA

The purpose of this study was to determine whether a significant difference existed between the Minnesota Multiphasic Personality Inventory clinical scales of Southwestern State College students who were placed on academic probation at the end of their freshman year and Southwestern State College students who possessed academic ability similar to the probation group, but were not on academic probation at the end of their freshman year. A further analysis was made by comparing personality characteristics of probationary and nonprobationary students according to sex and size of high school from which they graduated.

Students included in this study completed their freshman year at Southwestern State College between 1966 and 1971. They enrolled in a minimum of 24 credit hours during their freshman year, scored within a range from 103 to 121 on the Gamma form of the Otis Quick-Scoring Mental Ability Test, scored within a range of 17 to 21 on the composite score of the American College Test, and completed the Minnesota Multiphasic Personality Inventory with a valid profile. The academic probation students failed to achieve an overall grade-point average of 1.50 during their freshman year. The nonprobation students maintained an overall grade-point average of 1.50 or above during their freshmen year.

The data were arranged so that the statistical treatment could be performed as stated in the section on the treatment of data in Chapter III. Two by two contingency tables were used for appropriate arrangement of the data and all hypotheses were tested by chi square.

Comparison of Probationary and Nonprobationary Students on the Clinical Scales of the MMPI

Hypothesis 1 stated that there is no statistically significant difference between probationary and nonprobationary freshmen students at Southwestern State College on the ten clinical scales of the Minnesota Multiphasic Personality Inventory. The data in table 1 show the median scores for probationary and nonprobationary students and the chi square values on the clinical scales of the MMPI.

An analysis of data in table 1 reveals that there is not a statistically significant difference between probationary and nonprobationary students on seven of the ten clinical scales of the MMPI. The probationary students received a higher median score on all seven scales, but the difference was not significant at the .05 level of confidence. The smallest chi square values were observed on the hypochondriasis (.98), masculinity-femininity (.19), and introversion-extroversion (.32) scales. Larger chi square values were obtained on the depression (1.45), hysteria (2.02), paranoia (2.22), and psychasthenia (2.65)scales. However, the observed values on all seven scales were below the 3.84 critical value required for statistical significance at the .05 level and the portions of hypothesis 1 dealing with these seven scales were accepted.

TABLE 1

CHI SQUARE VALUES FOR PROBATIONARY AND NONPROBATIONARY SAMPLES ON THE CLINICAL SCALES OF THE MMPI

MMPI Scale	Median Score		X^2
	Probation	Nonprobation	
Hs	49.50	48.19	.98
D	51.08	48.39	1.45
Hy	53.79	51.72	2.02
Pd	60.64	53.61	6.58*
Mf	52.23	51.85	.19
Pa	55.79	53.61	2.22
Pt	57.83	54.50	2.65
Sc	56.29	52.41	8.89**
Ma	63.73	53.90	14.76***
Si	52.98	51.50	.32

$$X^2 = \frac{N(AD - BC)^2}{(A+B)\ (C+D)\ \ (A+C)\ (B+D)}$$

*Significant at the .05 level
**Significant at the .01 level
***Significant at the .001 level

Statistically significant differences between probationary and nonprobationary students were obtained on the psychopathic deviate, schizophrenia, and hypomania scales. The 6.58 chi square value on the psychopathic deviate scale exceeded the 3.84 value required for significance

at the .05 level and approached the 6.64 critical value required for significance at the .01 level of confidence. The difference between probationary and nonprobationary students on the shizophrenia scale is represented by a chi square value of 8.89. This exceeds the critical value of 6.64 that is required for significance at the .01 level. The largest chi square value in table 1 resulted when the hypomania scales of probationary and nonprobationary students were compared. The 14.76 chi square value exceeded the 10.83 required for statistical significance at the .001 level of confidence. The portions of hypothesis 1 dealing with the psychopathic deviate, schizophrenia, and hypomania scales were rejected because the chi square values for those scales exceeded the critical value required for rejection at or below the .05 level of confidence.

Comparison of Male Probationary and Nonprobationary Students on the Clinical Scales of the MMPI

Hypothesis 2 stated that there is no statistically significant difference between male probationary and nonprobationary students on the ten clinical scales of the MMPI.

Table 2 presents the median scores for male probationary and nonprobationary students and the chi square values obtained when the samples were compared on the clinical scales.

An analysis of data contained in table 2 reveals that a statistically significant difference was not obtained on eight of the ten clinical scales. A chi square value of less than 1.00 was observed on the

TABLE 2

CHI SQUARE VALUES FOR PROBATIONARY AND NONPROBATIONARY MALE STUDENTS ON THE CLINICAL SCALES OF THE MMPI

MMPI Scale	Median Score		X^2
	Probation	Nonprobation	
Hs	49.50	48.61	.72
D	52.36	49.50	1.41
Hy	53.88	51.25	2.57
Pd	60.25	54.21	6.59*
Mf	53.55	54.89	.72
Pa	55.64	54.24	.71
Pt	58.50	56.17	1.05
Sc	56.17	53.25	2.32
Ma	62.72	54.88	7.37**
Si	52.83	52.50	.00

$$X^2 = \frac{N(AD - BC)^2}{(A+B)\ (C+D)\ (A+C)\ (B+D)}$$

*Significant at the .05 level
**Significant at the .01 level

introversion-extroversion (.00), paranoia (.71), hypochondriasis (.72), and masculinity-femininity scales. Higher chi square values were obtained when the psychasthenia (1.05), depression (1.41), schizophrenia (2.32), and hysteria (2.57) scales for probationary and nonprobationary male

students were compared. However, the observed values of chi square were all below the 3.84 required for significance at the .05 level of confidence.

The median scores for male probationary students were higher than median scores for male nonprobationary students on seven of the eight scales discussed above. The only exception was on the masculinity-femininity scale and in that case, the difference in median scores was slight.

Male probationary students scored significantly higher than male nonprobationary students on the psychopathic deviate and hypomania scales. The 6.59 chi square value on the psychopathic deviate scale was significant at the .05 level and approached significance at the .01 level where a critical value of 6.64 was required. The 7.37 value obtained when the hypomania scales were compared is significant at the .01 level. The portions of hypothesis 2 dealing with the psychopathic deviate and hypomania scales were rejected. The remaining eight parts of hypothesis 2 were not significant at the .05 level and that portion of the null hypothesis was accepted.

Comparison of Female Probationary and Nonprobationary Students on the Clinical Scales of the MMPI

Hypothesis 3 stated that there is no statistically significant difference between female probationary and nonprobationary students on the ten clinical scales of the MMPI. Table 3 presents the median scores for female probationary and nonprobationary students and the chi square

values obtained when the samples were compared on the clinical scales.

TABLE 3

CHI SQUARE VALUES FOR PROBATIONARY AND NONPROBATIONARY FEMALE STUDENTS OF THE CLINICAL SCALES OF THE MMPI

MMPI Scale	Median Score		X^2
	Probation	Nonprobation	
Hs	49.50	47.00	1.16
D	48.40	47.14	.00
Hy	53.50	53.07	.27
Pd	60.33	52.68	3.25
Mf	49.92	45.33	1.68
Pa	56.50	52.28	2.97
Pt	56.50	51.17	3.25
Sc	56.50	50.00	6.69**
Ma	69.50	52.00	8.43**
Si	53.50	50.50	.62

$$X^2 = \frac{N(AD - BC)^2}{(A+B)\ (C+D)\ (A+C)\ (B+D)}$$

**Significant at the .01 level

An analysis of data contained in table 3 shows that a statistically significant difference was not obtained on eight of the ten clinical scales. A chi square value of less than 1.00 was observed on the depression (.00), hysteria (.27), and introversion-extroversion (.62) scales. The hypochondriasis (1.16) and masculinity-femininity (1.68) scales had chi square values between 1.00 and 1.99. Chi square values on the paranoia (2.97), psychopathic deviate (3.25), and psychasthenia (3.25) approached significance, but the hypothesis was accepted on these eight components because they failed to meet the .05 level of confidence required for rejection in this study.

The portions of hypothesis 3 dealing with the schizophrenia and hypomania scales of female probationary and nonprobationary students were rejected at the .01 level. The chi square values of 6.69 and 8.43 exceeded the critical value of 6.64 required for significance at the .01 level.

An analysis of data in table 3 shows that median scores for probationary female students were higher than nonprobationary female students on all ten scales of the MMPI.

Comparison of Probationary and Nonprobationary Graduates of Small High Schools

Hypothesis 4 stated that there is no statistically significant difference between probationary and nonprobationary students, who graduated from small high schools, on the ten clinical scales of the MMPI. Table 4 presents the median scores for probationary and nonprobationary students who graduated from small high schools and the chi square values obtained when the samples were compared on the clinical scales.

TABLE 4

CHI SQUARE VALUES FOR PROBATIONARY AND NONPROBATIONARY STUDENTS WHO GRADUATED FROM SMALL HIGH SCHOOLS

MMPI Scale	Median Score		X^2
	Probation	Nonprobation	
Hs	50.00	48.25	1.05
D	50.57	48.39	1.04
Hy	54.14	52.83	.02
Pd	55.75	54.70	.03
Mf	51.09	55.50	3.38
Pa	53.25	55.75	.90
Pt	55.12	52.83	.51
Sc	52.56	52.00	.19
Ma	55.75	53.25	.51
Si	54.00	55.75	.48

$$X^2 = \frac{N(AD - BC)^2}{(A+B)\ (C+D)\ (A+C)\ (B+D)}$$

The data in table 4 show chi square values of less than the 3.84 required for significance on all clinical scales of the MMPI. A chi square value less than 1.00 was observed on the hysteria (.02), psychopathic deviate (.03), schizophrenia (.19), introversion-extroversion (.48), hypomania (.51), psychasthenia (.51), and paranoia (.90) scales. The depression (1.04) and hypochondriasis (1.05) scales barely exceeded a 1.00 chi square value. The nonprobationary students who graduated from small high schools scored considerably higher than the probationary students who graduated from small high schools on the masculinity-femininity scale and the 3.38 chi square value approached significance. However, since all values on the ten scales were below the 3.84 required for significance at the .05 level, hypothesis

4 was accepted.

Comparison of Probationary and Nonprobationary Graduates of Medium High Schools

Hypothesis 5 stated that there is no statistically significant difference between probationary and nonprobationary students, who graduated from medium high schools, on the ten clinical scales of the MMPI.

TABLE 5

CHI SQUARE VALUES FOR PROBATIONARY AND NONPROBATIONARY STUDENTS WHO GRADUATED FROM MEDIUM HIGH SCHOOLS

MMPI Scale	Median Score		X^2
	Probation	Nonprobation	
Hs	48.07	47.19	.33
D	50.00	46.17	1.33
Hy	52.36	49.50	.08
Pd	61.17	51.32	8.39**
Mf	50.33	51.64	.19
Pa	56.64	51.75	3.59
Pt	54.50	52.63	.33
Sc	54.50	50.13	3.09
Ma	59.50	54.50	1.37
Si	51.38	48.88	.36

$$X^2 = \frac{N(AD - BC)^2}{(A+B)\ (C+D)\ (A+C)\ (B+D)}$$

**Significant at the .01 level

Data in table 5 reveal that a chi square value below 1.00 was obtained on the hysteria (.08), masculinity-femininity (.19), hypochondriasis (.33), Psychasthenia (.33), and introversion-extroversion (.36) scales. Slightly higher chi square values were obtained on the depression (1.33) and

hypomania (1.37) scales. The 3.09 and 3.59 values obtained on the schizophrenia and paranoia scales approached significance, but did not meet the 3.84 critical value required for statistical significance in this study. The only statistically significant finding related to hypothesis 5 was the psychopathic deviate scale. The 8.39 chi square value was significant at the .01 level of confidence.

Comparison of Probationary and Nonprobationary Graduates of Large High Schools

Hypothesis 6 stated that there is no statistically significant difference between probationary and nonprobationary students, who graduated from large high schools, on the ten clinical scales of the MMPI. An analysis of data in table 6 reveals that a statistically significant difference did not exist on nine of the ten clinical scales when probationary and nonprobationary students from large high schools were compared. The chi square values for hypochondriasis (.02), introversion-extroversion (.33), depression (.53), and hysteria (.56) were below 1.00. The 1.05 chi square value on the psychopathic deviate and masculinity-femininity scales and the 1.07 value on the psychasthenia scale did not approach the level required for statistical significance. The values for paranoia (2.57) and schizophrenia (2.62) were also below the 3.84 critical value required for significance at the .05 level and were accepted with the other seven components of hypothesis 6 discussed above because they did not meet the .05 level selected for use in this study.

TABLE 6

CHI SQUARE VALUES FOR PROBATIONARY AND NONPROBATIONARY STUDENTS WHO GRADUATED FROM LARGE HIGH SCHOOLS

MMPI Scale	Median Scores		X^2
	Probation	Nonprobation	
Hs	49.50	50.21	.02
D	48.50	50.75	.53
Hy	52.83	51.00	.56
Pd	59.50	57.50	1.05
Mf	52.42	51.37	1.05
Pa	58.25	53.43	2.57
Pt	59.50	56.38	1.07
Sc	59.50	54.09	2.62
Ma	70.41	55.75	13.33***
Si	52.00	54.50	.33

$$X^2 = \frac{N(AD - BC)^2}{(A+B)\ (C+D)\ (A+C)\ (B+D)}$$

***Significant at the .001 level

The 13.33 chi square value obtained when the hypomania scales were compared exceeded the 10.83 critical value required for significance at the .001 level of confidence. Therefore, the portion of hypothesis 6 dealing with the hypomania scale was rejected at the .001 level.

Summary

Median MMPI clinical scale scores for probationary and nonprobationary students and the chi square values obtained when median scores were compared through the use of a sign test for two independent samples were presented in six tables. An analysis of the data contained in the tables indicated that a significant difference on the psychopathic deviate scale

existed between probationary and nonprobationary students, male probationary and nonprobationary students, and probationary and nonprobationary students who graduated from medium size high schools. A significant difference was obtained when probationary and nonprobationary students and female probationary and nonprobationary students were compared on the schizophrenia scales. A significant difference was also obtained when the hypomania scales of probationary and nonprobationary students in the total samples, probationary and nonprobationary male and female students, and probationary and nonprobationary students who graduated from large high schools were compared. The chi square values obtained when probationary and nonprobationary samples were compared on the hypochondriasis, depression, hysteria, masculinity-femininity, paranoia, psychasthenia, and introversion-extroversion scales were not significant.

CHAPTER V

SUMMARY, FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

The purpose of this study was to determine whether personality differences existed between academic probation and nonprobation students of like academic potential who completed the freshman year at Southwestern State College. Scores on the American College Test and the Otis Quick-Scoring Mental Ability Test were used to match probationary and nonprobationary samples on academic ability and academic achievement.

All probationary and nonprobationary student samples were compared on the ten clinical scales of the Minnesota Multiphasic Personality Inventory. A sign test for two independent samples was used to test the hypotheses. The null hypotheses were that no statistically significant difference existed between the medians of the population from which the samples were drawn. A chi square test was used to determine whether the observed frequency of signs departed significantly from expectations under the null hypotheses.

Data were gathered and the following null hypotheses were tested:

1. There is no statistically significant difference between probationary and nonprobationary freshmen students at Southwestern State College on the ten clinical scales of the Minnesota Multiphasic Personality Inventory.

2. There is no statistically significant difference between male probationary and nonprobationary students on the ten clinical scales of the Minnesota Multiphasic Personality Inventory.

3. There is no statistically significant difference between female probationary and nonprobationary students on the ten clinical scales of the Minnesota Multiphasic Personality Inventory.

4. There is no statistically significant difference between probationary and nonprobationary students, who graduated from small high schools, on the ten clinical scales of the Minnesota Multiphasic Personality Inventory.

5. There is no statistically significant difference between probationary and nonprobationary students, who graduated from medium high schools, on the ten clinical scales of the Minnesota Multiphasic Inventory.

6. There is no statistically significant difference between probationary and nonprobationary students, who graduated from large high schools, on the ten clinical scales of the Minnesota Multiphasic Personality Inventory.

Summary of Findings

Six hypotheses were used to compare six probationary and nonprobationary samples on the ten clinical scales of the Minnesota Multiphasic Personality Inventory. A statistical analysis of the data resulted in the following findings:

1. Hypochondriasis Scale: Significant differences were not observed when the hypochondriasis scales of probationary and nonprobationary samples were compared.

2. Depression Scale: Significant differences were not observed when the depression scales of the probationary and nonprobationary samples were compared.

3. Hysteria Scale: Significant differences were not observed when the hysteria scales of probationary and nonprobationary samples were compared.

4. Psychopathic Deviant Scale: The null hypotheses Ho_1, Ho_2, and Ho_5, for the psychopathic deviant subsample were rejected at or below the .05 level of confidence. Therefore, the findings indicated that the observed difference between psychopathic deviant scales of probationary and nonprobationary students was not a result of chance when the total sample - Ho_1, male students - Ho_2, and medium size high school samples - Ho_5 were compared. Significant differences were not observed when the psychopathic deviant scales of probationary and nonprobationary samples of female students - Ho_3, graduates of small high schools - Ho_4, and graduates of large high schools - Ho_6 were compared.

5. Masculinity-Femininity Scale: Significant differences were not observed when the masculinity-femininity scales of the probationary and nonprobationary samples were compared.

6. Paranoia Scale: Significant differences were not observed when the paranoia scales of probationary and nonprobationary samples were compared.

7. Psychasthenia Scale: Significant differences were not observed when the psychasthenia scales of probationary and nonprobationary samples were compared.

8. Schizophrenia Scale: The null hypotheses Ho_1 and Ho_3 for the schizophrenia subsample were rejected at the .01 level of confidence.

Therefore, the findings indicated that the observed difference between schizophrenia scales of probationary and nonprobationary students was not a result of chance when the total samples - Ho_1 and the female samples - Ho_3 were compared. Significant differences were not observed when the schizophrenia scales of probationary and nonprobationary samples of male students - Ho_2, graduates of small high schools - Ho_4, graduates of medium high schools - Ho_5, and graduates of large high schools - Ho_6 were compared.

9. Hypomania Scale: The null hypotheses Ho_1, Ho_2, Ho_3, and Ho_6 for the hypomania subsample were rejected at or below the .01 level of confidence. Therefore, the findings indicated that the observed difference between hypomania scales of probationary and nonprobationary students was not a result of chance when the total samples - Ho_1, male samples - Ho_2, female samples - Ho_3, and large high school samples - Ho_6 were compared. Significant differences were not observed when the hypomania scales of probationary and nonprobationary samples of graduates of small high schools - Ho_4 and graduates of medium high schools - Ho_5 were compared.

10. Introversion-Extroversion: Significant differences were not observed when the introversion-extroversion scales of probationary and nonprobationary students were compared.

Conclusions

The following conclusions were drawn from the findings of this study:

1. Three clinical scales of the Minnesota Multiphasic Personality Inventory have validity for making predictions of academic success for freshmen students at Southwestern State College. Probationary students are

liable to be characterized by the following types of behavior:

a. Psychopathic deviant: Irresponsibility, immaturity, delinquency, truancy, nonconformity, and poor motivation.

b. Schizophrenia: Emotional isolation, internal conflicts, withdrawal, anxieties, and nonconformity.

c. Hypomania: Hyperactive, impulsive, unpredictable, unstable moods, restlessness, overoptimism, and easy distractibility.

2. Male probationary students are liable to be characterized by irresponsibility, immaturity, delinquency, truancy, nonconformity, and poor motivation.

3. Female probationary students are liable to be characterized by emotional isolation, internal conflicts, withdrawal, anxieties, and nonconformity.

4. The Minnesota Multiphasic Personality Inventory did not effectively differentiate probationary and nonprobationary students according to the size of high school from which they graduated.

5. The hypochondriasis, depression, hysteria, masculinity-femininity, paranoia, psychasthenia, and introversion-extroversion scales of the Minnesota Multiphasic Personality Inventory do not have validity for making predictions of academic success for freshmen students at Southwestern State College.

Recommendations

Findings and conclusions of this study support the following recommendations:

1. Admission decisions should be based on academic ability factors and data from a personality inventory.

2. Students who are likely to experience academic problems resulting from negative personality characteristics should be identified during the early days of the freshman year and counseling assistance provided.

3. Findings related to high school size were not conclusive. Therefore, it is recommended that future research deal with personality characteristics of successful and unsuccessful college students who graduated from high schools of various size.

4. Findings related to the masculinity-femininity and introversion-extroversion scales were not consistent with the findings of several earlier studies. Therefore, it is recommended that additional research be conducted in an effort to determine the relationship between those scales and academic success.

5. Studies dealing with the relationship between personality characteristics and academic success should be conducted with samples representing a wide range of college types and sizes.

6. Studies should be conducted to examine the relationship between characteristics of the social setting and the ways in which they interact with personality to affect the level of academic achievement.

7. The environment of colleges and universities should be studied to determine the degree to which the institution contributes to the failure of a portion of its student body.

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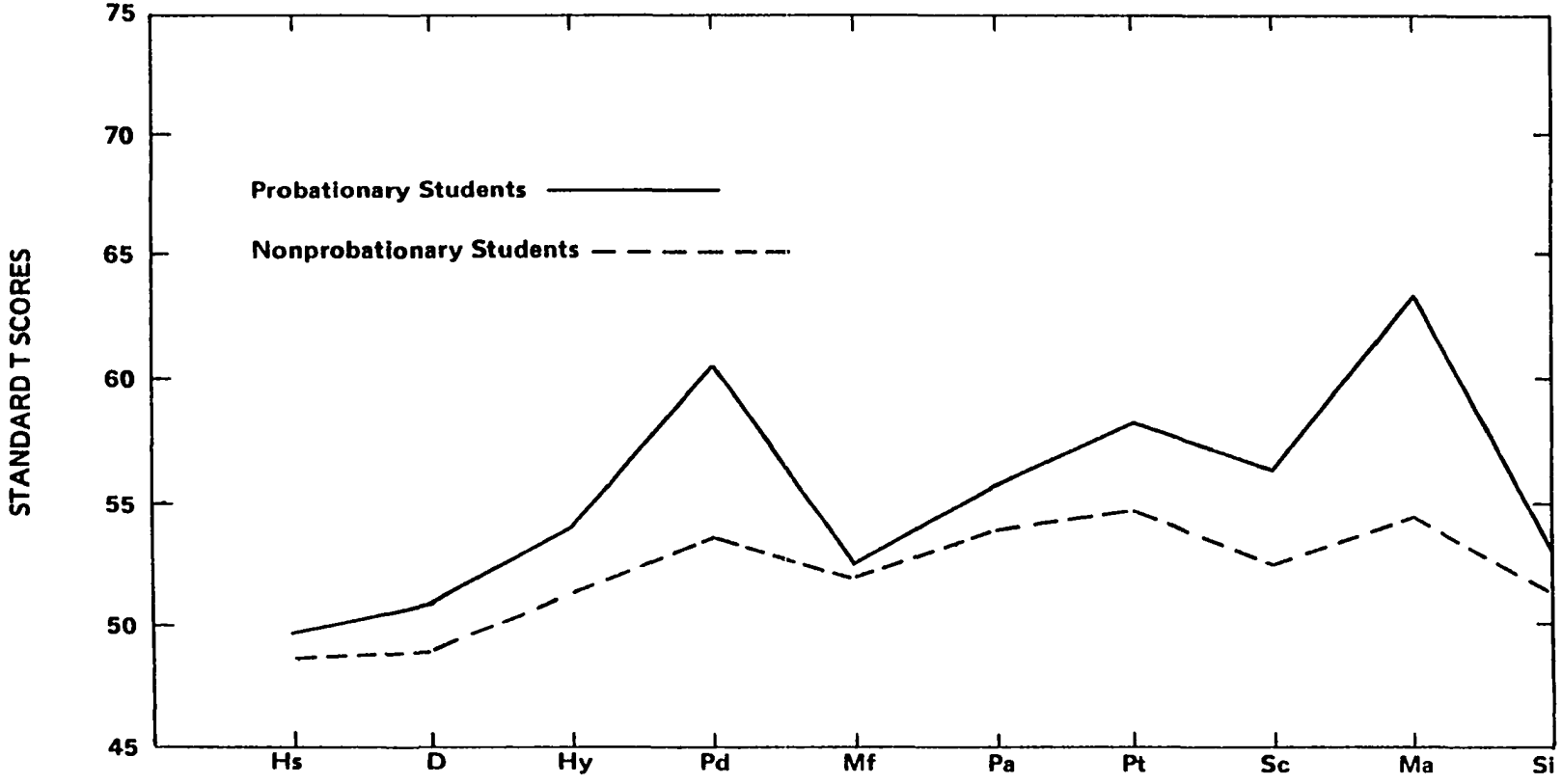
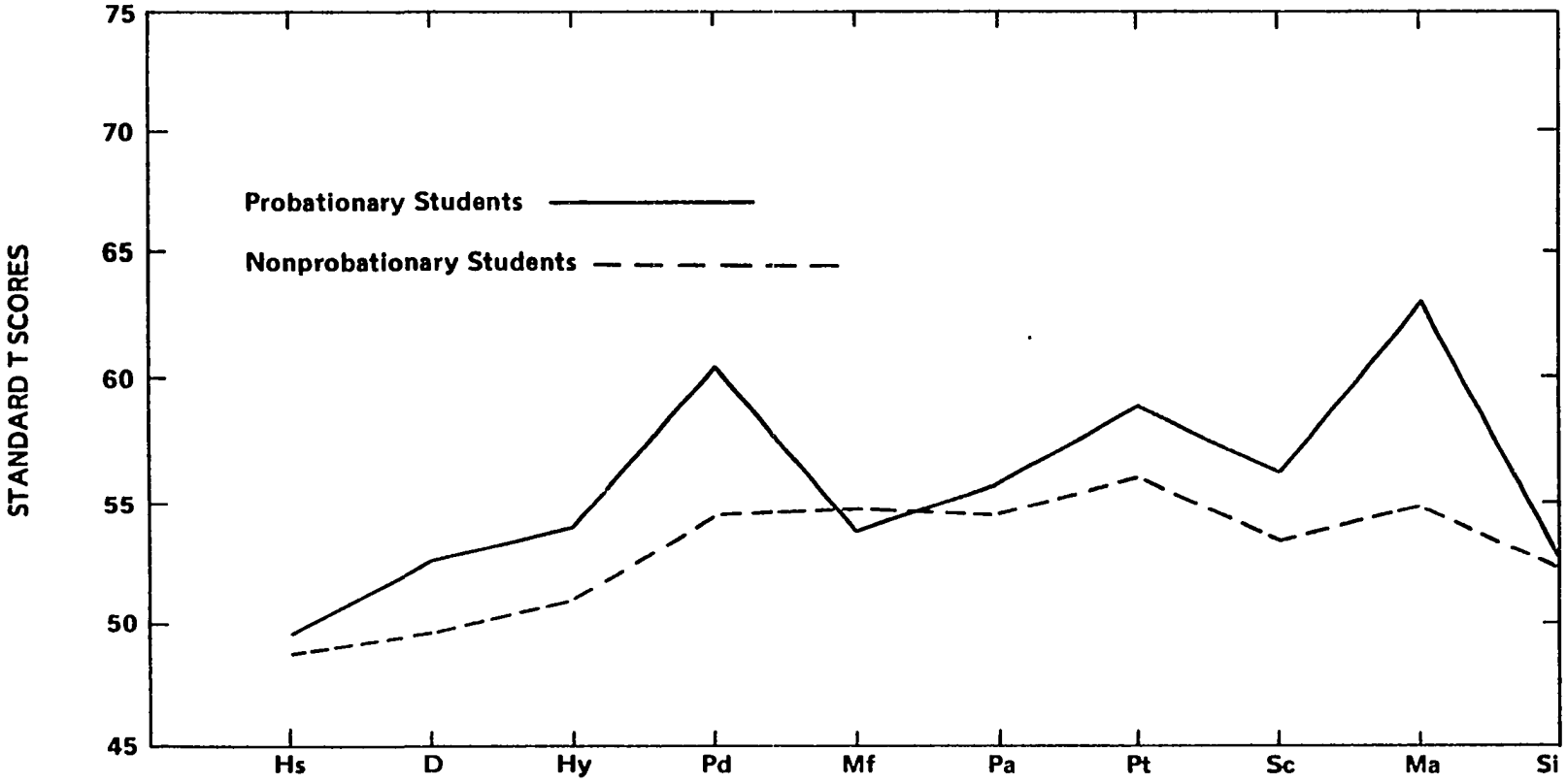
APPENDIX A

COMPARISON OF MMPI GROUP PROFILES



MEDIAN MMPI SCALE SCORES FOR
PROBATIONARY AND NONPROBATIONARY STUDENTS



MEDIAN MMPI SCALE SCORES FOR
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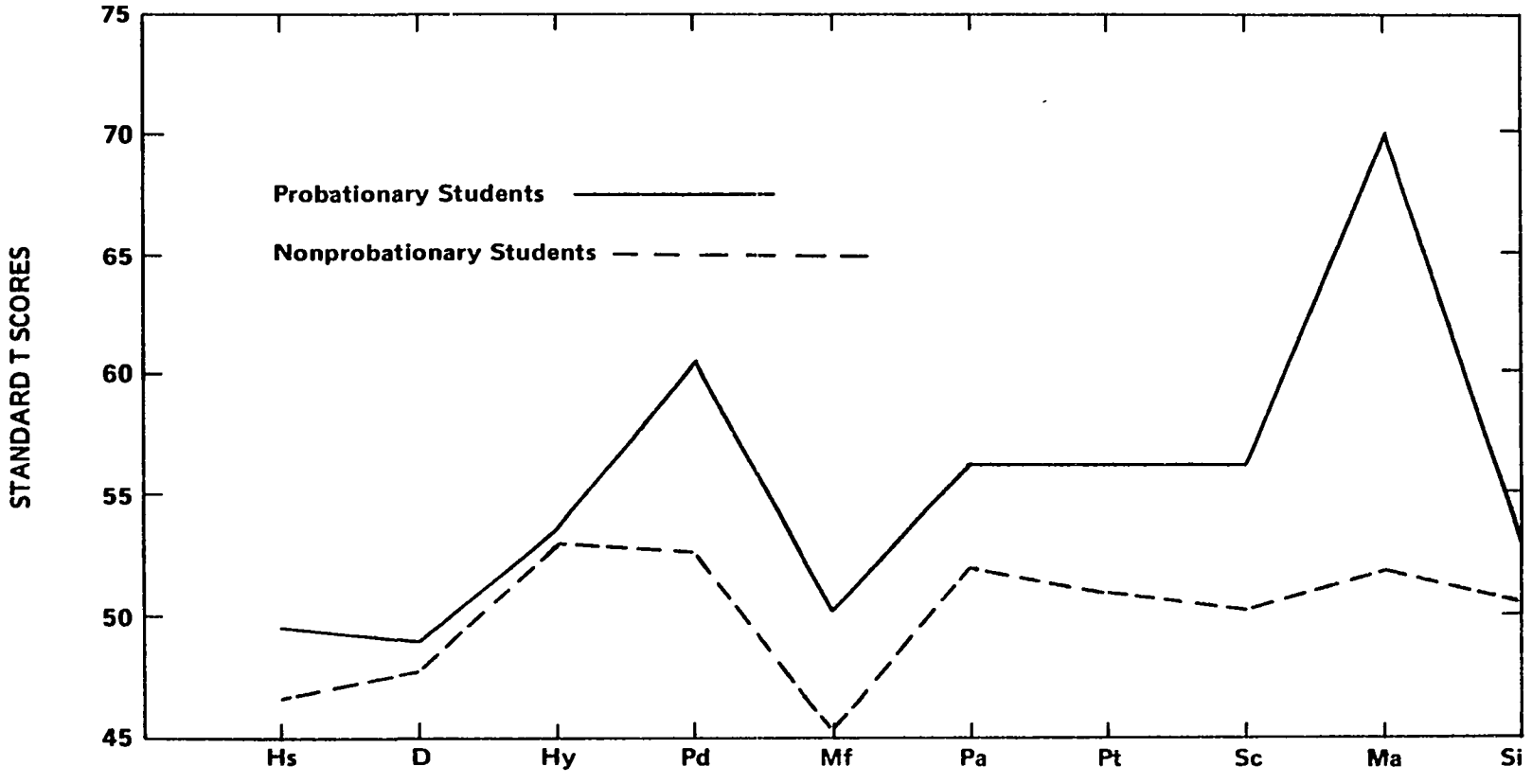

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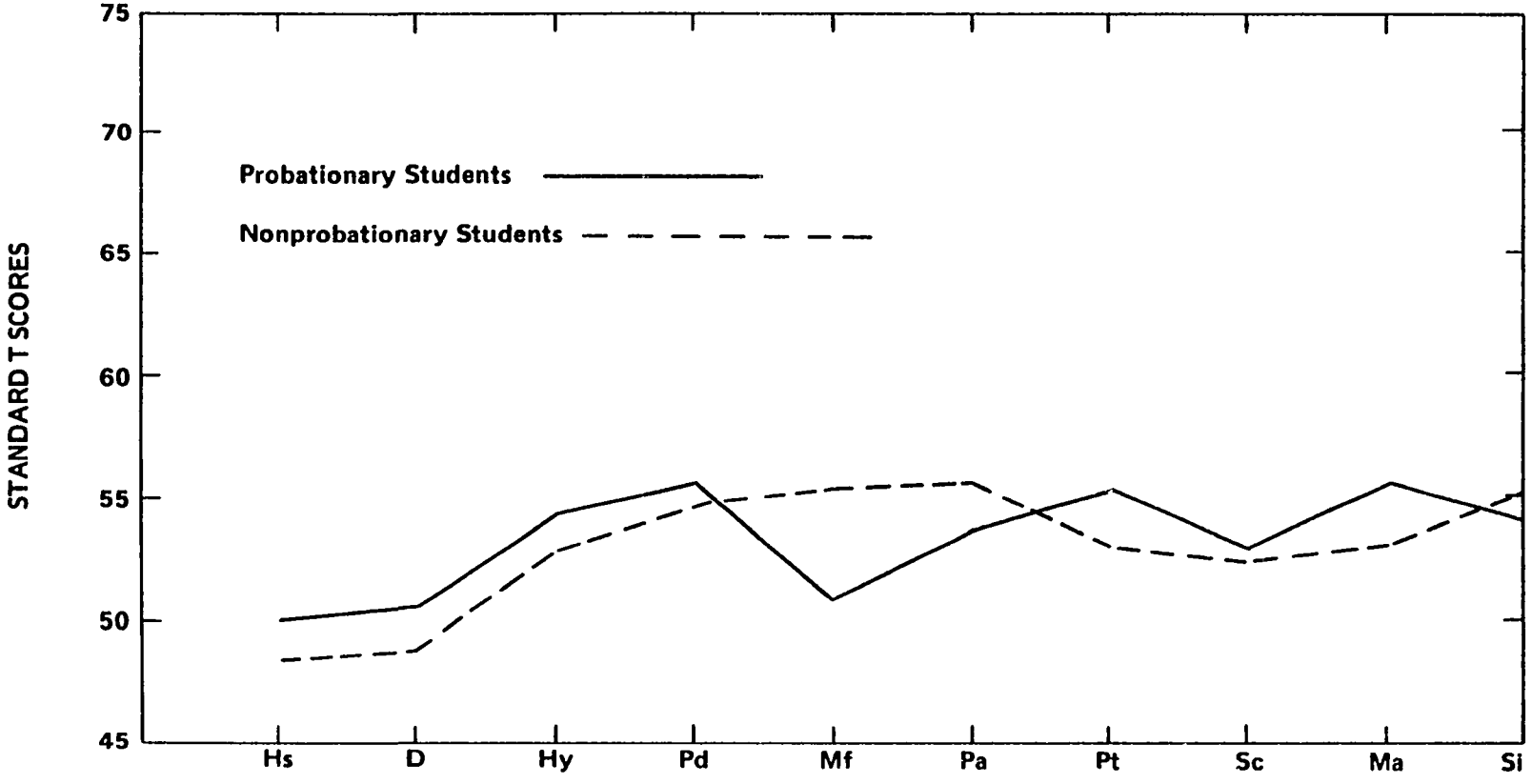
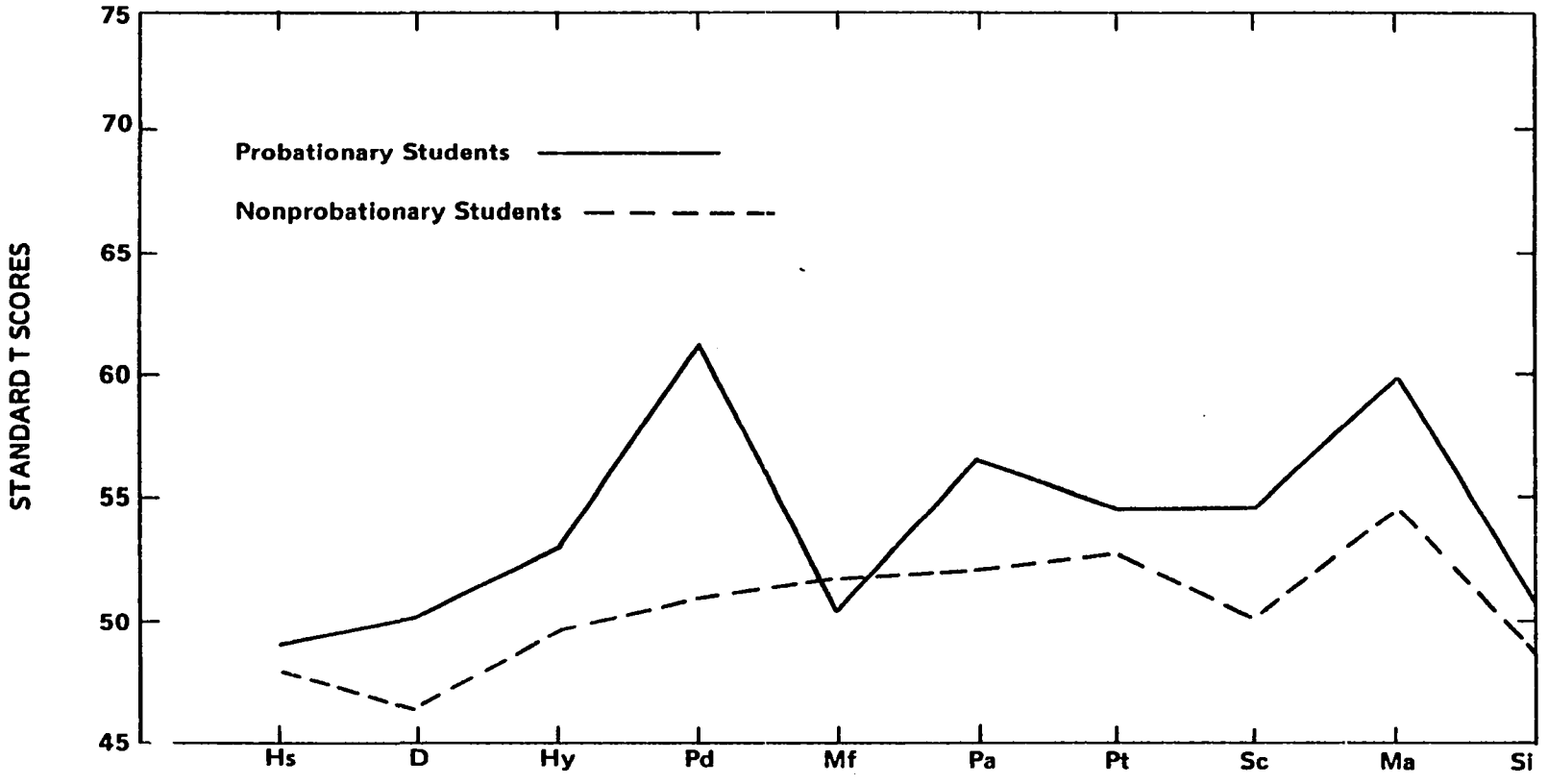
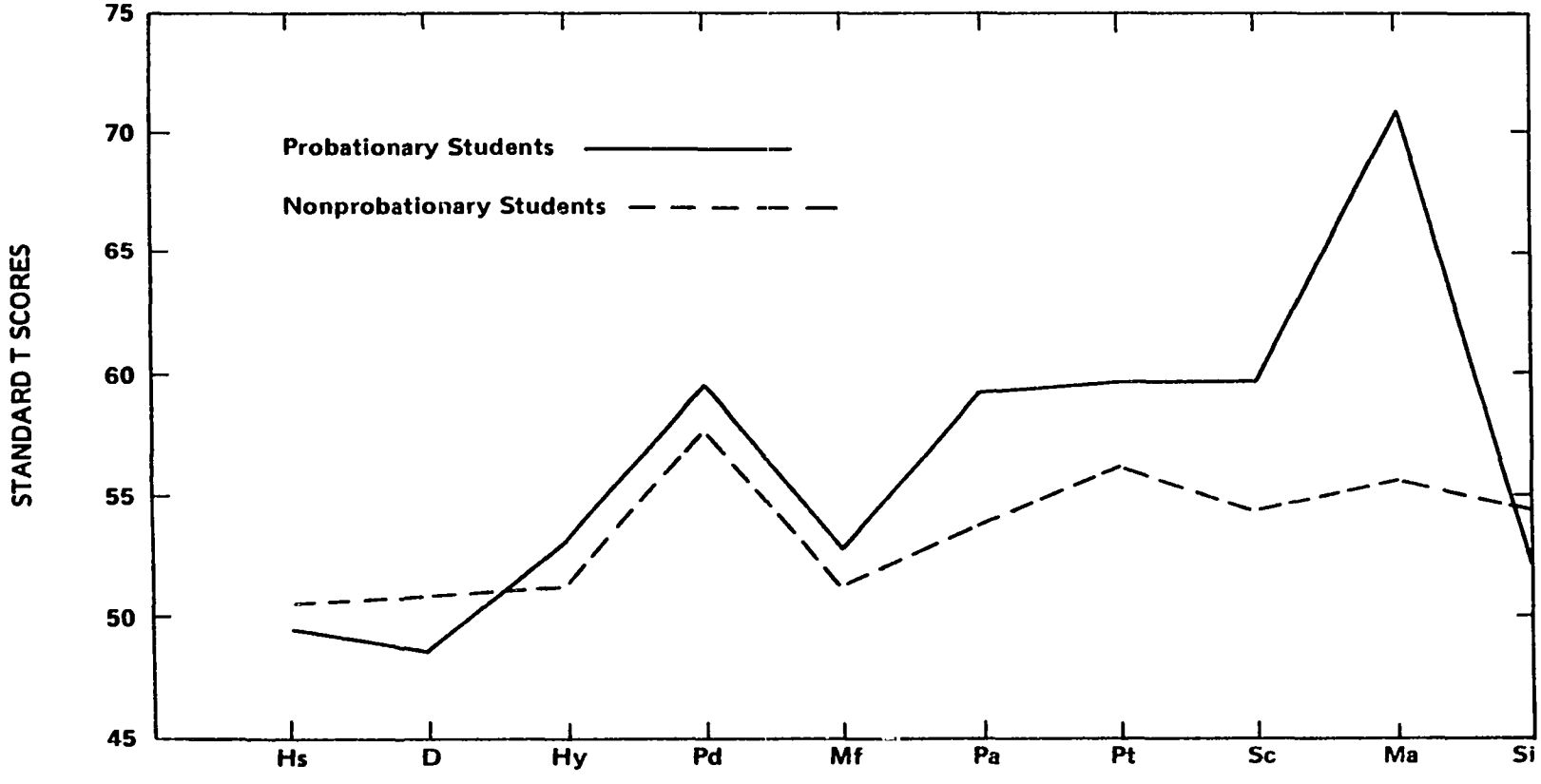
PROBATIONARY AND NONPROBATIONARY FEMALE STUDENTS



MEDIAN MMPI SCALE SCORES FOR PROBATIONARY AND NONPROBATIONARY STUDENTS WHO GRADUATED FROM SMALL HIGH SCHOOLS



MEDIAN MMPI SCALE SCORES FOR PROBATIONARY AND NONPROBATIONARY STUDENTS WHO GRADUATED FROM MEDIUM HIGH SCHOOLS



MEDIAN MMPI SCALE SCORES FOR PROBATIONARY AND NONPROBATIONARY STUDENTS WHO GRADUATED FROM LARGE HIGH SCHOOLS

APPENDIX B

MEAN ACT COMPOSITE SCORES AND MEAN I.Q. SCORES OF PROBATIONARY AND NONPROBATIONARY SAMPLES

MEAN ACT COMPOSITE SCORES

Sample	Probation	Nonprobation
Total	18.68	18.92
Male	18.84	19.01
Female	18.30	18.70
Small High School	19.00	19.17
Medium High School	18.92	18.75
Large High School	19.56	19.17

MEAN OTIS QUICK-SCORING MENTAL ABILITY TEST SCORES

Sample	Probation	Nonprobation
Total	110.58	110.30
Male	110.63	110.83
Female	110.47	109.07
Small High School	108.84	110.84
Medium High School	111.96	109.04
Large High School	111.96	110.87

APPENDIX C

SAMPLE DISTRIBUTION, ACT COMPOSITE SCORES, OTIS QUICK-SCORING MENTAL ABILITY TEST SCORES, AND MMPI CLINICAL SCALE T SCORES OF PROBATIONARY STUDENTS

No.	SAMPLE						ACT COMP.	IQ	MMPI SCALE T SCORES									
	Total	Male	Female	SHS	MHS	LHS			Hs	D	Hy	Pd	Mf	Pa	Pt	Sc	Ma	Si
1	x	x				x	20	115	80	70	70	69	72	65	74	79	70	70
2	x	x		x			17	108	40	52	56	53	53	56	62	66	70	52
3	x	x		x			17	106	40	45	40	42	52	45	49	50	59	52
4	x	x				x	18	116	76	70	65	66	50	50	65	80	72	60
5	x	x					18	118	54	39	47	49	57	67	60	74	74	43
6	x	x		x			20	106	45	57	50	60	63	45	67	58	60	45
7	x	x				x	21	106	62	60	55	56	59	70	62	70	55	55
8	x	x				x	20	111	55	72	56	53	52	52	76	67	65	65
9	x	x		x			18	119	55	48	50	40	52	58	55	52	50	63
10	x	x				x	17	108	45	50	54	66	60	73	74	70	72	55
11	x	x				x	17	107	36	57	50	48	52	40	42	40	65	50
12	x	x		x			18	113	38	57	40	57	56	50	50	50	55	62
13	x	x		x			18	108	40	46	44	55	47	45	55	50	45	62
14	x	x					19	114	45	58	42	60	55	57	58	62	65	70
15	x	x			x		21	113	60	70	65	70	60	58	58	55	53	55
16	x	x			x		21	114	39	47	50	47	60	63	40	42	60	53
17	x	x				x	20	104	47	40	48	53	40	62	62	70	58	60

No.	SAMPLE						ACT COMP.	IQ	MMPI SCALE T SCORES									
	Total	Male	Female	SHS	MHS	LHS			Hs	D	Hy	Pd	Mf	Pa	Pt	Sc	Ma	SI
18	x	x		x			17	105	62	62	62	70	52	68	65	60	55	55
19	x	x			x		21	115	47	52	58	53	47	50	56	50	64	48
20	x	x				x	19	105	45	50	38	57	50	56	52	60	60	45
21	x	x					20	107	40	32	48	50	40	44	40	48	65	40
22	x	x			x		19	109	45	46	45	62	55	85	60	80	80	50
23	x	x			x		17	105	40	60	45	70	50	52	75	62	70	62
24	x	x		x			17	104	55	52	53	62	50	57	58	51	42	47
25	x	x					17	112	62	38	62	66	57	59	75	104	88	55
26	x	x			x		19	117	57	80	65	56	62	58	72	67	43	73
27	x	x					20	107	45	37	60	50	60	45	44	46	58	58
28	x	x			x		20	110	57	50	62	66	50	55	58	56	50	42
29	x	x					19	118	65	50	62	76	55	52	65	64	80	53
30	x	x			x		18	118	48	60	52	70	67	65	82	94	75	52
31	x	x					20	105	52	57	54	70	42	50	54	50	58	38
32	x	x					21	111	50	58	60	55	62	60	75	61	60	71
33	x	x			x		18	117	41	34	42	56	40	52	64	67	78	50
34	x	x		x			17	104	55	48	52	52	45	31	54	49	58	48

No.	SAMPLE						ACT COMP.	IQ	MMPI SCALE T SCORES									
	Total	Male	Female	SHS	MHS	LHS			Hs	D	Hy	Pd	Mf	Pa	Pt	Sc	Ma	Si
35	x	x			x		19	107	52	52	65	64	55	58	50	50	40	48
36	x	x					20	113	45	40	56	60	47	47	50	50	60	45
37	x	x		x			21	109	62	70	60	74	53	50	65	59	38	58
38	x	x		x			18	103	76	60	62	65	63	56	66	60	70	45
39	x	x				x	20	119	50	45	47	65	50	40	47	50	70	36
40	x	x		x			20	108	52	50	55	52	35	40	42	48	50	37
41	x	x				x	19	118	45	46	45	64	50	57	62	50	80	40
42	x	x					17	105	47	70	52	64	55	52	62	60	52	54
43	x	x					19	106	48	56	48	74	62	45	64	65	65	60
44	x	x			x		19	109	55	56	48	62	52	50	60	55	35	73
45	x	x			x		20	115	40	39	52	50	47	45	45	50	72	40
46	x	x					21	114	55	56	62	80	60	70	72	86	60	50
47	x	x					20	120	55	72	60	60	62	45	60	56	48	50
48	x	x		x			21	118	47	70	55	65	35	50	63	72	48	65
49	x	x			x		17	103	45	60	50	70	47	62	50	54	62	52
50	x	x		x			17	104	45	49	50	42	60	58	47	50	70	54
51	x	x				x	18	114	55	36	57	78	65	71	63	70	86	32

No.	SAMPLE						ACT COMP.	IQ	MMPI SCALE T SCORES									
	Total	Male	Female	SHS	MHS	LHS			Hs	D	Hy	Pd	Mf	Pa	Pt	Sc	Ma	Si
52	x	x					21	111	50	40	58	76	63	53	53	53	50	35
53	x	x		x			17	114	52	52	57	47	50	56	63	45	63	60
54	x	x				x	19	115	52	49	44	62	47	58	56	56	70	60
55	x	x			x		20	118	50	46	62	71	55	70	54	46	50	46
56	x	x					18	119	55	56	65	66	64	72	80	80	80	50
57	x	x				x	18	113	45	48	48	58	40	48	42	48	65	38
58	x	x					19	103	35	75	42	60	57	58	58	50	65	62
59	x	x					19	104	47	40	56	63	60	67	56	56	45	55
60	x	x			x		19	114	48	70	65	52	50	57	50	50	52	60
61	x	x					17	110	35	57	42	32	60	58	75	60	52	67
62	x	x		x			19	113	40	40	52	48	47	44	42	37	52	50
63	x	x			x		18	111	57	46	58	62	53	72	60	65	70	40
64	x	x					19	108	52	50	55	70	55	55	52	50	43	50
65	x	x			x		18	110	50	50	50	50	37	47	43	45	40	50
66	x	x					17	103	54	70	55	47	45	56	51	45	40	59
67	x	x				x	21	107	45	44	52	50	50	50	53	52	65	40
68	x	x				x	17	107	54	53	65	64	71	57	54	56	70	50

No.	SAMPLE						ACT COMP.	IQ	MMPI SCALE T SCORES									
	Total	Male	Female	SHS	MHS	LHS			Hs	D	Hy	Pd	Mf	Pa	Pt	Sc	Ma	Si
69	x	x			x		21	117	38	36	42	53	50	47	38	42	50	45
70	x	x			x		17	107	55	35	47	62	47	77	60	81	82	55
71	x		x		x		21	103	46	40	50	51	39	50	52	49	72	50
72	x		x			x	21	115	50	44	62	67	47	70	71	66	60	42
73	x		x				20	104	37	50	46	54	38	38	50	50	77	45
74	x		x			x	18	114	50	47	58	56	47	65	57	72	70	50
75	x		x	x			17	104	35	36	44	42	50	56	46	55	72	46
76	x		x	x			19	103	34	45	38	60	32	47	52	47	52	60
77	x		x	x			19	118	50	50	50	50	52	62	57	46	48	72
78	x		x				17	121	58	60	58	57	42	58	54	44	52	70
79	x		x			x	18	112	58	46	70	50	50	71	57	55	70	38
80	x		x				17	104	56	55	52	42	55	55	60	67	63	65
81	x		x		x		17	113	46	62	56	69	45	58	72	67	58	62
82	x		x				17	109	58	60	67	82	45	72	78	69	86	65
83	x		x			x	21	117	45	47	40	40	50	45	50	47	48	50
84	x		x				18	103	56	65	62	67	54	45	60	69	70	55
85	x		x			x	20	112	43	47	48	62	50	47	58	58	72	60

No.	SAMPLE						ACT COMP.	IQ	MMPI SCALE T SCORES									
	Total	Male	Female	SHS	MHS	LHS			Hs	D	Hy	Pd	Mf	Pa	Pt	Sc	Ma	SI
86	x		x	x			17	117	42	46	39	60	60	52	48	55	58	56
87	x		x			x	17	120	46	46	46	60	58	52	64	60	70	62
88	x		x	x			21	104	46	42	57	50	52	47	40	42	40	55
89	x		x			x	17	108	39	54	56	54	50	45	59	49	39	60
90	x		x		x		17	113	40	50	50	62	46	40	40	40	48	45
91	x		x				18	108	50	57	54	60	50	63	63	63	71	60
92	x		x	x			17	110	52	42	60	67	52	65	50	54	62	42
93	x		x		x		17	111	32	45	33	65	47	82	50	56	78	50
94	x		x			x	17	121	45	37	42	52	50	76	70	78	86	46
95	x		x			x	17	103	60	70	80	70	63	62	70	70	70	45
96	x		x	x			17	109	50	42	57	70	40	52	52	54	52	40
97	x		x				20	106	36	34	40	74	50	82	65	66	78	45
98	x		x		x		20	118	50	47	46	41	44	58	38	40	57	45
99	x		x	x			18	107	50	51	55	54	40	45	60	52	58	55
100	x		x	x			19	107	76	60	81	66	30	79	69	70	79	50

APPENDIX D

SAMPLE DISTRIBUTION, ACT COMPOSITE SCORES, OTIS QUICK-SCORING MENTAL ABILITY TEST SCORES, AND MMPI CLINICAL SCALE T SCORES OF NONPROBATIONARY STUDENTS

No.	SAMPLE						ACT COMP.	IQ	MMPI SCALE T SCORES									
	Total	Male	Female	SHS	MHS	LHS			Hs	D	Hy	Pd	Mf	Pa	Pt	Sc	Ma	SI
1	x	x		x			20	108	45	50	52	65	40	52	52	50	53	42
2	x	x					17	113	47	57	52	52	62	55	55	55	42	60
3	x	x					17	106	45	47	50	52	52	58	56	50	50	67
4	x	x					21	118	38	28	50	52	38	47	50	50	72	37
5	x	x				x	18	107	52	62	58	55	47	55	75	65	50	68
6	x	x		x			19	112	52	57	60	65	43	57	50	50	52	44
7	x	x			x		19	113	40	48	45	40	48	45	50	35	45	54
8	x	x					21	113	57	48	58	67	38	58	57	57	45	45
9	x	x					17	108	56	50	57	52	54	58	67	67	53	55
10	x	x		x			19	117	47	48	55	42	62	61	47	45	45	58
11	x	x		x			20	105	55	47	65	62	57	57	59	62	60	37
12	x	x		x			19	116	47	52	48	42	47	47	43	40	52	48
13	x	x					17	105	52	45	48	48	48	46	58	53	53	62
14	x	x					18	108	42	45	47	62	46	40	50	50	80	45
15	x	x				x	20	113	58	45	50	62	40	53	56	56	60	50
16	x	x					21	112	47	47	47	47	68	58	70	67	62	58
17	x	x			x		19	110	47	32	45	52	42	47	40	45	62	47

No.	SAMPLE						ACT COMP.	IQ	MMPI SCALE T SCORES									
	Total	Male	Female	SHS	MHS	LHS			Hs	D	Hy	Pd	Mf	Pa	Pt	Sc	Ma	Si
18	x	x		x			21	114	52	34	57	62	58	52	40	42	50	38
19	x	x				x	18	104	46	58	52	65	72	45	55	53	55	42
20	x	x		x			19	114	52	62	48	48	75	47	47	48	26	64
21	x	x		x			18	111	62	63	68	62	50	58	58	58	45	48
22	x	x				x	21	115	53	53	53	57	34	47	58	58	60	50
23	x	x			x		21	115	50	50	50	46	55	38	55	52	55	65
24	x	x		x			18	114	48	40	58	60	65	52	50	47	58	48
25	x	x				x	19	112	38	50	45	52	55	62	67	50	65	68
26	x	x					18	103	44	45	45	48	40	53	45	50	43	55
27	x	x			x		19	108	37	42	45	50	37	45	32	40	65	42
28	x	x				x	20	112	50	49	57	58	42	53	43	46	50	65
29	x	x		x			19	114	47	35	48	48	68	56	48	60	63	55
30	x	x				x	18	111	70	60	62	75	45	67	70	85	60	67
31	x	x			x		19	103	45	52	48	65	50	52	60	56	50	60
32	x	x					19	114	52	57	60	57	63	57	48	52	41	47
33	x	x					21	112	47	38	50	5[illegible]	70	62	55	58	60	45
34	x	x					21	112	47	38	50	54	70	62	55	58	60	45

No.	SAMPLE						ACT COMP.	IQ	MMPI SCALE T SCORES									
	Total	Male	Female	SHS	MHS	LHS			Hs	D	Hy	Pd	Mf	Pa	Pt	Sc	Ma	Si
35	x	x			x		17	110	52	37	56	48	54	67	55	50	54	47
36	x	x		x			21	109	55	47	65	55	58	62	72	65	48	57
37	x	x					18	113	40	60	50	55	48	57	58	51	52	52
38	x	x					17	112	48	48	65	55	68	70	60	56	58	67
39	x	x		x			17	108	45	55	52	48	50	65	58	50	54	37
40	x	x					21	117	52	50	54	60	45	52	54	50	52	48
41	x	x			x		19	110	65	80	65	75	68	70	72	82	75	65
42	x	x				x	20	117	52	60	48	65	63	66	63	68	78	62
43	x	x				x	17	110	40	50	45	55	40	50	45	35	35	48
44	x	x		x			19	105	52	46	45	50	57	52	60	55	50	42
45	x	x		x			17	110	55	62	52	68	65	70	96	87	80	60
46	x	x			x		21	112	52	38	67	52	50	65	52	54	70	40
47	x	x		x			20	114	48	58	54	40	78	57	62	52	58	55
48	x	x				x	21	109	45	45	37	62	58	50	74	72	70	60
49	x	x				x	18	109	40	52	51	68	58	56	67	58	50	48
50	x	x					19	111	40	70	47	49	58	65	82	60	52	72
51	x	x			x		18	115	48	48	60	54	55	54	54	45	55	45

No.	SAMPLE						ACT COMP.	IQ	MMPI SCALE T SCORES									
	Total	Male	Female	SHS	MHS	LHS			Hs	D	Hy	Pd	Mf	Pa	Pt	Sc	Ma	Si
52	x	x					18	104	47	52	52	57	57	58	60	52	44	60
53	x	x					18	103	47	62	54	65	72	50	58	50	56	45
54	x	x			x		20	115	45	50	52	42	75	55	52	52	42	45
55	x	x					20	118	47	36	45	48	45	50	42	43	65	52
56	x	x		x			18	111	62	74	62	65	75	65	85	85	68	75
57	x	x					20	115	55	57	60	52	47	50	45	40	40	42
58	x	x		x			21	117	38	47	47	50	65	64	45	48	35	65
59	x	x				x	19	111	65	65	65	53	62	65	78	82	58	65
60	x	x			x		17	105	35	33	42	35	50	46	36	32	68	40
61	x	x			x		17	104	47	40	47	50	57	52	54	54	54	50
62	x	x					18	111	40	57	60	62	58	47	58	53	58	48
63	x	x			x		19	110	47	65	42	52	75	56	72	65	45	68
64	x	x				x	20	111	50	58	52	67	67	35	60	50	50	63
65	x	x					18	117	57	48	58	50	59	47	60	57	59	46
66	x	x			x		21	111	52	47	47	40	50	58	62	50	38	78
67	x	x		x			19	103	45	32	54	50	50	47	55	62	68	42
68	x	x				x	19	111	46	32	42	38	51	50	50	47	59	46

No.	SAMPLE						ACT COMP.	IQ	MMPI SCALE T SCORES									
	Total	Male	Female	SHS	MHS	LHS			Hs	D	Hy	Pd	Mf	Pa	Pt	Sc	Ma	SI
69	x	x				x	19	104	45	40	45	48	35	38	40	55	48	48
70	x	x				x	19	109	48	58	48	67	58	62	70	62	68	55
71	x		x				19	114	45	48	52	48	40	50	57	53	52	40
72	x		x		x		20	106	42	57	55	75	48	53	58	56	58	55
73	x		x				18	111	47	50	42	74	40	40	47	55	62	47
74	x		x				18	107	48	46	65	47	47	45	42	40	48	52
75	x		x			x	17	106	45	36	55	48	40	47	49	50	60	36
76	x		x			x	21	113	47	47	49	58	40	57	42	40	44	42
77	x		x			x	20	116	52	52	48	55	57	57	48	46	48	63
78	x		x				20	111	52	53	60	53	38	62	60	52	40	47
79	x		x		x		18	103	45	42	45	57	45	52	52	48	65	48
80	x		x	x			20	111	45	40	55	57	57	53	50	50	58	42
81	x		x				18	103	48	42	58	65	42	65	58	65	60	55
82	x		x	x			19	103	38	55	52	62	35	46	48	47	35	75
83	x		x				17	105	55	54	55	50	50	45	61	57	50	60
84	x		x		x		17	106	42	30	45	38	52	47	42	40	58	45
85	x		x		x		17	104	47	42	47	50	62	45	50	52	50	40

No.	SAMPLE						ACT COMP.	IQ	MMPI SCALE T SCORES									
	Total	Male	Female	SHS	MHS	LHS			Hs	D	Hy	Pd	Mf	Pa	Pt	Sc	Ma	Si
86	x		x			x	21	113	47	47	57	50	50	45	47	47	52	40
87	x		x		x		17	111	50	48	55	50	28	50	48	47	62	47
88	x		x			x	18	114	58	45	57	55	45	50	50	50	50	50
89	x		x				18	115	42	48	50	60	58	56	53	52	48	50
90	x		x		x		20	113	45	47	50	48	46	62	60	47	43	58
91	x		x		x		19	106	48	48	42	50	44	50	50	55	58	50
92	x		x	x			18	111	45	48	57	46	40	52	50	46	45	60
93	x		x			x	18	106	38	48	57	50	52	58	50	54	78	60
94	x		x	x			19	115	47	48	42	50	37	65	55	58	48	65
95	x		x				18	104	50	46	52	48	46	46	40	46	42	57
96	x		x	x			20	108	38	52	47	42	38	60	45	40	38	63
97	x		x		x		20	112	48	46	52	57	58	50	45	47	50	42
98	x		x		x		17	112	47	45	57	52	52	55	58	50	54	50
99	x		x	x			20	110	45	47	45	62	37	65	54	53	60	62
100	x		x		x		19	103	45	46	52	52	38	45	45	66	52	47