THE RELATIONSHIPS BETWEEN COLLEGE APITUDE, RACE, COLLEGE HOURS COMPLETED, AND P-PST SCORES FOR EDUCATION STUDENTS IN TEXAS PUBLIC COLLEGES AND UNIVERSITIES

DISSERTATION

Presented to the Graduate Council of the North Texas State University in Partial Fulfillment of the Requirements

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By

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The purpose of this study was to determine the relationships between the scores of students on the Pre-Professional Skills Test (P-PST) and the scores of students on college aptitude tests, the race of students and the number of college hours that students had completed.

The subjects who participated in this study were education students who sought admittance to Texas public colleges and universities and took the P-PST in March, 1984. A total of 642 students participated in the study, 512 White or other, 48 Blacks and 82 Hispanics. P-PST scores, race, number of college hours completed, and college aptitude scores were obtained from the student's college or university as a result of the signed release forms each student completed at the March, 1984 testing date.

The data were statistically analyzed by two techniques. A correlation analysis determined significant relationships among variables of the study. The stepwise multiple linear regression procedure determined the best combination of variables to predict a student's score on the P-PST.
Significant relationships were determined between P-PST scores and college aptitude scores and race. No significant relationship was determined between college hours completed and P-PST scores for Hispanics and Blacks. One exception existed for Blacks, P-PST Math and college hours completed. Whites and total students had low correlations between college hours completed and P-PST scores. It was concluded through the regression analysis that college aptitude scores and race were the most consistent factors for predicting students' scores on the Pre-Professional Skills Test (P-PST).

Recommendation was made that prediction equations be used by colleges to identify students who will experience difficulty in scoring passing grades on the P-PST. Those identified students should then be given the opportunity to take non-credit basic skills classes to prepare them to take the P-PST.
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CHAPTER I

INTRODUCTION

The 1980's may well be remembered as the decade of the teacher competency movement. Vlaanderen (34) described the movement to test teachers as the new, hot subject in education. Hathaway (13) reported that state legislatures, boards of education, and local school boards were turning to tests for teachers as the means to ensure teacher competency. The pressure from the public sector to assure quality teaching is greater than the pressure of the 1960's, stated Seeley (30). Reports by Foote (6) indicated that eighty-five percent of the adults in the United States favor testing teachers to guarantee quality in the teaching profession.

As early as the 1979 Gallup Poll (8), the public listed improving the quality of teaching as the most important variable in gaining the constituents' respect, even more important than discipline. The American Federation of Teachers and the National Education Association both opposed competency testing for teachers already certified by states. Karagan (15) suggested that local school boards have often bowed to the pressure of teacher unions and failed to demand teacher competency.
There is no doubt that the legislatures and state boards of education across the country have demanded that prospective teachers display proficiency on externally administered examinations concluded Yalow and Popham (37). Twenty states required prospective teachers to take a nationally normed test such as the National Teacher Examinations (NTE) or a state criterion referenced test as recorded by Vlaanderen (34) in 1983.

A defense for testing teachers was offered by Weaver (35) as he reported Scholastic Aptitude Test (SAT) verbal and quantitative scores of college-bound high school seniors planning to major in education were well below average. Weaver (35) strongly suggested that new teachers should be able to read and write sentences, recognize common words, add, subtract, and multiply numbers with at least average proficiency. Holley (14), in assessing a survey of teachers, administrators, parents, and students, concluded that testing teachers may be the only way to establish a minimum competence level.

There is disagreement and debate within the American education community over whether tests are a worthwhile means of ensuring teacher competency. Cole (3) cautioned against hastily conceived tests of minimum competency. In the history of competency testing, McPhail (16) suggested that competency testing in the past has failed because of poorly designed and non-validated testing programs. Borg (2)
stressed the need for field testing and reliability and validity studies before competency testing is implemented by the various states.

In a study prepared for the State of New Mexico, Hall (10, 11) advocated testing prospective teachers in basic skills and specialization before issuing certificates. Parker (21) indicated from a survey of 206 teachers, administrators, parents, and students that teachers needed more work in English. Rosner and Gandy (28) noted in the revision of the Commons Exam of the National Teacher Examinations, that reviewers requested more emphasis on communication skills.

In Texas, the Legislature and State Board of Education believed that the State would have teachers of the highest caliber if both a screening and certification proficiency test were required of prospective teachers (36, 37, 38, 39). In October, 1982, the Texas State Board of Education adopted the Pre-Professional Skills Test (P-PST), published by the Educational Testing Service (ETS) as a basic skills screening device for admission to an approved Texas teacher education program. The first testing occurred in March, 1984. A certification proficiency test will be instituted in 1985.

The momentum is very strong behind the movement to some form of minimum competency testing. The previous comments indicated the necessity of accepting the inevitability of
minimum competency testing and studying the more widely accepted tests and factors which might be indicative of performance on those tests. The Texas Education Agency desired to develop information regarding factors which were indicative of Pre-Professional Skills Test performance. Local school districts were concerned with improving the quality of education. By developing information which could be used to improve P-PST scores, the pool of available, qualified talent would be broadened. This will allow local school districts to be more selective in choosing new teachers. This study was undertaken to address these recognized needs.

Statement of the Problem

The problem of this study was an analysis of the correlation between College Aptitude tests, race, college hours completed and Pre-Professional Skills Test (P-PST) scores to determine if relationships exist between and among the variables.

Purposes of the Study

The purposes of the study were to

1. Determine the relationship of the students' total College Aptitude scores to total Pre-Professional Skills Test (P-PST) scores both for the total sample and for each racial classification;

2. Determine the relationship of the students' College Aptitude Verbal scores to the Pre-Professional Skills Test
(P-PST) Writing and Reading scores, both for the total sample and for each racial classification;

3. Determine the relationship of the students' College Aptitude Quantitative scores and Pre-Professional Skills Test (P-PST) Mathematics scores, both for the total sample and for each racial classification;

4. Determine the relationship of the students' college hours completed to Pre-Professional Skills Test (P-PST) total scores, both for the total sample and for each racial classification;

5. Determine the relationship of the students' college hours completed to Pre-Professional Skills Test (P-PST) Reading, Writing and Mathematics scores, both for the total sample and for each racial classification;

6. Determine if College Aptitude scores, race, and college hours completed can predict students' Pre-Professional Skills Test (P-PST) scores.

Hypotheses

Based on the analysis of the related literature, the following hypotheses were formulated.

1. There is no significant difference in the correlation of total American College Test (ACT) scores with total Pre-Professional Skills Test (P-PST) scores and the correlation of total Scholastic Aptitude Test (SAT) scores with total Pre-Professional Skills Test (P-PST) scores.
II. A statistically significant correlation exists between College Aptitude total and Pre-Professional Skills Test (P-PST) total for students of each racial group taken separately or together as a whole.

III. A statistically significant correlation exists between College Aptitude Verbal scores and Pre-Professional Skills Test (P-PST) Reading scores for students of each racial group taken separately or together as a whole.

IV. A statistically significant correlation exists between College Aptitude Verbal scores and Pre-Professional Skills Test (P-PST) Writing scores for students of each racial group taken separately or together as a whole.

V. A statistically significant correlation exists between College Aptitude Quantitative scores and Pre-Professional Skills Test (P-PST) Mathematics scores for students of each racial group taken separately or together as a whole.

VI. A statistically significant correlation exists between number of college hours completed and total Pre-Professional Skills Test (P-PST) scores for students of each racial group taken separately or together as a whole.

VII. A statistically significant correlation exists between college hours completed and Pre-Professional Skills Test (P-PST) Reading scores for students of each racial group taken separately or together as a whole.
VIII. A statistically significantly correlation exists between college hours completed and Pre-Professional Skills Test (P-PST) Writing scores for students of each racial group taken separately or together as a whole.

IX. A statistically significant correlation exists between college hours completed and Pre-Professional Skills Test (P-PST) Mathematics scores for students of each racial group taken separately or together as a whole.

X. A prediction equation with a statistically significant R Square will be found where the total Pre-Professional Skills Test (P-PST) score is the dependent variable and some combination of College Aptitude Verbal scores, College Aptitude Quantitative scores, college hours completed, and race are the independent variables.

XI. A prediction equation with a statistically significant R Square will be found where Pre-Professional Skills Test (P-PST) Reading score is the dependent variable and some combination of College Aptitude Verbal score, College Aptitude Quantitative score, college hours completed, and race are the independent variables.

XII. A prediction equation with a statistically significant R Square will be found where Pre-Professional Skills Test (P-PST) Writing score is the dependent variable and some combination of College Aptitude Verbal score, College Aptitude Quantitative score, college hours completed, and race are the independent variables.
XIII. A prediction equation with a statistically significant R Square will be found where Pre-Professional Skills Test (P-PST) Mathematics score is the dependent variable and some combination of College Aptitude Verbal score, College Aptitude Quantitative score, college hours completed, and race are the independent variables.

Background and Significance

Testing teachers for certification requirements was not a new idea said Vlaanderen (34). Not since the earliest days of the nation's history, however, had it been so widely applied. In colonial America oral and written exams were administered by school boards or county superintendents. By 1825, certification required only the satisfactory completion of a prescribed curriculum at approved institutions. The testing of teachers for certification was ignored. This was the primary basis of certification in existence until the challenge of the 1980's.

By 1976, only four states (North Carolina, South Carolina, West Virginia and Mississippi) required passing the National Teacher Examinations (NTE) as a condition of certification. Before that time twenty-three states used the NTE for purposes such as validating credits from an unaccredited institution or certification in special areas. In 1977, The NTE's use as a screening test for certification was challenged as being discriminatory in the case of United
States v. South Carolina (13, 37). The United States Supreme Court ruled in January, 1978, that South Carolina did not discriminate against Blacks by using the NTE to certify teachers even though the standards applied disqualified many more Blacks than Whites. According to Hathaway (13) the teacher testing movement gained momentum from this landmark ruling.

Florida and New Mexico have developed extensive teacher testing programs as a result of legislative action (5,10,11). They were most similar to Texas in that they required a basic skills test plus a specialization test. At present, twenty states have instituted a testing program for prospective teachers (34).

Tests for subject specialization have been developed nationally for vocational teachers (17,19,20). Tests for foreign language teachers were developed in the State of New York (12). A national assessment program for science teachers has also been finalized (17,18).

Panitz and Olivo (19,20) found that the occupational competency tests for vocational teachers have raised professional recognition of these teachers, improved their teacher competence, and improved vocational education. Popham (23) suggested that vocational tests be tied to competency based teacher education programs.

McPhail (16) reported a study of the NTE scores attained by identified excellent teachers in the State of
South Carolina. The results indicated that the successful teachers made above average scores on the examinations. Teachers with advanced degrees were likely to rate higher on the examinations than those with lesser degrees. The results also indicated that a successful NTE score might indicate the attainment of the education generally expected of college graduates.

Louisiana was added to the states using the NTE when the state superintendent chose it as the means of meeting a legislative requirement in 1977 that teachers pass a test as a condition of certification. Tarver and Carr (32) in a study of the relationship of the NTE to factors such as the ACT overall score, ACT Math, ACT English, and grade point average found that the best single predictor of NTE composite scores is the ACT overall scores.

The Southern Regional Education Board (31) highlighted a study investigating the relationships between the NTE Area Tests and the Georgia Department of Education Teacher Certification Tests (TCT). The TCT were criterion referenced tests designed as qualification tests for certification in Georgia (9). The correlations between the NTE Area Tests and TCT Area Tests ranged from .82 to .97, depending on the specialization subject. Bolstered by the results of the study, the Southern Regional Education Board advocated reciprocity between states in accepting test scores for teacher applicants. Noting the highly mobile teacher
population in the region (approximately one-third of Georgia's teachers were from other states), the Board believed that this reciprocity should apply to all accepted standardized tests, regardless of which one an applicant may have completed. States have been reluctant to accept this recommendation from the Southern Regional Education Board.

Andrews, Blackman and Mackey (1) investigated the usefulness of the NTE as a tool in identifying effective prospective teachers. They found few positive relationships between NTE scores and teacher performance ratings. Andrews, Blackman and Mackey (1) hypothesized that the difficulty lay with the teacher performance ratings rather than with the NTE's. More likely, the NTE does not measure the interpersonal skills necessary to effectively create positive learning situations in the classroom. The important contribution, however, of the NTE, they stated, was the objective measurement of the academic preparation of the teacher candidate. This point seems to stand, since no amount of interpersonal skill can enable a teacher to transmit information he or she does not personally possess (1).

Comparing the standard setting of the NTE to the standards of a teacher observation assessment program, Rosner (27) concluded that both approaches contribute to improving the quality of the teachers. Internal and external based verifications of professional standards would be needed to promote teacher excellence.
Numerous studies were available on the NTE, but the Pre-Professional Skills Test has not been studied (37). Very limited comparative data was available. The closest data which bear on the P-PST were those drawn from studies of the NTE. Although the examinations studied in the NTE investigations were not identical to the P-PST, the core battery NTE tests were similar because they dealt with the same subject matter, that is, reading, writing, and mathematics.

The P-PST is being used in the states of California, New Mexico, Delaware, Kansas, Indiana, and Texas. However, states differed on the form of the P-PST that they selected for use. Louisiana and Oklahoma are studying the possibility of using it in their states. The Educational Testing Service predicted that other states will choose to use it. Popham and Yalow (37) reflected that little information existed regarding any correlation between the P-PST and other factors or tests.

This study was significant in that it
1. Determined if College Aptitude scores, race, and college hours completed predicted the Pre-Professional Skills Test (P-PST) scores of a sample of students at selected state supported colleges and universities;
2. Provided a useful basis for advising and counseling students seeking entrance into teacher education colleges on when to take the test and if additional coursework is needed;
3. Provided research on the Pre-Professional Skills Test (P-PST), to determine if certain factors can predict a student's score on the P-PST. According to Dick Majetic of the Educational Testing Service, this was the first research on the P-PST;

4. Developed implications for teacher preparation curriculum. The implications influenced the area of retraining of basic skills.

Definition of Terms

These listed definitions were pertinent to the vocabulary of this study.

**College Aptitude.** American College Test (ACT) and Scholastic Aptitude Test (SAT) total scores, American College Test (ACT) verbal and quantitative scores, and Scholastic Aptitude Test (SAT) verbal and quantitative scores were used as the measure of college aptitude.

**Competency Testing.** The minimum skills, both basic and specialized, needed by teachers to instruct students in Texas schools, that are tested by either a national normed test such as the National Teacher Examinations (NTE) or a state constructed test.

**P-PST.** The Pre-Professional Skills Test designed by the Educational Testing Service (ETS) for the purpose of screening college students in the areas of reading, writing and mathematics before they may be admitted to
an approved Texas teacher education program.

**Texas Teacher Education Programs.** The professional courses in education, both general and specialized for the students' field of study. Generally, these courses begin in the junior year of college, after general studies have been completed and approximately sixty hours completed.

**Basic Assumptions**

The problem and procedures of this study were based on the following assumptions.

1. It was assumed that the subjects of this study were reflective of the total population of students required to take the P-PST for entrance into Texas teacher education programs.

2. It was assumed that subjects signed the release forms and responded honestly to the survey questions of race and number of college hours completed.

3. It was assumed that P-PST scores and the College Aptitude test scores were an accurate assessment of the student's academic ability.

**Procedures for Collection of Data**

**Population.**--The population consisted of all students in 1984, requesting entrance into a Texas teacher education program at a state college or university. There are currently thirty-three public college or university teacher education programs in the State of Texas.
Selection of sample.--Students were divided into three racial groups, in order to reflect the racial make-up of the Texas population, which is approximately 55.7 percent White, 28.1 percent Hispanic, and 15.8 percent Black. Colleges which had other predominantly White and other students were randomly selected; predominantly Hispanic and Black colleges were selected for concentrations of race. The following colleges responded affirmatively to a request from Mr. Raymon Bynum, Commissioner of Texas Education, to participate in this study: East Texas State University (Commerce), Lamar University, North Texas State University, Pan American University at Edinberg, Stephen F. Austin State University, Southwest Texas State University, Texas A&I University, and West Texas State University. All students registering to take the P-PST in these institutions were requested to sign a release form to enable previous College Aptitude test scores and P-PST scores to be obtained from their university or the Educational Testing Service. In addition, the students were asked to disclose the number of college hours completed and their race. A target sample of one hundred Blacks and one hundred Hispanics were sought for the study. This target sample was not obtained in the March testing. Another attempt was made to secure Blacks and Hispanics who took the P-PST in July, 1984, to participate in the study, but those who signed the release form were taking the P-PST a second time and would have
contaminated the results. Therefore, the sample of students was drawn from only the March, 1984, testing date.

Research design.—This was a correlational study to determine relationships among variables. The variables to be studied were: P-PST total score, P-PST Reading, P-PST Mathematics, P-PST Writing, College Aptitude total, College Aptitude Verbal, College Aptitude Quantitative, race and college hours completed. Data was collected on the variables associated with the P-PST and relationships were examined. There was no attempt to assign causality to College Aptitude scores, race or college hours completed or control any extraneous variables.

Procedures for Analysis of Data

Testing of Hypotheses

Hypothesis I was tested using Fisher's z-r transformation of the correlation coefficient.

Hypotheses II through IX were tested with the Pearson Product Moment Correlation Coefficient (22).

Hypotheses X through XIII were tested using Multiple Linear Regression as suggested by Roscoe (26). Each variable was added to the prediction equation only if it increased the R Square significantly. The final combination of independent variables entered was taken as the best prediction equation.

The prediction equation, combined with the statistical standard error of prediction, enables a counselor to
predict a student's P-PST. The dependent variable, P-PST score, was based on the combination of independent variables entered. The standard error of prediction provided a confidence interval within which the student's "true" score is likely to fall. An interval of plus or minus 1 standard error of prediction (SEP) around the predicted score gave a 68% confidence interval (CI). Plus or minus 2 SEP gave a 95% CI, plus or minus 3 SEP, a 99% CI.

Reporting of Data

Complete frequency distributions with simple descriptive statistics were presented on all variables. In addition, subpopulation breakdowns were presented; for example: P-PST total by race, ACT total by race, SAT total by race, P-PST total by ACT/SAT. Correlations of variables were also reported for each subpopulation to aid in interpreting prediction equations. Examples of this are P-PST total with College Aptitude by race, P-PST Reading, Writing, and Mathematics with College Aptitude Verbal and Quantitative by race.

All descriptive statistics that have a bearing on the major purpose of the study were reported. In this way, it was expected that the greatest amount of useful information was presented.

Chapter Two is a review of the literature concerning teacher competency testing. Methods and procedures of statistical data are presented in Chapter Three. Chapter
Four is a presentation of the statistical data. Summary conclusions and implications are given in Chapter Five.
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CHAPTER II

REVIEW OF THE RELATED LITERATURE

As with any topic of controversy, teacher competence generated extensive and varied reactions from interested persons. Tests to measure teacher competence have received even more critical analysis by researchers and theorists. In a 1978 front page story, the Dallas Times Herald (35) reported that, of the 535 new teachers in the Dallas Independent School District in 1976-77, more than one-half failed a competency test used for students thirteen years and older. Administrators, taking the same competency test, scored worse than a sample of high school students. In New Mexico, Crewdson (28) found that none of the thirteen bilingual teachers could pass a fourth grade Spanish examination. Watkins (127), in a 1980 study of Scholastic Aptitude Test scores for college-bound high school seniors, found that the 6.1 percent who planned to study education had some of the lowest scores on the test. Potential education majors had average verbal scores of 389 and average math scores of 418, compared with the national average of 424 on the verbal section and 466 on the math section for students in all fields. Weaver (128) noted that scores of education majors on the Graduate Record
Examination had significantly declined since 1970, and were substantially lower than those of majors in eight other professional fields. In a survey of 386 member institutions of the National Council for the Accreditation of Teacher Education (NCATE), Haberman (60), Twa and Green (121) reported that 344 of the institutions relied most heavily on minimum grade point averages and tended to accept almost anyone who applied.

Testing prospective teachers was the most viable means of improving teacher quality cited Shanker (107). According to Rubin (101), the potential for change lay in highly skilled teachers, since little could be done in schools to change the nature of students, their parents or their out-of-school environment. In reviewing research studies over a fifteen-year period, Smith (116) concluded that differences in student performance could only be attributed to differences among teachers. However, in a study reported by Medley (81), any part of teacher effectiveness that could be predicted from a teacher selection instrument was irrelevant to teacher competence. Only "achievement" rather than a "predictive" model should be used in testing new teachers, he further concluded. Results of a study by Coleman (22) led to the conclusion that verbal abilities of teachers had the strongest relationship to student achievement. Coleman noted that the higher the teacher's verbal ability, the higher students achieved in that teacher's class. Levin
(74) in a similar study found that a one point increase in a teacher's verbal score resulted in higher student achievement increases than did one-year increases in years of teaching experience. He further concluded that it costs much more to raise student achievement levels through hiring more experienced teachers than it did to hire teachers with higher verbal skills.

Testing teachers is a very complex task. In a report by the Public Education Association in 1981 (98), the testing program for teachers and supervisors in the New York City public schools was challenged on the grounds that the tests were discriminatory and were not job related. The result was an injunction lasting nearly ten years against written supervisory examinations. The Public Education Association concluded that the development of a valid statewide competency test for teachers was difficult, if not impossible. Popham and Yalow (96) stated that the installation of a test to screen teachers had serious implications. Certain individuals will be excluded from entering a profession which they otherwise could have selected. On the other hand, Weaver (128) reported that the elevation of standards for public school teachers may improve the overall quality of public education.

Analysis of the Pre-Professional Skills Test

In October, 1982, the Texas State Board of Education adopted a basic skills screening test, the Pre-Professional
Skills Test, which prospective Texas teachers must pass before being admitted to a state-approved teacher education program. This was generally after students completed sixty college hours. This was a tangible effort by the Texas State Board of Education to improve the quality of public schools by ensuring that new teachers had fundamental skills in reading, writing and mathematics.

The Pre-Professional Skills Test (P-PST) was a newly developed college level basic skills test constructed by the Educational Testing Service (ETS). This test was being currently used in other states. The P-PST consisted of three separate tests: one in mathematics, one in reading, one in writing. The mathematics and reading section of the P-PST had forty multiple-choice items each. The writing section had two parts. The first part consisted of forty-five multiple choice questions; the second part was a single essay question. Testing time was fifty minutes for mathematics, forty minutes for reading, and one hour for writing with thirty minutes allotted to each part.

The Texas application was the first broad usage of the P-PST. The Texas Education Agency (TEA) decided to gather evidence regarding the quality of the P-PST. Since using the P-PST excluded individuals from teacher education programs, the test must withstand legal scrutiny. The Texas Education Agency selected IOX Assessment Associates, Popham,
Yalow, and Appel to evaluate the quality of the P-PST and to secure information that would be useful in the establishment of appropriate passing standards.

Yalow and Popham (134), IOX Assessment Associates, determined a course of evaluation. First, to appraise the suitability of the P-PST, they made an effort to assess the extent to which Texas students had been provided with adequate preparation for each of the P-PST's three sections. Next, evidence was gathered regarding two aspects of content validity for each of the P-PST's sections. Yalow and Popham accepted the American Psychological Association definition of content validity, "content validity reflects the extent to which the behaviors demonstrated in testing constitute a representative sample of behaviors to be exhibited in a desired performance domain (3 p.4)." Finally, pertinent information was secured for selecting appropriate performance standards for each of the P-PST's sections.

Several recent court cases have raised the adequacy-of-preparation question regarding standardized testing. In Debra, P. v. Turlington (33,34), a high school student filed suit against the Turlington School District for failing to provide the instruction needed to pass the high school graduation tests. The judge ruled that the Florida school district had provided adequate preparation for the criterion referenced graduation tests. In U.S. v. South
Carolina (123), 1977, the plaintiffs questioned whether colleges adequately prepared all students for the National Teacher Examinations (NTE).

In examining adequacy-of-preparation for the P-PST, IOX Assessment Associates took into account three different sources of data. First, they asked Texas public school educators to review the P-PST's contents to gauge the extent of preparation provided in Texas Public Schools. Secondly, they asked newly admitted teacher education candidates in Texas colleges and universities to complete the P-PST, then indicate the degree to which they had been prepared for the test. Finally, they made a review of textbooks widely used in secondary schools to discern the extent of preparation for the P-PST provided in those texts.

Yalow and Popham assembled a panel of public school educators. The educators were drawn from 25 percent of the 252 public school districts with at least one high school. The public school districts selected had student ethnic distributions that reflected the student ethnic distribution of the state. They asked each district to send two educators, one to serve on the language arts and writing panel and one to serve on the mathematics panel. Of the 516 requested panelists, 338 attended the two hour workshop session. The language arts educator panel reviewed reading and writing; the mathematics panel reviewed mathematics.
Educators reviewed the sections that they were assigned for both item-by-item analysis and total-section analysis. They were asked to answer "yes" or "no" or "insufficient" information to the question:

"Do students in the college-preparatory program in your district have the opportunity to learn the content of this item?" (133, p. 7)

For the total test section of mathematics and reading and the multiple choice section of writing, the educators were then asked to indicate "almost all", "most", "small amount", or "almost none" regarding the amount of preparation provided to secondary public school students. In the essay portion of writing, the educators were asked to answer "yes" or "no" to the question:

"Do students in the college preparatory program in your district have the opportunity to learn how to write an acceptable essay in response to this assignment?" (97, p. 8)

Popham, Yalow and Appel (97) found that the results of the average per item score exceeded 90 percent for each section. The average was 95 percent in math, 92 percent in reading, and 94 percent in the multiple choice writing section. The educators cast a 97 percent yes vote for adequacy-of-preparation for the essay portion of the writing section.
On the total section evaluation for each of the three parts of the P-PST, 95 percent of the educator panelists indicated that preparation was provided by their districts for "almost all" or "most" of the content for each section. Overall, Popham and Yalow (96) concluded that the adequacy-of-preparation estimates by educators in Texas suggested that students in the college-preparatory programs in Texas Public Schools had been given substantial instruction to prepare them for all sections of the P-PST.

In the second evaluation of adequacy-of-preparation for the P-PST, IOX Assessment Associates asked newly admitted students enrolled in courses in Texas teacher education programs to participate in the evaluation. Of the sixty-four Texas colleges and universities that offered approved teacher education programs, fifty-five institutions sent from twenty to forty participants. In all, 1,114 students took part from the 1,500 requested by the Texas Education Agency.

Students participating in this phase of the adequacy-of-preparation evaluation were asked to take all three sections of the P-PST. After all test booklets had been collected, the respondents were then asked to indicate the proportion of the P-PST for which they had been provided preparation. Students were requested to make their responses separately for each section. They were asked to select one of four statements that best reflected the extent
of preparation received for the mathematics, reading, and writing multiple choice sections of the P-PST: "almost all", "most", "a small amount", or "almost none." For the essay section of the P-PST respondents were to answer "yes" or "no" to the question of whether they were provided with adequate preparation to be able to write the essay on the P-PST.

On the mathematics and writing multiple choice, 82 percent of the students reported being prepared for "almost all" or "most" of the P-PST sections. In reading, 90 percent of the students reported preparation for "almost all" or "most" of this section. On the writing essay, 87 percent of the students felt they had adequate preparation to be able to write the essay. Thus, the IOX Assessment Associates (135) concluded that the vast majority of students indicated that they had been prepared for "almost all" or "most" of each section of the P-PST.

In the final analysis of the adequacy-of-preparation for the P-PST, textbooks that were most frequently utilized in secondary Texas Public Schools were chosen for evaluation. Textbook analysts reviewed the sixty-seven skills that are tested in the P-PST. Next, analysts reviewed the sixty-five textbooks chosen; twenty-five in mathematics, twenty-four in reading, and sixteen in writing. A page-by-page review was done on all sixty-five textbooks with notations made of page numbers that contained
any practice on one of the sixty-seven skills measured in the P-PST. Verification experts did an evaluation of the textbook analysts' evaluation. Yalow (97) reported a high degree of agreement existed. Only one reading skill (application) and one mathematics skill (relationships in data) were found to not have relevant pages of instruction in the textbooks evaluated. Thus, Popham, Yalow and Appel (96) concluded that the page-by-page analysis of sixty-five reading, writing, and mathematics textbooks widely used in grades seven through twelve in Texas Public Schools revealed that substantial textbook material was found relevant to all but two of the P-PST's sixty-seven skills.

In the Texas P-PST study, the IOX Assessment Associates (134) found the appraisal of judges regarding adequacy-of-preparation tended to be somewhat more positive than seen in the National Teacher Examinations (NTE). Popham and Yalow (96) stated that the National Teacher Examinations Common Examination was most comparable to the P-PST, as they both measured reading, mathematics, and writing skills.

Studies of the NTE have been carried out in a number of settings. In several of those studies, an attempt has been made to judge the adequacy-of-preparation provided for the NTE. Notably, the adequacy-of-preparation evaluation has been addressed in NTE studies carried out in South Carolina (U.S. v. South Carolina, 1977) (123), North Carolina (ETS, 1976) (42), Mississippi (ETS, 1979) (40), Virginia (Cross,
L. H., 1982) (29), and Kentucky (IOX Assessment Associates, 1983) (66). For each of the P-PST's three sections, more than 95 percent of the panelists reported that preparation had been supplied for "most" or "almost all" of the examination (134). In the earlier NTE adequacy-of-preparation studies, such positive judgements were secured from only 80 percent of the participating judges (66). Popham and Yalow concluded,

"As one reviews the consistently positive results from the three sets of evidence produced in the present investigation (the positive response from our 300 Texas educators, the positive responses from more than eleven hundred Texas college students, and the textbook analyses results showing that instruction is devoted to all but a few of the P-PST skills), it is difficult to conclude that Texas students have not been given sufficient preparation to enable them to pass the P-PST (96, p.19)."

In the next large scale evaluation of the P-PST, IOX Assessment Associates investigated two dimensions of the P-PST's content validity. First, they examined the link between P-PST content and the content of teacher education programs, labeled program relevance. Second, they evaluated the extent to which P-PST content matched the content of teaching occurring daily in the public schools of Texas. This evaluation was referred to as the P-PST's job relevance.
To evaluate program relevance, at least three faculty members from each of the sixty-four teacher education programs who taught professional education courses were asked to assess the three sections of the P-PST. A total of 286 of the 308 asked actually participated. The participants were divided according to their expertise, into either the language arts, writing or mathematics sections. Each faculty member examined each item on the P-PST section assigned to them and determined if the item was necessary in order for students to succeed in teacher education preparation programs. Then the faculty was asked to evaluate the total section in each of the three sections and decide if "almost all", "most", "a small amount", or "almost none" of the P-PST's content must be known for students to succeed in their institution's teacher education program.

In the reading section, Yalow and Popham (134) reported that the faculty panelists rated 77.4 percent of the reading items program relevant. In writing multiple choice, 77.3 percent of the items were judged to be program relevant, in writing essay 89.2 percent. On the mathematics section, the faculty members reported 69.9 percent of the math test was program relevant.

On the total test evaluation, 80.4 percent of the language arts faculty felt "almost all" or "most" of the reading and writing items were necessary for one to know to succeed in a teacher education program. In the mathematics
section 73.7 percent of the mathematics faculty panel felt "almost all" or "most" of the items were necessary to know if a student were to succeed in a teacher education program in Texas (134).

In evaluating the job relevance, the second type of content validity of the P-PST, the IOX Assessment Associates used the same 338 public school educators who rated the adequacy-of-preparation for the P-PST. The educators were asked to indicate on each item of their section if students needed to know the content of the item in order to perform successfully as a teacher in Texas. The educators were assigned to the section of their expertise. Next, for the total test section, the educators were asked to indicate if "almost all", "most", "a small amount" or "almost none" of the section was necessary to know in order to perform successfully as a teacher in Texas. This form of validity, stated Yalow and Popham (134), focused on job relevance as related to the job relevance demanded of employee selection tests since the enactment of the Civil Rights Act of 1964.

The public school educators determined that in reading 88 percent of the items were relevant to success as a teacher. In math, the average per item score was 78.4 percent. In writing multiple choice, the score was 88.6 percent; on the writing essay, the score was 98.2 percent. In looking at the total test section, 95 percent of the language arts educators and mathematics educators found
"almost all" or "most" of the reading, writing and mathematics sections of the P-PST job relevant. IOX Associates (134) noted that the mathematics section received a much lower score than did the language arts sections.

Two studies of the National Teacher Examinations (NTE) are germane to job relevance. In an investigation of the NTE in Virginia, Cross (29) reported that 70-80 percent of the items on 17 NTE specialty examinations were judged important or crucially job-relevant. The IOX Assessment Associates (134) did a 1983 study of the NTE in Kentucky. Similar item-by-item percentages for twenty-two specialty examinations and the three core battery examinations were reported. In comparison, the item-by-item estimates regarding the P-PST's job relevance were substantially more positive then obtained in either of the two NTE studies, concluded Yalow and Popham (134).

In summary of the content validity studies of the P-PST, the scores for job relevance were higher than for program relevance. This was likely attributable to the basic skills format of the test, concluded Popham and Yalow (96). Texas public school teachers rated fundamentals of reading, writing, and mathematics as highly relevant to the daily responsibilities of teachers. In contrast, although basic skills were needed by college students, university educators were more concerned with students' mastery of curriculum principles, instructional psychology and methodology. On
balance, Yalow and Popham stated content validity evaluation resulted in decisive support of the P-PST (96).

In the third phase of the study of the P-PST, the IOX Assessment Associates looked at setting performance standards (or passing standards) for the three sections of the P-PST. Scoring on the P-PST was expressed in scaled scores. A raw score (number correct) on the mathematics and reading sections of the P-PST can range from 0 to 40. The scaled score for these two sections was obtained by adding 150 to the raw score. The scaled score for the writing section was computed by weighting the multiple choice and essay sections equally to obtain a weighted score ranging from 0 to 40 and adding 150 to this weighted average. Thus, the scaled scores in each section of the P-PST ranged from 150 to 190.

Three different sources of data were used to assist the Texas State Board of Education in establishing passing standards for the P-PST. The first data used to help establish passing standards was drawn from the faculty members who assisted in evaluating the program relevance of the P-PST. The second data consisted of the results of the Fall, 1983, statewide administration of the P-PST to over 1,200 college students newly enrolled in the sixty-four teacher education programs in Texas. By completing the P-PST under regular examination conditions, these students provided an estimate of the level of performance that might be expected from future students who are required to take
the P-PST. Thirdly, four groups of influential Texas citizens and educators reviewed the performance standards recommended by the faculty panelists and student performance results. The four groups included the Public School Professional Personnel Advisory Committee, Public School Board of Trustees Advisory Committee, College and University presidents from the sixty-four colleges and universities offering approved teacher education programs, and the sixty-four deans or department chairs of the approved teacher education programs.

The same 286 college and university faculty members who had supplied estimates of the P-PST's program relevance were asked to focus on appropriate performance standards for the P-PST during the same sessions in which they provided content validity judgements. The faculty panelists answered yes or no to each item of their assigned section as to whether students should know the item. Then they judged the total section test as to the total number students should get right on the total test. In mathematics, the faculty mathematics panel recommended that students get 70 percent of the items correct, or a scaled score of 178. On the total test evaluation, the panelists suggested that 65 percent of the mathematics items should be answered correctly. The language arts faculty panelists reported that in reading, students should obtain a score of at least 77 percent of the items correct, or a scaled score of 181. On the total
reading test, language arts panelists suggested that 69 percent of the total test should be answered correctly by students, or a scaled score of 177. In writing, the language arts panelists judged that 79 percent of the items on the writing test should be answered correctly, or a scaled score of 182; however, in judging the total test, they recommended students obtain a passing score on 67 percent of the total test, or a scaled score of 177. The IOX Assessment Associates (133) noted that when the faculty members rated the three sections item-by-item, they determined that a higher percentage of items should be known than when they went back to make a total-test judgment. In addition, 91 percent of the panelists believed that students should be able to write an acceptable response to the essay assignment (133).

On the second portion of the data collection, over 1,200 students actually took the P-PST. The predominant ethnic group was White and others (851 examinees). There were 165 Blacks and 215 Hispanics. Participating students' mean scaled test scores for mathematics were 173 for the total population, 164 for Blacks, 169 for Hispanics, and 177 for Whites and others (133). In reading, the mean scaled test scores were 174 for total students, 165 for Blacks, 169 for Hispanics and 177 for Whites and others (133). Writing mean scaled test scores were 175 for total students, 168 for Blacks, 172 for Hispanics, and 177 for Whites and others (133).
Large discrepancies between ethnic groups at almost all score points were found, with Whites and others consistently outscoring Blacks and Hispanics. Whites and other examinees had the highest mean score on all three sections of the P-PST and, the Black examinees had the lowest mean on all three sections of the P-PST reported Yalow (133).

In the third phase of setting passing standards, the IOX Assessment Associates asked influential Texas citizens and educators to recommend appropriate performance standards for the P-PST. From the thirty-four Public School Professional Advisory Committee members, nineteen participated. Of the thirty-one members of the Public School Board of Trustees Advisory Committee, sixteen responded. In the sixty-four colleges and universities with approved teacher education programs, twenty-eight presidents responded and forty-one deans or chief administrators of the teacher education programs responded.

After examining the evidence of the P-PST's content validity and the adequacy of preparation studies, the standards advisors (or influential citizens) studied the faculty recommended passing standards and the student performance data. On the basis of all this information, the standards advisors were asked to recommend performance standards for the P-PST by indicating a scaled score value for each of the three sections of the examination. As a group, the standards advisors recommended a performance
standard of 171 for mathematics, 172 for reading, and 173 for writing reported Yalow (133). These recommended performance standards corresponded to students correctly answering 53 percent of the mathematics items, 55 percent of the reading items, and 57 percent of the writing items.

The Education Testing Service (41,44) had done field testing to establish norms for the P-PST. They had set a mean of 175.97 for math with a standard deviation of 7.33, a mean of 175.44 for reading with a standard deviation of 7.33, and a mean 175.47 for writing with a standard deviation of 5.95. In an independent study, the Educational Testing Service (41) administered the P-PST to 2,400 Houston Independent School District teachers. The data was treated as a separate case study of basic skills demonstrated by practicing teachers. On the mathematics section, the teachers had a mean score of 173.9 with a standard deviation of 8.50. The Houston teachers scored 174.3 in reading with a standard deviation of 7.67. In the writing section, they compiled a mean score of 175.4 with a standard deviation of 6.27.

The Texas State Board of Education considered all the data from the performance setting: the data from the faculty panel, the data from the students' testing, the data from the valued Texas citizens and educators, and the normed data from the Educational Testing Service. In studying the data for performance setting, the Board of Education decided to
set a passing score of 171 in mathematics, 172 in reading and 173 in writing, the recommendations of the valued citizens and educators group.

On March 3, 1984, the state administered the first official session of the Pre-Professional Skills Test. Students must pass all three parts of the test before they can be admitted to teacher education programs. The Educational Testing Service (41) reported that of the 2,700 students taking the first test, 70 percent passed the mathematics section, 73.3 percent passed the reading portion and 66.8 percent passed the writing test. Of the 436 Hispanics who took the test, 19 percent passed all three tests, while 10 percent of the 126 Blacks and 62 percent of the 2,133 Whites passed (41). The Texas State Board of Education determined that examinees will have three opportunities to pass the P-PST.

Popham and Yalow (95, 96) concluded that, regarding the issues which have been the subject of test-related litigation in recent years, namely, content validity and adequacy-of-preparation, the P-PST appeared acceptable. However, they cautioned that the performance of minority applicants (Blacks and Hispanics) was likely to be markedly lower than Whites and others. Popham (96) suggested that a solution to this dilemma was to provide test applicants with targeted instruction regarding the test contents so that reasonable numbers of minority students could pass the
P-PST. The targeted instruction should not be "teaching to the test." It should be teaching the concepts and skills represented by the test.

Conclusion

The Texas State Legislature mandated that students entering a teacher education program in Texas be given a basic skills test. The Texas State Board of Education adopted the Pre-Professional Skills Test developed by the Educational Testing Service. Students must make a scaled score of 171 in mathematics, 172 in reading, and 173 in writing in order to enter a teacher education program in Texas. Much work was done to ensure that the Pre-Professional Skills Test had content validity and that students had adequacy-of-preparation.

Analysis of the National Teacher Examinations

The Educational Testing Service (41) indicated that no research studies had been completed on the P-PST. Yalow and Popham (134) stated that the National Teacher Examinations Common Examination (NTE) was the most comparable to the Pre-Professional Skills Test (P-PST) as both test reading, mathematics, and writing skills.

The National Teacher Examinations were comprised of two sections: Common Examinations and Area Examinations. The Common Examinations had a Professional Education Examination, a Written English Expression Examination, a Social
Studies, Literature, and Fine Arts Examination, and a Science and Mathematics Examination. The Professional Education Examination was reported in a weighted subtotal and the Written English Expression, the Social Studies, Literature, and Fine Arts, and the Science and Mathematics examinations were combined in a second weighted subtotal. The combination of these two weighted subtotals and a weighted combination of them were called the Weighted Common Examination Total (WCET)(126).

The second section of the National Teacher Examinations was the Area Examinations. There were twenty-six Area Examinations, or specialties areas. The score on the Area Examination and the score on the WCET were combined for a composite National Teacher Examinations score (13).

In a study of 119 teachers, Sheehan and Marcus (110) found a positive relationship between teacher WCET scores and pupil achievement scores on the vocabulary and mathematics subtest of the Iowa Tests of Basic Skills. They further stated that the WCET was a significant predictor of student class average gains. In adding race to the regression analysis, WCET scores were no longer significant predictors of student achievement.

Medley and Quirk (81) reported that Blacks scored 27 percent higher when sixty-five general cultural items on the WCET were rewritten reflecting Black culture. They concluded that the National Teacher Examinations were culturally biased.
Johnson (68), in a study of the correlations of the NTE with other standardized tests, reported that the NTE is significantly correlated with the Graduate Record Examination. He suggested that the NTE and other tests of verbal and mathematical abilities in education, including achievement tests, involved similar kinds of aptitudes.

Investigations of similar research were conducted by Duncan (36), Eissey (46), Walberg (125), and Elting (47). Looking at WCET and college grade point averages, they concluded that WCET scores and undergraduate grade point averages correlated fairly closely. McCamey (77), Seagoe (106), and Shea (109) in earlier studies also validated this correlation.

Ayers and Qualls (7), in closely related studies, stated that the WCET was significantly correlated with undergraduate grade point average. However, American College Testing Scores (ACT) were better predictors of Weighted Common Examination Total scores and Teacher Area Examinations of the National Teacher Examinations than were undergraduate grade point averages. Similarly, Ayers and Rohr (6) identified that ACT scores were better predictors of WCET and Teaching Area Examination scores on the National Teacher Examinations than grade point averages of undergraduate college students.

Looking at the relationship of National Teacher Examination Scores and principal ratings of teaching
effectiveness, Quirk, Witten, and Weinberg (99) reported no significant correlations. Ayers and Qualls (7) reported similar findings.

Reporting different findings was Brown (11). Brown found in a study of secondary teachers that the Teaching Area Examinations on the National Teacher Examinations were significantly related to principal ratings of secondary teachers. Merwin (82), in a review of research related to the NTE, reported that there is much evidence to support a median correlation between WCET scores and ratings given by principals during a teacher's first year. Simpson (113) concluded in a study of WCET scores and actual teacher performance, that WCET scores were not good predictors of teacher performance. Thacker (121) and Brown (11) expressed similar findings.

In still another study of the National Teacher Examinations and teacher performance, Shields and Daniels (111) stated that the NTE is one of the best indicators of teacher performance. They cautioned school districts against using NTE scores as the only selection criterion for teachers. Leiser (72) stressed the need for teachers to be competent in the English language before they are hired.

Mitchell (84) expressed a similar opinion in stating that NTE scores should be only one quality among many used in evaluating teacher competence. Holtzman (62) concluded that there was no empirical evidence to show that the
National Teacher Examinations have ever been validated for job ability. Buros (13) cautioned that the NTE has a questionable claim in terms of predicting who will be an effective teacher. Wandt (126) supported this statement in saying that the National Teacher Examinations should not be utilized for selection or licensing purposes.

Seashore (107) viewed the National Teacher Examinations as useful in identifying good teachers in that they test basic skills and subject knowledge. In stating that the National Teacher Examinations were the "best now available," Brownswell (12) urged school administrators to use test scores, but to, also, supplement this information with other data. Willie (131) stated that school districts should consider truth and honesty above scores on tests in selecting teachers.

Conclusion

The National Teacher Examinations were used as an exit test from college by many states. Researchers have conducted extensive analyses of the National Teacher Examinations regarding test suitability and job correlation. Some of these tests have produced conflicting results. However, most researchers felt the NTE had merit as one indication of knowledge and skills. It has already stood at least one courtroom test. The researchers generally agreed that the National Teacher Examinations were one, but not the only, factor that needed to be considered in the selection of teachers.
Analysis of College Aptitude Tests

The two most widely used college aptitude tests are the Scholastic Aptitude Test (SAT) and the American College Test (ACT). Researchers have conducted numerous studies of both tests attempting to validate their abilities to predict college aptitude and performance. The results of these studies have been mixed and conflicting.

The Scholastic Aptitude Test had two sections, Verbal and Quantitative. Scores were reported for each section, as well as a total for both sections. Each section had a mean scaled score of 500, with a total mean of 1,000. The American College Test had five component scores. They were English, Math, Social Studies, Science, and Composite. Each component had a mean score of 20 with 5 as a standard deviation.

Larson and Scontrino (71) conducted an eight-year study of the ability of the SAT and high school grades to predict college grade point average. They reported a highly significant correlation. Chisson and Lanier (18) found the same high correlations between SAT and high school record and grade point average in college, as did the College Entrance Examination Board (23). In a study of seniors in college, Hills, Bush, and Klock (63) reported high multiple correlations between senior cumulative grade point average and SAT verbal and quantitative and average high school grades. Zeleznik, Hojat, and Veloske (137) discovered that,
using medical students as the population in a ten-year study, the SAT's predictive value of cumulative grade point average was high. The predictive quality of the SAT was particularly strong when SAT scores were in the upper twenty-fifth percentile.

Ford and Campos (51), in a 1964-1974 study of the admissions program of colleges participating in the Validity Study Service, determined that the SAT verbal and quantitative scores were more stable in predicting college grades over the four-year period than were high school grades. Manger and Kolmodin (75), in a similar study of 318 sophomore students, found that SAT verbal and math scores had sufficient validity to predict cumulative grade average for those students when they reached their senior year. They reported that the SAT would have even stronger predictive ability if senior students were tested using achievement tests. In looking at correlations between the SAT and grade point average, Siegelman (112) found that the SAT had high predictive value for grade point average as number of college credits increased, particularly for females.

In predicting success on the College Level Examination Program, (CLEP), Gusset (59) determined that SAT verbal and math scores had a high correlation. The higher the SAT score, the higher the CLEP score was.
McDonald and Gawkoski (79) found moderate correlations between grade point averages of honor students and SAT scores at Marquette University. Humphries, Levy and Taber (65) discovered that the SAT could predict grades of high academic students better than it could lower academic students.

Goldman, Schmidt, Hewitt and Fisher (56) reported that the SAT is a better predictor of college performance when measured within homogeneous categories of academic work. In another study, Goldman and Slaughter (57) examined five undergraduate classes at the University of California at Riverside and found that SAT scores were more valid predictors of single class grades than overall grade point average.

Kaplan (70) stated that the SAT added a significant increment to high school grades in predicting college aptitude. He argued that high school grades are an unstable variable; and, if colleges did not use the SAT or ACT, the colleges would tend to admit all students. VanDusen (124) reported that fewer than two percent of universities used either the SAT or ACT as an important variable in admissions. Astin, King and Richardson (5) stated that few colleges used just the SAT or ACT exclusively for admissions; and, 95 percent of all students were admitted to the college of their first or second choice. Citing the fact that grades vary greatly from high school to high school, Jackson and Weitzman (67, 129) urged colleges to use the SAT or ACT
as an important admissions criterion. Breland and Griswold (9, 10) reported that SAT and ACT scores were declining and college grades were higher in a study of grade inflation.

In conflicting data, Nairn and Associates (85, 86) reported that SAT scores are no better than chance for predicting first-year college performance. Fields (50) also agreed with Nairn. Widerstrom and Jengeleskin and Chansky (130) found that, for undergraduate law students, SAT scores were relatively weak predictors of freshman grade point average.

Chansky (16) found that SAT scores varied in predictability of freshman grade point average in six different curriculum areas. The highest prediction was in math and science, and the lowest was in education.

In a thirteen-year study of the use of SAT scores and high school grades in predicting college grades, Dalton (30) discovered that both SAT and high school grades were decreasing in predictive ability. Michael and Jones (83) reported that in a five-year period at the University of Southern California, SAT and high school average decreased in predictive validity for freshman grade point averages.

In comparing SAT scores to achievement test scores, Coffman (21) found that achievement test scores were better predictors of college grade point averages than were SAT scores, except in the area of English composition. Durio
(37) reported that the Mathematics Achievement Test, Level 1, was more heavily correlated with freshmen engineering grades than was the SAT Quantitative score.

The Educational Testing Service (44) admitted that high school grades had a high prediction value for college grades, but insisted that the SAT was nearly as good and the two together were better than either one. Emphatically stating that in 100 percent of the cases the SAT was a more accurate predictor of college aptitude than a random process, the Educational Testing Service defended the SAT.

In examining the American College Test (ACT) studies, a similarly conflicting picture emerged. Sawyer and James (104) studied 206 colleges from 1972-1977 and concluded that the ACT was a more stable predictor of college grades than were high school grades. Rowan (101) reported that ACT English and Social Studies subtests had the highest correlations with grade point average. High school standing was a very invalid predictor.

Snyder and Elmore (117) conducted a study of 496 students attending a four-year college. They found that the ACT composite was a more valid predictor of college grade point average than was high school percentile rank. O'Connor and McAnulty (88) looked at the grades of 328 pre-engineering students and found that ACT scores aided in predicting college grades.
When looking at reading tests and ACT composite scores, Stiggins and others (118) found that the ACT was the most valid predictor of reading tests. Carney and Geis (14) recommended the use of ACT scores as a way to identify students in need of reading remediation.

Pickle (93) discovered that in successive semesters, ACT scores and high school grades had lower correlations to college grades. Humphries (64) reported that by the eighth semester, the correlation of ACT scores to students' college grade point averages decreased from moderate to low. In utilizing junior college students Nolan reported low correlations between the ACT and college grade point average.

Studies on college aptitude tests and minorities presented inconsistent results. Cleary (19), Humphries and Kendrick (20) reported that the SAT was equally predictable for Blacks and Whites. Sattler (103) found that the SAT had equal prediction validity for different ethnic and income groups.

Dalton (30) discovered conflicting findings. In a study of the predictive value of SAT and high school rank, he reported that the SAT was a better predictor of college grade point average for Whites than for minorities. Dalton also noted that high school rank had low correlation with college grade point average for minorities. Goldman and Widawski (58) determined that SAT scores favor upper
socio-economic students. The Educational Testing Service (43) reported low correlations between family income and SAT scores.

In a study of thirteen institutions, Temp (120), Pfeifer and Sedlacek (92), and Kallingal (69) concluded that only in a few instances was a single regression plane using SAT to predict college grades appropriate for both Blacks and Whites. Perrone (91) stressed the need to use high school grade point average for minorities, not the SAT or ACT.

Changing eighty-five culture-specific items on the English and Social Studies sections of the ACT to reflect Black culture, Schmeiser and Ferguson (105) found no increase in ACT subtest scores for Blacks. McCornack (78) completed a study of 2,000 freshmen in four ethnic groups, Hispanic, Black, Indian, and Oriental. In hypothesizing, the predictive variance of SAT and high school point average to college grades, McCornack found greatest variances for Blacks and Hispanics. He concluded that the SAT was biased.

Using the regression equation derived from a sample of Whites to predict college grades from SAT scores, Goldman and Resina (55) reported an overprediction of Hispanic children. They were more field dependent and verbally sensitive, and abstract thinking was difficult for them. Using an essay placement test and the SAT, Breland and
Griswold (10) determined that the SAT and essay tests were highly correlated. Women were underestimated and men and minorities were overestimated in predicting college grades.

Most data supported the hypothesis that the ACT and SAT predicted college achievement at about the same level, .40. Lenning (73) in a study of 120 colleges, concluded that the ACT and SAT were equally predictive but, the ACT was better in predicting college grades in highly selective institutions. Aleamoni and Oboler (2) found, in a study of 4,283 freshmen, the SAT was at least equal, if not better at predicting college grade point averages. Chase, Ludlow, Pomeroy, and Barritt (17) reported that the ACT and SAT were equally capable of predicting college grades. Boyce and Paxon (8) concurred. Astin and Hensen (4) stated that the ACT and SAT were virtually alternate forms of the same test.

Conclusions

The SAT and ACT were the two most widely accepted tests for predicting college performance. Numerous studies indicated moderate to high correlation with college grade point averages. Some of the studies suggested that the correlation was affected by sex and socio-economic level. Other studies indicated potential cultural and racial bias in these tests. The prevailing conclusion was that both tests were similar in their predictive abilities and were a tool to be used in college admissions. The possibility, raised in some studies, that the
tests were biased precluded an endorsement of a stronger role in the college admission process.

Analysis of the Effects of Coaching

Popham and Yalow (96) concluded that a solution to the dilemma of minority students failing the Pre-Professional Skills Test (P-PST) would be to provide targeted instruction. The targeted instruction would be teaching to the domain of knowledge and skills not "teaching to the test." Efforts to coach students in the past have met with mixed results.

Slack and Porter (114) stated that coaching could raise students' scores on the SAT. Dyer and King (39) reported that coaching could raise the level of SAT and ACT scores to the level needed for admittance to select colleges. French (53) discovered in a short-term, eight-hour drill that SAT verbal scores rose eighteen points and SAT quantitative scores rose eighteen points. French and Dear (54) used some of the items on old SAT tests and students' scores climbed forty-seven points on the verbal section and fifteen points on the quantitative section. Dear (32) found that, in another study with eighteen hours of coaching, students' mean quantitative scores increased twenty-six points, but the verbal scores remained unchanged. Dyer (38) reported a mean gain of twenty-nine points in quantitative score for students in the experimental group as compared to the control group which had no coaching.
Investigating both a commercial coaching school and a public high school coaching concentrated session of ten four-hour sessions plus homework, the Federal Trade Commission (48, 49) reported negligible gains from the commercial school, but twenty to thirty mean point gains in both verbal and quantitative scores for the public high school coaching. Slack and Porter (115) found similar mean gains of twenty-two points in verbal scores and thirty-three points in quantitative scores after coaching sessions in a six-week period at school.

In longer periods of time, Marron (76) and Pallone (89) reported large gains in SAT scores. In a six-week program of forty-five minute periods conducted by Pallone, students had mean gains of ninety points on the verbal section. Then, in a seven month coaching class of forty-five minute periods, students increased their mean verbal scores by 109 points. Marron held a coaching class for six months, teaching reading skills and verbal analogies. Students increased their mean verbal scores by fifty-eight points and their quantitative scores by seventy-nine points.

In instances of short-term coaching, Jackson (67) concluded that programs of drill and practice produce little gain. Alderman (1) and Pike and Evans (94) reported negative gains for short-term coaching.

Fremer and Chandler (52) concluded that studies of coaching show that scores gained by coaching amount to less
than ten points. Roberts and Oppenheim (100), using a control and experimental group, found that after seven and one-half hours of coaching, a mean gain of twelve points was attained in verbal scores and eight points in quantitative scores.

The College Entrance Examination Board (25, 26, 27, 28) cited that coaching was ineffective. If verbal and mathematical aptitude can be developed within the length of a school year, no one has demonstrated a way, concluded the College Entrance Examination Board. The Commission on Tests (27) stated that, regardless of the method of coaching, student gains vary slightly, but average less than ten points.

Summary

Short-term coaching, less than six weeks, appeared to have less than a ten point gain for student scores on college aptitude tests. In reviewing the limited studies on long-term coaching, large gains seemed possible. This possibility suggested that coaching might be a powerful tool to use in helping minorities overcome the tendency of the Pre-Professional Skills Test to screen out minorities disproportionately.
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CHAPTER III

METHODS AND PROCEDURES

Description of the Population

The subjects in this study were students in 1984, requesting entrance into a Texas teacher education program at a state college or university. Approximately 2,700 students took the Pre-Professional Skills Test (P-PST) in March of 1984. Colleges with teacher education programs were requested to participate in this study. In attempting to reflect the racial make-up of the Texas population, predominantly Hispanic and Black colleges were asked to participate. Colleges with heavy concentrations of Whites and others were randomly selected.

Responding to a letter from Mr. Raymon Bynum, Commissioner of the Texas Education Agency at that time, eight colleges and universities agreed to participate in this study. They were East Texas State University at Commerce, Lamar University, North Texas State University, Pan American University at Edinberg, Stephen F. Austin State University, Southwest Texas State University, Texas A & I University, and West Texas State University.

All students registering to take the P-PST in these institutions were requested to sign a release form to enable
previous college aptitude test scores and P-PST scores to be obtained from their university or the Educational Testing Service. In addition, students were asked to disclose the number of college hours completed and their race. A total of 642 students from these institutions agreed to participate in this study. Of this number, 512 were classified as White or other, forty-eight as Black and eighty-two as Hispanic. The target sample of 100 Blacks and 100 Hispanics was not met.

Description of the Instruments

The instruments used to predict performance on the Pre-Professional Skills Test (P-PST) were the Scholastic Aptitude Test (SAT) and the American College Test (ACT), college aptitude tests. These tests, according to Jackson (67) were valid predictors of college performance. The Pre-Professional Skills Test (P-PST) was the instrument selected by the Texas Board of Education to test students who wish to enter Teacher Education Programs in Texas.

Scholastic Aptitude Test

The Scholastic Aptitude Test (SAT) contained verbal ability and mathematical ability sections and yielded separate scores in these two areas. Wallace (10) stated that the SAT's purpose was to assess students' competence for college. The verbal section (SAT-V) included ninety items in two separately timed parts for a total of seventy-five
minutes. The mathematics section (SAT-M) contained sixty items, also divided into two parts, with a total time of seventy-five minutes. Items were five option, multiple choice and were formula scored. A mean of 500 has been determined for both the verbal and mathematical sections, with a standard deviation of 100. Internal consistency reliability coefficients were regularly .91 for SAT-V and .90 for SAT-M (10, p. 422).

**American College Test**

The American College Test (ACT) was initiated in 1959. Four sections were developed as well as a composite score. The sections were: English Usage, Mathematics, Social Studies Reading, and Natural Science Reading. Wallace (9) reported that recent forms of the English Usage Test contained seventy-five items with a forty minute time limit. The Mathematics Usage Test consisted of forty items with a fifty minute time limit. Both the Social Studies Reading Test and the Natural Science Reading Test had fifty-two items, with a time limit of thirty-five minutes. All four sections, plus the composite had a mean scale score of approximately twenty, with a standard deviation of five. Buros (1) cited a different mean scale score for high school seniors and college students, but for the purpose of this study a mean of twenty was used.

All the items in the ACT were of the multiple choice type. Those in the mathematics section had five options,
while the rest had four. Reliabilities of successive forms of the ACT were estimated by the odd-even procedure. Interform correlations ranged from .69 in Natural Sciences to .86 on the composite, as reported by Wallace (9).

The Pre-Professional Skills Test

The Educational Testing Service developed the Pre-Professional Skills Test (P-PST) as a basic skills screening instrument in the early 1980's. The P-PST was adopted in Texas in October of 1982 to screen candidates for Teacher Education Programs in Texas. There were three sections: Reading, Mathematics and Writing. The sum of the three parts was the total score for the P-PST.

The Mathematics and Reading sections of the P-PST consisted of forty multiple-choice items. Fifty minutes of testing time were alloted for the Mathematics section; forty minutes were alloted for the Reading section. The Writing section of the P-PST had two parts, thirty minutes each. The first part consisted of forty-five multiple-choice questions; the second part was a single essay question.

In a sampling of 3,000 students taking the P-PST, the Educational Testing Service (2) determined a standard score mean for Reading of 175.44, with a standard deviation of 5.95. The Mathematics section was found to have a standard score mean of 175.97 with a standard deviation of 8.66. The Writing section had a standard score mean of
175.47 with a standard deviation of 5.95. The Texas State Board of Education set standard scores of 173 in Writing, 172 in Reading, and 171 in Mathematics as passing scores on the P-PST (96).

Reliability studies were conducted using the test-retest method. Kuder-Richardson Formula 20 reliability estimates were reported at .889 for Reading, .890 for Writing and .907 for Mathematics. Validity studies were conducted by the IOX Assessment Associates. Adequacy-of-preparation was determined by an evaluation of textbooks used in Texas secondary schools, an evaluation of test items by Texas school educators and by a questionnaire filled out by the sample of students taking the trial test. At least 80 percent of the students and Texas school educators felt that students had been prepared for the Pre-Professional Skills Test (P-PST)(96). Secondly, the Texas Education Agency had IOX Assessment Associates evaluate the content validity of the P-PST. The same Texas school educators judged the job relevance; that is, the extent to which the P-PST measured skills needed for teaching in the Texas Public Schools. Then, a group of Texas faculty panelists judged the program relevance of the P-PST. In judging the program relevance, Texas faculty representatives determined if the concepts or skills measured by the P-PST, were actually necessary for success in the teacher education programs in Texas.
Popham and Yalow (96) reported 95 percent of the Texas school educators felt that "almost all" or "most" of the total tests in reading, mathematics, and writing were necessary to know, in order to perform successfully as a teacher. In program relevance, 80.4 percent of the Texas faculty panelists felt "almost all" or "most" of the items on the reading and writing sections were necessary for one to know in order to succeed in a teacher education program. Popham and Yalow (96) reported that only 73.7 percent of the faculty panelists felt that "almost all" or "most" of the mathematics section was necessary to know if students were to succeed in a teacher education program in Texas. (For a more detailed analysis of the adequacy-of-preparation and content validity studies, refer to Chapter II).

Procedures for Collecting Data

Each subject of this study who signed the release form, indicated his race, college hours completed, and college attending at the March, 1984 testing of the Pre-Professional Skills Test (See Appendix C for a copy of the release form). Forms indicating the students' name, social security number, race, and P-PST scores were sent to the eight colleges participating in the study (See Appendix D). Personnel at the colleges verified the number of college hours completed by Spring, 1984 and filled in either the Scholastic Aptitude Test (SAT) score or the American College Test (ACT) score. Most colleges had incomplete data on SAT and ACT scores for
students; one college had scores for only 11 percent of their students. Citing large numbers of transfer students, universities reported that they required no college aptitude scores for transfer students. Of the 642 students, college aptitude scores were received for 325 students.

The Pre-Professional Skills Test scoring was tabulated by the Educational Testing Service. Results were recorded on data cards for all participating students and these cards were mailed directly to the Registrar's Office at North Texas State University. The Registrar then mailed the data cards to the researcher so the information could be recorded on the form sent to the eight colleges (See Appendix D). All information on race, test scores for P-PST, ACT or SAT and college hours completed were recorded on the Summary Sheets for each university (See Appendix D).

Statistical Procedures

The two major statistical techniques that were used in this study were the Pearson Product Moment Correlation Coefficient (PPMCC) and Multiple Linear Regression (MLR). These two procedures were suggested by Kirk (5) to be used in research studies.

The PPMCC recommended by Ferguson, (3) was to be used between two variables to determine the degree and direction of their relationship. Hypotheses II through IX were tested with the PPMCC. The variables to be tested were P-PST Total score, P-PST Reading score, P-PST Mathematics score, P-PST
Writing score, College Aptitude Total score, College Aptitude Verbal score, College Aptitude Quantitative score, Race and college hours completed. Since the problem of the study was to study the relationships between the P-PST and the other variables, the four P-PST scores for each student were central to each part of this study.

MLR was used to test Hypotheses X through XIII. The stepwise method of MLR was used for each hypothesis as suggested by Pedhazur (6). This procedure allowed the variable most highly correlated with the dependent variable, the P-PST, to be entered into the prediction equation first and then all other variables were evaluated for entry into the equation. If another variable was entered into the equation, all variables already in the equation were evaluated for removal from the equation. Thus at each step every possible combination of predictors was evaluated.

The Statistical Package for the Social Sciences (SPSS)(8), as installed at the North Texas State University Academic Computing Center, was used for all of the statistical procedures.
CHAPTER BIBLIOGRAPHY


CHAPTER IV

PRESENTATION OF THE DATA

The purpose of this study was to determine the relationship between college aptitude, race, college hours completed and Pre-Professional Skills Test (P-PST) scores for education students in Texas public colleges and universities. A correlation analysis was utilized to determine the relationships among all variables of the study. Final analysis of the data determined the contribution which college aptitude scores, race, and college hours made in predicting performance on the P-PST.

The data obtained from the study are organized into three sections for presentation and discussion. The first section reports and discusses the correlation analysis of the variables. The second section reports and discusses the analysis of data to determine predictive relationships among the variables. The final section presents a summary of the data obtained from this study.

Analysis of the Relationships Among Variables of the Study

Relationships among variables in the present study were analyzed by application of a Pearson product correlation statistic. A description of the variables studied in this analysis are presented in Table I.
TABLE I

VARIABLES STUDIED IN THE CORRELATION ANALYSIS

<table>
<thead>
<tr>
<th>Number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>P-PST Total Score</td>
</tr>
<tr>
<td>2</td>
<td>P-PST Reading</td>
</tr>
<tr>
<td>3</td>
<td>P-PST Mathematics</td>
</tr>
<tr>
<td>4</td>
<td>P-PST Writing</td>
</tr>
<tr>
<td>5</td>
<td>College Aptitude Total</td>
</tr>
<tr>
<td>6</td>
<td>College Aptitude Verbal</td>
</tr>
<tr>
<td>7</td>
<td>College Aptitude Quantitative</td>
</tr>
<tr>
<td>8</td>
<td>Race</td>
</tr>
<tr>
<td>9</td>
<td>College Hours Completed</td>
</tr>
</tbody>
</table>

Hypothesis I predicted that there was no significant difference in the correlation of total American College Test (ACT) with total Pre-Professional Skills Test (P-PST) and the correlation of total Scholastic Aptitude Test (SAT) with total P-PST. Examination of Table II showed that the correlation of P-PST total with ACT total was .7136, while the correlation of P-PST total with SAT total was .8440. The difference between these two correlation coefficients was equivalent to a Z-score of -1.49 at the significance level of .068. While this difference was not significant at the .05 level and thus satisfied the test for Hypothesis I, it was close enough that all of the remaining hypotheses were tested with SAT and ACT separately and with the college ability scores converted to standard scores and tested together.
Hypothesis II predicted a statistically significant relationship between College Aptitude Total and Pre-Professional Skills Test (P-PST) Total for students of each racial group taken separately or together as a whole. Table II shows the relationship between P-PST Total and ACT Total and SAT Total. SAT and ACT totals were treated separately.

Examination of Table II indicates a significant correlation between College Aptitude Total and P-PST Total for all students and for all racial subgroups. The correlation was significant at the less than .001 level, except where there were ten or fewer students. Since only three Hispanic students and three Black students took the SAT and all three sections of the P-PST, the numbers were too small to attach a great deal of weight to the results. Only seven Black students took the ACT and P-PST, too few to produce a stable statistic.

**TABLE II**

<table>
<thead>
<tr>
<th>Variable Correlated with P-PST Total</th>
<th>Total Students</th>
<th>White Students</th>
<th>Black Students</th>
<th>Hispanic Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACT Total</td>
<td>.7136</td>
<td>.6446</td>
<td>.5520</td>
<td>.7692</td>
</tr>
<tr>
<td>N=237</td>
<td>Sig &lt; .001</td>
<td>N=167</td>
<td>N=7</td>
<td>N=62</td>
</tr>
<tr>
<td>SAT Total</td>
<td>.8440</td>
<td>.8326</td>
<td>.7937</td>
<td>-.1890</td>
</tr>
<tr>
<td>N=119</td>
<td>Sig &lt; .001</td>
<td>N=109</td>
<td>N=3</td>
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<tr>
<td></td>
<td></td>
<td>Sig &lt; .001</td>
<td>Sig &lt; .015</td>
<td>Sig=.435</td>
</tr>
</tbody>
</table>

Each cell contains: Pearson Product Moment Correlation Coefficient: Number of students used to calculate coefficient: Significance of the coefficient
Hypothesis III stated that a statistically significant relationship existed between the College Aptitude Verbal and Pre-Professional Skills Test (P-PST) Reading for students of each racial group taken separately or together as a whole. Table III shows that, as in Hypothesis II, where the number of students was above ten, a significant correlation existed between P-PST Reading and College Aptitude Verbal.

In each case in which combined standard scores on ACT and SAT were used, correlations significant at .05 or better were found. Only where N was less than ten were the correlation coefficients not found to be significant.

Table III

<table>
<thead>
<tr>
<th>Variable Correlated with P-PST Reading</th>
<th>Group</th>
<th>Total Students</th>
<th>White Students</th>
<th>Black Students</th>
<th>Hispanic Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACT Verbal</td>
<td></td>
<td>.6774</td>
<td>.6078</td>
<td>.3823</td>
<td>.5270</td>
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<tr>
<td></td>
<td></td>
<td>N=201 sig&lt;.001</td>
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<td>N=50 sig&lt;.001</td>
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<td>SAT Verbal</td>
<td></td>
<td>.6966</td>
<td>.6769</td>
<td>.5528</td>
<td>.2223</td>
</tr>
<tr>
<td></td>
<td></td>
<td>N=127 sig&lt;.001</td>
<td>N=107 sig&lt;.001</td>
<td>N=8 sig=.076</td>
<td>N=6 sig=.335</td>
</tr>
<tr>
<td>Standard Score, Combined ACT, SAT</td>
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<td>.6211</td>
<td>.5789</td>
<td>.5722</td>
<td>.4936</td>
</tr>
<tr>
<td></td>
<td></td>
<td>N=322 sig&lt;.001</td>
<td>N=243 sig&lt;.001</td>
<td>N=12 sig=.025</td>
<td>N=66 sig&lt;.001</td>
</tr>
</tbody>
</table>

Each cell contains: Pearson Product Moment Correlation Coefficient
: Number of Students used to calculate coefficient
: Significance of the coefficient

Hypothesis IV predicted a statistically significant relationship between College Aptitude Verbal and Pre-Professional Skills Test (P-PST) Writing for each racial group taken separately or together as a whole. Table IV
shows that where the number of students was above ten, a significant relationship existed between College Aptitude Verbal and P-PST Writing at the .05 level of significance or better. Four Black students had ACT Verbal scores and eight had SAT Verbal scores. Six Hispanic students had SAT Verbal scores.

### Table IV

<table>
<thead>
<tr>
<th>Variable Correlated with P-PST Writing</th>
<th>Total Students</th>
<th>White Students</th>
<th>Black Students</th>
<th>Hispanic Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACT Verbal</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>.5540</td>
<td>.5992</td>
<td>.8400</td>
<td>.6220</td>
</tr>
<tr>
<td></td>
<td>N=202</td>
<td>N=137</td>
<td>N=4</td>
<td>N=60</td>
</tr>
<tr>
<td></td>
<td>sig&lt;.001</td>
<td>sig&lt;.001</td>
<td>sig=.067</td>
<td>sig&lt;.001</td>
</tr>
<tr>
<td>SAT Verbal</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>.5635</td>
<td>.5159</td>
<td>.3099</td>
<td>.2007</td>
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<td></td>
<td>N=121</td>
<td>N=107</td>
<td>N=5</td>
<td>N=6</td>
</tr>
<tr>
<td></td>
<td>sig&lt;.001</td>
<td>sig&lt;.001</td>
<td>sig=.226</td>
<td>sig=.350</td>
</tr>
<tr>
<td>Standard Score, Combined ACT, SAT</td>
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<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>.5864</td>
<td>.5183</td>
<td>.6334</td>
<td>.5789</td>
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<tr>
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<td>N=12</td>
<td>N=66</td>
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<tr>
<td></td>
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<td>sig&lt;.013</td>
<td>sig&lt;.001</td>
</tr>
</tbody>
</table>

Each cell contains: Pearson Product Moment Correlation Coefficient
: Number of students used to calculate coefficient
: Significance of the coefficient

Hypothesis V stated that a statistically significant relationship existed between College Aptitude Quantitative and Pre-Professional Skills Test (P-PST) Mathematics for each racial group taken separately or together as a whole. In examining Table V, ACT Quantitative and P-PST Mathematics were statistically significantly related at the .05 or better level of significance for all groups for which the number in the sample was ten or greater. Only four Blacks had ACT Quantitative Scores.
Further examination of Table V indicates that SAT Quantitative and Pre-Professional Skills Test (P-PST) Mathematics was significantly correlated at the .05 level or better for all racial groups. However, both Blacks and Hispanics had sample sizes of less than ten and this correlation was not treated as a stable statistic for those groups. In looking at the correlation between P-PST Mathematics and College Aptitude Standard Scores (SAT and ACT combined), the correlation was not significant for Blacks. The ACT Quantitative correlation with the P-PST Mathematics was so low for Blacks (.1669) that it pulled down the combined standard score. The correlation of P-PST Mathematics and College Aptitude Quantitative was significant at the .001 level for Total Students, Whites, and Hispanics.

TABLE V

<table>
<thead>
<tr>
<th>Variable Correlated with P-PST Mathematics</th>
<th>Total Students</th>
<th>White Students</th>
<th>Black Students</th>
<th>Hispanic Students</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACT Quantitative</td>
<td>.7025</td>
<td>.7024</td>
<td>.1569</td>
<td>.4513</td>
</tr>
<tr>
<td></td>
<td>N=205</td>
<td>N=138</td>
<td>N=4</td>
<td>N=62</td>
</tr>
<tr>
<td></td>
<td>sig&lt;.001</td>
<td>sig&lt;.001</td>
<td>sig=.415</td>
<td>sig&lt;.001</td>
</tr>
<tr>
<td>SAT Quantitative</td>
<td>.7912</td>
<td>.7861</td>
<td>.7259</td>
<td>.7284</td>
</tr>
<tr>
<td></td>
<td>N=121</td>
<td>N=107</td>
<td>N=8</td>
<td>N=6</td>
</tr>
<tr>
<td></td>
<td>sig&lt;.001</td>
<td>sig&lt;.001</td>
<td>sig=.019</td>
<td>sig&lt;.046</td>
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<td>Standard Score, Quantitative for ACT &amp; SAT</td>
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<td>Combined</td>
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</tr>
</tbody>
</table>

Each cell contains: Pearson Product Moment Correlation Coefficient. Number of students used to calculate coefficient. Significance of the coefficient.
Hypothesis VI stated that a statistically significant correlation existed between the number of college hours completed and total Pre-Professional Skills Test (P-PST) for each racial group taken separately or together as a whole. Table VI indicates that a correlation existed for Total Students and Whites at the .05 level of significance. However, the correlation was low. The correlation was not significant for Blacks and Hispanics at the .05 level.

Hypothesis VII predicted a statistically significant correlation between college hours completed and Pre-Professional Skills Test (P-PST) Reading for students of each racial group taken separately or together as a whole. Table VI indicates a low correlation between college hours completed and P-PST Reading for Total Students and White Students. This correlation was at the .05 level of significance or better. Hispanics and Blacks did not report a correlation between college hours completed and P-PST Reading Scores at the necessary .05 level of significance.

Hypothesis VIII predicted a statistically significant correlation between college hours completed and Pre-Professional Skills Test (P-PST) Writing for students of each racial group taken separately or together as a whole. According to the data in Table VI, a low correlation existed between college hours completed and P-PST for Total Students and Whites. This was at the .05 level of significance. Again, Hispanics and Blacks showed no significant correlation
between college hours completed and P-PST Writing at the .05 level of significance.

Hypothesis IX stated that a statistically significant correlation existed between college hours completed and Pre-Professional Skills Test (P-PST) Mathematics for students of each racial group taken separately or together as a whole. Analyzing Table VI, low correlations were again found between P-PST Mathematics and college hours completed. Correlations at the .05 level or better of significance were found for Total Students, Whites, and Blacks. It should be noted that for Blacks a correlation of .29 was found between P-PST Mathematics and college hours completed. This was at the .05 level of significance. Hispanics still failed to show a correlation between P-PST Mathematics and college hours completed at the .05 level of significance.

TABLE VI
CORRELATION OF COLLEGE HOURS COMPLETED
WITH P-PST TOTAL, P-PST READING, P-PST WRITING
AND P-PST MATHEMATICS FOR TOTAL STUDENTS
AND THREE RACIAL SUBGROUPS

<table>
<thead>
<tr>
<th>Variable Correlated with P-PST Total</th>
<th>Total Students</th>
<th>White Students</th>
<th>Black Students</th>
<th>Hispanic Students</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P-PST Total</td>
<td>.1497</td>
<td>.1554</td>
<td>.1614</td>
<td>.0365</td>
</tr>
<tr>
<td></td>
<td>N=617</td>
<td>N=501</td>
<td>N=33</td>
<td>N=77</td>
</tr>
<tr>
<td></td>
<td>Sig &lt;.001</td>
<td>Sig &lt;.001</td>
<td>Sig &lt;.185</td>
<td>Sig &lt;.376</td>
</tr>
<tr>
<td>P-PST Reading</td>
<td>.1172</td>
<td>.0921</td>
<td>.0149</td>
<td>.0305</td>
</tr>
<tr>
<td></td>
<td>N=520</td>
<td>N=502</td>
<td>N=34</td>
<td>N=78</td>
</tr>
<tr>
<td></td>
<td>Sig &lt;.002</td>
<td>Sig &lt;.020</td>
<td>Sig &lt;.467</td>
<td>Sig &lt;.396</td>
</tr>
<tr>
<td>P-PST Writing</td>
<td>.0758</td>
<td>.0958</td>
<td>.0260</td>
<td>.0264</td>
</tr>
<tr>
<td></td>
<td>N=621</td>
<td>N=503</td>
<td>N=34</td>
<td>N=78</td>
</tr>
<tr>
<td></td>
<td>Sig &lt;.029</td>
<td>Sig &lt;.016</td>
<td>Sig &lt;.446</td>
<td>Sig &lt;.409</td>
</tr>
<tr>
<td>P-PST Mathematics</td>
<td>.1761</td>
<td>.1533</td>
<td>.2871</td>
<td>.0126</td>
</tr>
<tr>
<td></td>
<td>N=622</td>
<td>N=503</td>
<td>N=33</td>
<td>N=80</td>
</tr>
<tr>
<td></td>
<td>Sig &lt;.001</td>
<td>Sig &lt;.001</td>
<td>Sig &lt;.053</td>
<td>Sig &lt;.456</td>
</tr>
</tbody>
</table>

Each cell contains: Pearson Product Moment Correlation Coefficient
: Number of students used to calculate coefficient
: Significance of the coefficient
Discussion

College Aptitude was defined as a student's SAT or ACT score. It was decided after comparing the Z-scores to use these measures separately and as combined in standard scores since minority students had few reported College Aptitude scores. College Aptitude (ACT) and P-PST total score were highly correlated for All Students, Whites and Hispanics. Few Blacks had ACT scores, therefore, these results cannot be treated seriously. Only three Hispanics and Blacks took the SAT, so this data cannot be treated as stable statistics. Total Students and Whites indicated a high correlation between College Aptitude (SAT) and P-PST Total.

When Blacks and Hispanics numbered ten or more, correlations between College Aptitude and P-PST Reading, Writing, and Mathematics were significant at the .05 level or better. When numbers of Blacks and Hispanics were under ten, stable statistics could not be determined.

Correlation of P-PST with college hours completed was generally low, even to the point of not being correlated for Blacks on P-PST Total, P-PST Reading, and Writing, and Hispanics on all parts of the P-PST. Only P-PST Mathematics and college hours completed was correlated for Blacks, .29 at the .05 level of significance. This was the highest correlation of P-PST and college hours completed for any racial group.

Although these correlations were low, many of them were statistically significant at .05 or better, particularly for
Whites and Total Students. Hours completed was a statistic related to P-PST, not as closely as ability, but as Hypotheses X-XIII showed, it helped in some cases in predicting P-PST when combined with race and ability.

Analysis of the Data by the Stepwise Multiple Linear Regression Procedure

Additional analysis of the data by applying the Multiple Linear Regression procedure examined the predictive power of test variables in predicting P-PST scores for Reading, Writing, Mathematics and Total. The variables examined in the Multiple Linear Regression are presented in Table VII.

**TABLE VII**

**VARIABLES STUDIED IN THE REGRESSION ANALYSIS**

<table>
<thead>
<tr>
<th>Description</th>
<th>Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>College Aptitude Verbal Combined Standard Score (Z Verb)</td>
<td>Independent</td>
</tr>
<tr>
<td>College Aptitude Quantitative Combined Standard Score (Z Quan)</td>
<td>Independent</td>
</tr>
<tr>
<td>College Aptitude Verbal (SAT Verb)</td>
<td>Independent</td>
</tr>
<tr>
<td>College Aptitude Quantitative (SAT Math)</td>
<td>Independent</td>
</tr>
<tr>
<td>College Aptitude Verbal (ACT Verb)</td>
<td>Independent</td>
</tr>
<tr>
<td>College Aptitude Quantitative (ACT Math)</td>
<td>Independent</td>
</tr>
<tr>
<td>Race (R)</td>
<td>Independent</td>
</tr>
<tr>
<td>College Hours Completed (Hrs.)</td>
<td>Independent</td>
</tr>
<tr>
<td>P-PST Total (P-PST Tot.)</td>
<td>Dependent</td>
</tr>
<tr>
<td>P-PST Reading (P-PST R)</td>
<td>Dependent</td>
</tr>
<tr>
<td>P-PST Writing (P-PST W)</td>
<td>Dependent</td>
</tr>
<tr>
<td>P-PST Mathematics (P-PST M)</td>
<td>Dependent</td>
</tr>
</tbody>
</table>

The predictor variables were examined using Stepwise Multiple Linear Regression Analysis to determine the
combination of independent variables which produced the best prediction equation. The listed predictor variables were chosen since they represent the data commonly available to colleges and were variables under study in this investigation. Tables II-VI also indicated correlations between the predictor variables and the dependent variables.

The dependent variables were scores from the Pre-Professional Skills Test: P-PST Total, P-PST Reading, P-PST Writing, P-PST Mathematics. The scores were representative of those generally obtained by college students on the first examination date, March 3, 1984.

Three different scores for College Aptitude were utilized. The Scholastic Aptitude Test (SAT), the American College Test (ACT) and the Standard scores of the combination of SAT and ACT expressed in Z-scores were treated separately for Hypotheses X-XIII. The balance of this Chapter is organized around these three ways of reporting College Aptitude. Thus, Hypotheses X-XIII were tested three times each, once for each type of College Aptitude.

The two race variables were used in dummy coding for the regression procedure. Race cannot be used as an ordinal variable since there is no implicit order. The three races were coded as two nominal variables.

Race 1 assigned zero to Whites, zero to Hispanics, and one to Blacks. Race 2 assigned zero to Whites, zero to
Blacks, and one to Hispanics. Thus race was handled by two arbitrary variables. This technique is equivalent to asking two questions, "Is the student Black or not?" and "Is the student Hispanic or not?" The answer to those two questions identified the student as belonging to one and only one of the three racial groups. Any other similar assignment could have been used with identical results. If either of the two race variables was selected by the Stepwise Regression Procedure, both variables were entered into the equation.

Each of the three sections begins with a description of the variables used in testing Hypotheses X-XIII. Next the final prediction equation is presented. Lastly, a summary table showing each step in the Stepwise Multiple Linear Regression Process is offered.

Hypothesis X-XIII were stated as follows:

X. A prediction equation with a statistically significant $R^2$ would be found where total Pre-Professional Skills Test (P-PST) score was the dependent variable and some combination of College Aptitude Verbal score, College Aptitude Quantitative score, college hours completed, and race were the independent variables.

XI. A prediction equation with a statistically significant $R^2$ would be found where Pre-Professional Skills Test (P-PST) Reading score was the dependent variable and some combination of
College Aptitude Verbal score, College Aptitude Quantitative score, college hours completed, and race were the independent variables.

XII. A prediction equation with a statistically significant $R^2$ would be found where Pre-Professional Skills Test (P-PST) Writing score was the dependent variable and some combination of College Aptitude Verbal score, College Aptitude Quantitative score, college hours completed, and race were the independent variables.

XIII. A prediction equation with a statistically significant $R^2$ would be found where Pre-Professional Skills Test (P-PST) Mathematics score was the dependent variable and some combination of College Aptitude Verbal score, College Aptitude Quantitative score, college hours completed and race were the independent variables.

SECTION I

In this section, College Aptitude was reported in standard scores, combining Scholastic Aptitude Test (SAT) and American College Test (ACT) scores in a single Z-score. The next section reported College Aptitude with ACT scores and the final section with SAT scores.
TABLE VIII
DESCRIPTION OF VARIABLES USED IN PREDICTION EQUATIONS WHERE COLLEGE APTITUDE IS REPORTED BY COMBINED STANDARD SCORES OF ACT AND SAT
N=315

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-PST Total</td>
<td>524.575</td>
<td>15.330</td>
</tr>
<tr>
<td>P-PST Reading</td>
<td>175.397</td>
<td>6.261</td>
</tr>
<tr>
<td>P-PST Writing</td>
<td>174.349</td>
<td>4.408</td>
</tr>
<tr>
<td>P-PST Math</td>
<td>174.829</td>
<td>7.394</td>
</tr>
<tr>
<td>Verbal Aptitude</td>
<td>-.637</td>
<td>1.044</td>
</tr>
<tr>
<td>Quantitative Aptitude</td>
<td>-1.055</td>
<td>1.243</td>
</tr>
<tr>
<td>Race 1</td>
<td>.038</td>
<td>.192</td>
</tr>
<tr>
<td>Race 2</td>
<td>.200</td>
<td>.401</td>
</tr>
<tr>
<td>Hours Completed</td>
<td>55.254</td>
<td>23.910</td>
</tr>
</tbody>
</table>

Notes: Theoretically, the mean and standard deviation of Verbal Aptitude and Quantitative Aptitude expressed as standard scores should be 0 and 1 respectively. To calculate standard scores, a mean and standard deviation of 20 and 5 for ACT and 500 and 100 for SAT were used. These means were higher than the actual sample.

The mean of ACT Verbal was 18.03 and ACT Mathematics was 14.364 (N=198). The mean of SAT Verbal was 395.043 and SAT Mathematics was 406.838 (N=117). Since the actual samples had means below the norms used, Z-score means below zero were expected.

Hypothesis X stated that a prediction equation with a statistically significant $R^2$ would be found with Pre-Professional Skills Test (P-PST) Total as the dependent variable and some combination of College Aptitude Verbal, College Aptitude Quantitative, college hours completed, and...
race as the independent variables. The prediction equation for P-PST Total is reported as follows:

\[
P\text{-PST Total Prediction Equation} = +5.00967 \text{ (Z Verb)} + 4.71261 \text{ (Z Quan)} - 11.53214 \text{ (Race 1)} - 5.81081 \text{ (Race 2)} + 0.05528 \text{ (Hours)} + 531.92243 \text{ (Constant)}
\]

Table IX indicates each step in the Stepwise Multiple Linear Regression Process for determining the prediction equation for P-PST Total. College Aptitude was a combination of ACT and SAT expressed in standard score.

Table IX shows that for P-PST Total, Verbal Aptitude was the strongest predictor variable; then, Quantitative Aptitude was next. Total college hours changed the \( R^2 \) only .0669, but even this small change was statistically significant.

Hypothesis XI stated that a prediction equation with a statistically significant \( R^2 \) would be found with Pre-Professional Skills Test (P-PST) Reading as the
dependent variable and some combination of College Aptitude Verbal, College Aptitude Quantitative, college hours completed, and race as the independent variables. The prediction equation for P-PST Reading is reported as follows:

P-PST Reading Prediction Equation
Weights
P-PST Reading = +2.46574 (Z Verb)  
+1.13027 (Z Quan)  
-2.19971 (Race 1)  
-4.21531 (Race 2)  
+179.08748 (Constant)

The prediction equation for P-PST Reading indicated a subtraction of (-2) would need to be made for Race 1 (Blacks) and (-4) for Race 2 (Hispanics). College Aptitude Verbal was the strongest predictor variable. Table X presents the steps used in the Stepwise Multiple Linear Regression procedure in determining the prediction equation for P-PST Reading. College Aptitude was combined (ACT, SAT) and expressed in standard Z-scores.

**TABLE X**

<table>
<thead>
<tr>
<th>Step Variable</th>
<th>R²</th>
<th>R²</th>
<th>Adj R²</th>
<th>F Equation</th>
<th>Sig. of F for Equa</th>
<th>R² Change</th>
<th>F Change</th>
<th>Sig. of F for Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Z Verb</td>
<td>.6219</td>
<td>.3857</td>
<td>.3848</td>
<td>197.377</td>
<td>&lt;.001</td>
<td>.3867</td>
<td>197.377</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>2. Race 2</td>
<td>.6913</td>
<td>.4776</td>
<td>.4745</td>
<td>142.753</td>
<td>&lt;.001</td>
<td>.0911</td>
<td>54.434</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>3. Z Quan</td>
<td>.7141</td>
<td>.5100</td>
<td>.5053</td>
<td>107.893</td>
<td>&lt;.001</td>
<td>.0322</td>
<td>20.441</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>4. *Race 1</td>
<td>.7170</td>
<td>.5141</td>
<td>.5079</td>
<td>82.009</td>
<td>&lt;.001</td>
<td>.0041</td>
<td>2.644</td>
<td>&lt;.105</td>
</tr>
</tbody>
</table>

*Not statistically significant*

Examination of Table X indicates that Verbal Aptitude, Race 2, and Quantitative Aptitude were the best combination
of independent variables to predict a student's score on P-PST Reading. Stepwise Multiple Linear Regression stopped after Step 3, at which point the test for entering another variable failed. (No more variables would have increased the $R^2$ significantly). However, since Race 1 had been entered on Step 2, Race 2 was forced into the equation to give a complete representation of the Race variable (White, Blacks, Hispanics). It was determined that Race 1 and 2 would both be entered when either one was entered into the prediction equation at the .05 or higher level.

Hypothesis XII stated that a statistically significant prediction equation would be found where Pre-Professional Skills Test (P-PST) Writing was the dependent variable and some combination of College Aptitude Verbal, College Aptitude Quantitative, college hours completed, and race were the independent variables. The prediction equation for P-PST Writing is listed below.

P-PST Writing Prediction Equation

Weights

P-PST Writing = 1.88744 (Z Verb)  
+ .62570 (Z Quan)  
-3.20287 (Race 1)  
- .43154 (Race 2)  
+176.42056 (Constant)

In the P-PST Writing Prediction Equation, College Aptitude Verbal and College Aptitude Quantitative were the predictor variables with the most value. The equation shows that both Race 1 (Blacks) and Race 2 (Hispanics) would subtract from the P-PST Writing Score.
Table XI presents the steps used in the Stepwise Multiple Linear Regression procedure in determining the prediction equation for P-PST Writing. College Aptitude was combined (ACT and SAT) and expressed in standard Z-scores.

**TABLE XI**

**SUMMARY TABLE FOR PREDICTION EQUATION FOR P-PST WRITING:**

<table>
<thead>
<tr>
<th>Step Variable</th>
<th>$r^2$</th>
<th>$R^2$</th>
<th>Adj $R^2$</th>
<th>F Equation</th>
<th>Sig of F for Eq Change</th>
<th>$R^2$</th>
<th>F Change</th>
<th>Sig of F for Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Z-Verb</td>
<td>.5903</td>
<td>.3484</td>
<td>.3464</td>
<td>167.382</td>
<td>&lt;.001</td>
<td>.3484</td>
<td>167.382</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>2. Z-Quant</td>
<td>.6098</td>
<td>.3718</td>
<td>.3709</td>
<td>92.328</td>
<td>&lt;.001</td>
<td>.0234</td>
<td>11.603</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>3. Race 1</td>
<td>.6232</td>
<td>.3884</td>
<td>.3825</td>
<td>65.837</td>
<td>&lt;.001</td>
<td>.0166</td>
<td>8.447</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>4. Race 2</td>
<td>.6243</td>
<td>.3897</td>
<td>.3818</td>
<td>49.48</td>
<td>&lt;.001</td>
<td>.0013</td>
<td>.555</td>
<td>.415</td>
</tr>
</tbody>
</table>

Table XI indicates that the best combination of independent variables for predicting P-PST Writing were Verbal Aptitude, Quantitative Aptitude, and Race 1. As in Table X, one coding of race (Race 2) was not statistically significant at the .05 level.

Hypothesis XII stated that a statistically significant prediction equation would be found where Pre-Professional Skills Test (P-PST) Mathematics was the dependent variable and some combination of the predictor variables were the independent variables. The predictor equation for P-PST Mathematics follows.

P-PST Mathematics Prediction Equation

Weights

P-PST Mathematics = 3.05326 (Z Quant) +1.67595 (Z Verb) -5.81797 (Race 1) -1.30378 (Race 2) +0.03013 (Hours) +177.93446 (Constant)
Examination of the P-PST Mathematics Equation indicated that College Aptitude Quantitative was the strongest predictor variable. Race 1 (Black) and Race 2 (Hispanics) would both subtract from the P-PST Mathematics Score.

The Stepwise Multiple Linear Regression procedure is presented in Table XII for P-PST Mathematics. College Aptitude was expressed as a combined (SAT and ACT) standard Z-score.

### TABLE XII
**SUMMARY TABLE FOR PREDICTION EQUATION**
**FOR P-PST MATHEMATICS:**
**COLLEGE APTITUDE = COMBINED STANDARD SCORES**

<table>
<thead>
<tr>
<th>Step Variable</th>
<th>$R^2$</th>
<th>$R^2_0$</th>
<th>$R^2_1$</th>
<th>$F$ for Equation</th>
<th>$F$ for Change</th>
<th>Sig of $F$ for Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Z-Quan</td>
<td>.7139</td>
<td>.5082</td>
<td>.5082</td>
<td>325.412</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>2. Z-Verb</td>
<td>.7508</td>
<td>.5638</td>
<td>.5610</td>
<td>201.608</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>3. Race 1</td>
<td>.7611</td>
<td>.5792</td>
<td>.5752</td>
<td>142.697</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>4. Hours</td>
<td>.7676</td>
<td>.5891</td>
<td>.5838</td>
<td>111.129</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>5. Race 2</td>
<td>.7703</td>
<td>.5933</td>
<td>.5867</td>
<td>90.152</td>
<td>&lt;.001</td>
<td>= .077</td>
</tr>
</tbody>
</table>

*Race 2 is not a statistically significant predictor variable in this equation.*

Quantitative Aptitude, Verbal Aptitude, Race 1, and Hours were the best combination of independent variables for predicting P-PST Mathematics. Race 2 was not a statistically significant predictor variable, but was entered to give a complete representation of the race variable (White, Blacks, Hispanics).

### SECTION II

This section reflects College Aptitude as American College Test (ACT) Verbal and American College Test (ACT)
Math. Hypotheses X-XIII were examined using this measure of the College Aptitude variable.

Table XIII describes the variables used in the prediction equation where Aptitude was represented by ACT scores.

**TABLE XIII**

**DESCRIPTION OF VARIABLES USED IN THE PREDICTION EQUATION WHERE APTITUDE IS REPRESENTED BY ACT SCORES**

N=198

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-PST Total</td>
<td>524.071</td>
<td>16.073</td>
</tr>
<tr>
<td>P-PST Reading</td>
<td>175.005</td>
<td>6.617</td>
</tr>
<tr>
<td>P-PST Writing</td>
<td>174.237</td>
<td>4.521</td>
</tr>
<tr>
<td>P-PST Math</td>
<td>174.626</td>
<td>7.534</td>
</tr>
<tr>
<td>ACT Verbal</td>
<td>18.030</td>
<td>5.427</td>
</tr>
<tr>
<td>ACT Quantitative</td>
<td>14.364</td>
<td>7.010</td>
</tr>
<tr>
<td>Race 1</td>
<td>.020</td>
<td>.141</td>
</tr>
<tr>
<td>Race 2</td>
<td>.293</td>
<td>.456</td>
</tr>
<tr>
<td>Hours</td>
<td>54.399</td>
<td>25.026</td>
</tr>
</tbody>
</table>

Hypothesis X stated that a statistically significant prediction equation would be found where Pre-Professional Skills Test (P-PST) Total was the dependent variable and some combination of predictor variables were the independent variables.

**P-PST Total Prediction Equation**

Weights

\[
P-PST \text{ Total} = 1.48776 \text{ (ACT Verb)} + .66473 \text{ (ACT Math)} - 7.30574 \text{ (Race 1)} - 4.92070 \text{ (Race 2)} + 0.06027 \text{ (Hours)} + 486.00862 \text{ (Constant)}
\]
In reviewing the P-PST Total Prediction Equation, ACT Verbal had the most predictive value, followed by ACT Math. College hours completed was entered for the first time as a significant predictor variable in the equation. For P-PST Total, both Race 1 (Blacks) and Race 2 (Hispanics) would subtract from the P-PST Total score for a true representation of their predicted score. Caution must be applied to the Race 1 predictor variable since so few Blacks took the ACT.

Table XIV explains the Stepwise Multiple Linear Regression procedure used for P-PST Total. College Aptitude was expressed as ACT Verbal and ACT Math for this Summary Table.

### Table XIV

**SUMMARY TABLE FOR PREDICTION EQUATION FOR P-PST TOTAL: COLLEGE APTITUDE = ACT VERBAL AND ACT MATH**

<table>
<thead>
<tr>
<th>Step Variable</th>
<th>R^2</th>
<th>R^2</th>
<th>Adj R^2</th>
<th>F for Equ</th>
<th>Sig of F for Change</th>
<th>R^2</th>
<th>F for Change</th>
<th>Sig of F for Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ACT-Verb</td>
<td>.7701</td>
<td>.5931</td>
<td>.5911</td>
<td>285.725</td>
<td>&lt;.001</td>
<td>.5931</td>
<td>285.725</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>2. ACT-Math</td>
<td>.8151</td>
<td>.6644</td>
<td>.6610</td>
<td>193.042</td>
<td>&lt;.001</td>
<td>.6610</td>
<td>41.426</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>3. Race 2</td>
<td>.8249</td>
<td>.6605</td>
<td>.6756</td>
<td>137.728</td>
<td>&lt;.001</td>
<td>.6756</td>
<td>9.758</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>4. Hours</td>
<td>.8295</td>
<td>.6882</td>
<td>.6818</td>
<td>106.507</td>
<td>&lt;.001</td>
<td>.6818</td>
<td>4.784</td>
<td>&lt;.05</td>
</tr>
<tr>
<td>5. Race 1</td>
<td>.8319</td>
<td>.6921</td>
<td>.6841</td>
<td>86.316</td>
<td>&lt;.001</td>
<td>.6841</td>
<td>2.420</td>
<td>=.420</td>
</tr>
</tbody>
</table>

#Race 1 is not a statistically significant predictor variable for P-PST Total.

A combination of ACT Verbal, ACT Math, Race 2, and hours completed made the best prediction equation for P-PST. Race 1 was not a statistically significant predictor
variable at the .05 level. Race 1 was entered so that race could be treated as a whole (Whites, Blacks, Hispanics).

Hypothesis XI reported that a statistically significant prediction equation would be formed where Pre-Professional Skills Test (P-PST) Reading was the dependent variable and some combination of predictor variables were the independent variables. The predictor variable of College Aptitude was expressed as ACT Verbal and ACT Math. The prediction equation for P-PST Reading consisted of the following variables.

<table>
<thead>
<tr>
<th>P-PST Reading Prediction Equation</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Weights</strong></td>
</tr>
<tr>
<td>P-PST Reading = 0.55306 (ACT Verb)</td>
</tr>
<tr>
<td>-0.18524 (ACT Math)</td>
</tr>
<tr>
<td>+1.01528 (Race 1)</td>
</tr>
<tr>
<td>-3.15518 (Race 2)</td>
</tr>
<tr>
<td>+163.09586 (Constant)</td>
</tr>
</tbody>
</table>

ACT Verbal was the best predictor variable for P-PST Reading. Race 1 added to the P-PST Reading score and Race 2 subtracted. Even though Blacks added one point to the P-PST Reading score, this was not treated as a stable prediction equation for Blacks since less than ten Blacks had ACT scores.

Table XV displays the steps in the Stepwise Multiple Linear Regression process for the P-PST Reading using College Aptitude as ACT scores.
TABLE XV
SUMMARY TABLE FOR PREDICTION EQUATION
FOR P-PST READING:
COLLEGE APTITUDE = ACT VERBAL AND ACT MATH

<table>
<thead>
<tr>
<th>Step Variable</th>
<th>$R^2$</th>
<th>$R^2$</th>
<th>Adj $R^2$</th>
<th>$F$ for Equation</th>
<th>Sig of $F$ for Equation</th>
<th>$R^2$ Change</th>
<th>$F$ Change</th>
<th>Sig of $F$ for Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ACT-Verb</td>
<td>.6761</td>
<td>.4572</td>
<td>.4544</td>
<td>165.067</td>
<td>&lt; .001</td>
<td>.4572</td>
<td>165.067</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>2. Race 2</td>
<td>.7151</td>
<td>.5114</td>
<td>.5063</td>
<td>102.031</td>
<td>&lt; .001</td>
<td>.0542</td>
<td>21.626</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>3. ACT Math</td>
<td>.7304</td>
<td>.5335</td>
<td>.5263</td>
<td>73.967</td>
<td>&lt; .001</td>
<td>.0222</td>
<td>9.228</td>
<td>&lt; .01</td>
</tr>
<tr>
<td>4. Race 1</td>
<td>.7307</td>
<td>.5340</td>
<td>.5243</td>
<td>55.288</td>
<td>&lt; .001</td>
<td>.0004</td>
<td>.183</td>
<td>= .67</td>
</tr>
</tbody>
</table>

*Race 1 is not a statistically significant predictor variable for P-PST Reading.

Examining Table XV, the best combination of predictor variables for P-PST Reading was ACT Verbal, Race 2, and ACT Math. Race 1 was not a statistically significant variable for predicting P-PST Reading. It was entered to reflect the race variable as a whole.

Hypothesis XII expressed that a statistically significant prediction equation would be found with Pre-Professional Skills Test (P-PST) Writing as the dependent variable and some combination of predictor variables as the independent variables. A prediction equation was formed for P-PST Writing with College Aptitude expressed as ACT Verbal and ACT Math. The prediction equation is reported below.

P-PST Writing Prediction Equation

Weights

P-PST Writing = .54855 (ACT Verb) + 164.34689
Only ACT Verbal was a statistically significant predictor variable for P-PST Writing. None of the other predictor variables (ACT Math, Race, or College Hours) added any significant contribution to the prediction equation for P-PST Writing.

The Summary Table is listed below.

**TABLE XVI**

**SUMMARY TABLE FOR PREDICTION EQUATION FOR P-PST WRITING:**

<table>
<thead>
<tr>
<th>Step Variable</th>
<th>( R^2 )</th>
<th>( \text{Adj} \ R^2 )</th>
<th>( F ) Equation</th>
<th>Sig of ( F ) for Change</th>
<th>( R^2 ) Change</th>
<th>( F ) Change</th>
<th>Sig of ( F ) for Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ACT Verb</td>
<td>.6585</td>
<td>.4336</td>
<td>150.074</td>
<td>&lt;.001</td>
<td>.4336</td>
<td>150.074</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

As in P-PST Writing where College Aptitude was expressed as combined standard scores, the \( R^2 \) value was lower than for other sections of the P-PST. When ACT was used as the measure of College Aptitude Verbal, the \( R^2 \) value was .43, when a combined standard score of College Aptitude was used the \( R^2 \) value for verbal aptitude is .39. These \( R^2 \) values were the lowest expressed for any sections of the P-PST (Total, Reading, Writing, Mathematics).

P-PST Mathematics had a statistically significant \( R^2 \) prediction equation where P-PST Math was the dependent variable and some combination of predictor variables were the independent variables. Hypothesis XIII was tested with College Aptitude reported as ACT Verbal and ACT Math. The prediction equation follows.
P-PST Mathematics Prediction Equation

Weights

\[
P\text{-PST Mathematics} = 0.47834 \text{ (ACT math)}
+ 0.40223 \text{ (ACT Verbal)}
- 5.90125 \text{ (Race 1)}
- 2.58524 \text{ (Race 2)}
+ 161.58184 \text{ (Constant)}
\]

ACT Math and ACT Verbal were the best predictor variables for P-PST Math with ACT Verbal being almost as good as ACT Math. Race 1 and Race 2 both had subtractive values when predicting P-PST Mathematics Scores. The Race 1 predictor variable was suspect because of the small number of Blacks with ACT scores.

Table XVII presents the data from the Stepwise Multiple Linear Regression procedure for the prediction equation for P-PST Mathematics. College Aptitude was expressed as AC1 Verbal and ACT Math.

<table>
<thead>
<tr>
<th>Step Variable</th>
<th>( R^2 )</th>
<th>( R_s^2 )</th>
<th>Adj ( R^2 )</th>
<th>F</th>
<th>Sig of F for ( R^2 ) Change</th>
<th>( R^2 ) Change</th>
<th>F</th>
<th>Sig of F for Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. ACT Math</td>
<td>0.7015</td>
<td>0.4921</td>
<td>0.4895</td>
<td>189.932</td>
<td>&lt;.001</td>
<td>0.4921</td>
<td>189.932</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>2. ACT Verb</td>
<td>0.7533</td>
<td>0.5675</td>
<td>0.5630</td>
<td>127.922</td>
<td>&lt;.001</td>
<td>0.0753</td>
<td>33.966</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>3. Race 2</td>
<td>0.7620</td>
<td>0.5815</td>
<td>0.5750</td>
<td>89.855</td>
<td>&lt;.001</td>
<td>0.0140</td>
<td>6.502</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>4. Race 1</td>
<td>0.7701</td>
<td>0.5930</td>
<td>0.5846</td>
<td>70.313</td>
<td>&lt;.001</td>
<td>0.115</td>
<td>5.472</td>
<td>&lt;.05</td>
</tr>
</tbody>
</table>

Examination of Table XVII reveals that the best combination of predictor variables for P-PST Mathematics was ACT Math, ACT Verbal, Race 2, and Race 1. All of these predictor variables were significant at the .05 level or better.
SECTION III

College Aptitude is reported as SAT Verbal and SAT Math in this section. A description of variables used in this section are presented below.

TABLE XVIII
DESCRIPTION OF VARIABLES USED WHERE APTITUDE IS REPRESENTED BY SAT SCORES

N=117

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-PST Total</td>
<td>525.427</td>
<td>14.011</td>
</tr>
<tr>
<td>P-PST Reading</td>
<td>176.060</td>
<td>5.573</td>
</tr>
<tr>
<td>P-PST Writing</td>
<td>174.538</td>
<td>4.223</td>
</tr>
<tr>
<td>P-PST Mathematics</td>
<td>174.829</td>
<td>7.184</td>
</tr>
<tr>
<td>SAT Verbal</td>
<td>395.043</td>
<td>82.259</td>
</tr>
<tr>
<td>SAT Quantitative</td>
<td>406.838</td>
<td>90.627</td>
</tr>
<tr>
<td>Race 1</td>
<td>.068</td>
<td>.253</td>
</tr>
<tr>
<td>Race 2</td>
<td>.043</td>
<td>.203</td>
</tr>
<tr>
<td>Hours</td>
<td>56.701</td>
<td>21.920</td>
</tr>
</tbody>
</table>

Hypothesis X stated that a statistically significant \( R^2 \) prediction equation would be found where Pre-Professional Skills Test (P-PST) Total was the dependent variable and some combination of the predictor variables were the independent variables. A prediction equation was determined for P-PST Total, where College Aptitude was expressed in SAT scores. The prediction equation is reported as follows:

\[
P-PST \text{ Total Prediction Equation} \\
\text{Weights} \\
P-PST \text{ Total} = 0.06302 \times \text{(SAT Verb)} + 0.07799 \times \text{(SAT Math)} - 11.05524 \times \text{(Race 1)} - 1.06464 \times \text{(Race 2)} + 469.60410 \times \text{(Constant)}
\]
The Prediction Equation showed SAT Verbal as the single best predictor of P-PST Total. The subtraction value of -11 was computed for Race 1 and -1 for Race 2. Thus, from P-PST Total Score 469.6, Race 1 and Race 2 subtracted -11 and -1 respectively in order to reflect their true predictive score.

A Summary Table is listed below to report the Stepwise Linear Regression Procedure for P-PST Total where College Aptitude is expressed in SAT Scores.

**TABLE XIX**

**SUMMARY TABLE FOR PREDICTION EQUATION FOR P-PST TOTAL:**

<table>
<thead>
<tr>
<th>Step Variable</th>
<th>$R^2$</th>
<th>$R^2$</th>
<th>Adj $R^2$</th>
<th>$F$ for Equation</th>
<th>Sig of $F$ for Equa</th>
<th>$R^2$ Change</th>
<th>$F$ Change</th>
<th>Sig of $F$ for Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. SAT Math</td>
<td>.773</td>
<td>.798</td>
<td>.595</td>
<td>171.506</td>
<td>&lt;.001</td>
<td>.598</td>
<td>171.506</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>2. SAT Verb</td>
<td>.848</td>
<td>.720</td>
<td>.715</td>
<td>146.930</td>
<td>&lt;.001</td>
<td>.121</td>
<td>146.930</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>4. Race 2</td>
<td>.869</td>
<td>.755</td>
<td>.746</td>
<td>86.422</td>
<td>&lt;.001</td>
<td>.002</td>
<td>86.422</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

Race 2 is not a statistically significant predictor variable for P-PST Total.

Examination of Table XIX indicates that SAT Math, SAT Verbal and Race 1 were the best combination of independent variables for predicting the total score on the Pre-Professional Skills Test (P-PST). Race 2 was not a statistically significant predictor variable, but was entered to reflect race for all three race groups.

Hypothesis XI stated that a statistically significant prediction equation would be found where Pre-Professional
Skills Test (P-PST) Reading was the dependent variable and some combination of predictor variables were the independent variables. The prediction equation for P-PST Reading where College Aptitude was measured by SAT Verbal and Math scores is listed below.

\[
P-\text{PST Reading Prediction Equation Weights}
\]

\[
P-\text{PST Reading} = 0.03454 (\text{SAT Verb}) + 0.01126 (\text{SAT Math}) -3.25878 (\text{Race 1}) -5.45158 (\text{Race 2}) + 158.28810 (\text{Constant})
\]

In reviewing the prediction equation for Reading, SAT Verbal scores were the strongest predictor variables for P-PST Reading. Race 1 (Blacks) and Race 2 (Hispanics) would again have subtraction values of -3 and -5, respectively.

The Summary Table presents the steps in the Multiple Linear Regression Procedure for P-PST where College Aptitude were expressed as SAT scores.

<table>
<thead>
<tr>
<th>Step Variable</th>
<th>( R^2 )</th>
<th>( R_{adj}^2 )</th>
<th>( F )</th>
<th>Sig of ( F ) for Equs</th>
<th>( R^2 ) Change</th>
<th>( F ) Change</th>
<th>Sig of ( F ) for Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. SAT Verb</td>
<td>.6968</td>
<td>.4855</td>
<td>.4811</td>
<td>108.545 &lt;.001</td>
<td>.4855</td>
<td>108.545 &lt;.001</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>2. Race 2</td>
<td>.7167</td>
<td>.5136</td>
<td>.5051</td>
<td>60.186 &lt;.001</td>
<td>.0280</td>
<td>6.570 &lt;.05</td>
<td>&lt;.05</td>
</tr>
<tr>
<td>3. SAT Math</td>
<td>.7328</td>
<td>.5370</td>
<td>.5247</td>
<td>43.680 &lt;.001</td>
<td>.0234</td>
<td>5.703 &lt;.05</td>
<td>&lt;.05</td>
</tr>
<tr>
<td>4. Race 1</td>
<td>.7457</td>
<td>.5561</td>
<td>.5402</td>
<td>35.072 &lt;.001</td>
<td>.0191</td>
<td>4.818 &lt;.05</td>
<td>&lt;.05</td>
</tr>
</tbody>
</table>

For P-PST Reading, the strongest combination of predictor variables were SAT Verbal, Race 2, SAT Math, and
Race 1. The $R^2$ for the prediction equation was .56, the highest $R^2$ for P-PST Reading of any College Aptitude measure.

Hypothesis XII stated that a statistically significant prediction equation would be found where Pre-Professional Skills Test (P-PST) Writing was the dependent variable and some combination of predictor variables were the independent variables. The prediction equation for P-PST Writing with College Aptitude expressed as SAT Verbal and Math is listed below.

**P-PST Writing Prediction Equation**

<table>
<thead>
<tr>
<th>Weights</th>
</tr>
</thead>
<tbody>
<tr>
<td>P-PST Writing = .01800 (SAT Verb) + .01210 (SAT Math) - 3.63320 (Race 1) + 1.04717 (Race 2) + 162.70695 (Constant)</td>
</tr>
</tbody>
</table>

SAT Verbal and SAT Math were the best predictors of P-PST Writing of the independent variables. Blacks (Race 1) had a subtractive value of -3, but the Hispanics (Race 2) had an additive value of +1. Less than ten Blacks and Hispanics had SAT scores so the Race variable weight was not viewed as a stable statistic.

Table XXI shows the order the independent variables were entered into the prediction equation.

**TABLE XXI**

<table>
<thead>
<tr>
<th>SUMMARY TABLE FOR PREDICTION EQUATION FOR P-PST WRITING: COLLEGE APTITUDE = SAT VERBAL AND SAT MATH</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Step Variable</strong></td>
</tr>
<tr>
<td>-------------------</td>
</tr>
<tr>
<td>1. SAT Verb</td>
</tr>
<tr>
<td>2. SAT Math</td>
</tr>
<tr>
<td>3. Race 1</td>
</tr>
<tr>
<td>4. Race 2</td>
</tr>
</tbody>
</table>

*Race 2 is not a statistically significant predictor variable.*
Examination of Table XXI indicates that SAT Verbal, SAT Math and Race 1 were the best combination of independent variables to predict P-PST Writing. Race 2, while not statistically significant, was entered into the equation to reflect total race.

Hypothesis XIII reported that a statistically significant prediction equation would be found where Pre-Professional Skills Test (P-PST) Math was the dependent variable and some combination of predictor variables were the independent variables. The prediction equation for P-PST Math consisted of the following independent variables.

P-PST Math Prediction Equation

\[
\begin{align*}
P-PST \text{ Math} &= 0.05976 \times (\text{SAT Math}) \\
&-4.90801 \times (\text{Race 1}) \\
&+2.72121 \times (\text{Race 2}) \\
&+150.73705 \times (\text{Constant})
\end{align*}
\]

In reviewing the Prediction Equation for P-PST Math, SAT Math was the strongest predictor variable. With the small numbers of Blacks and Hispanics having SAT scores, the Race 1 and Race 2 variable weights were treated with extreme caution.

The summary table lists only two significant independent variables, SAT Math and Race 1. Race 2 was entered to reflect total race, but was not statistically significant. SAT Math had a high R (.63) for predicting P-PST Math.

Discussion

Prediction equations were computed for each of the four sections of P-PST: Total, Reading, Writing, and Mathematics.
College Aptitude scores, Verbal and Math, were the strongest predictors of P-PST scores. Race was the next strongest predictor. In the cases where Blacks and Hispanics had less than ten students with College Aptitude Scores, the race variable was not treated as a stable statistic. Less than ten Blacks had ACT scores and SAT complete verbal and math scores. Less than ten Hispanics had SAT College Aptitude scores.

College hours was the weakest predictor variable. Only in P-PST Total where College Aptitude was reported in combined standard scores and in ACT scores was the $R^2$ significant at the .05 level. The P-PST Math Prediction Equation also had college hours as a statistically significant variable when College Aptitude was reported in combined standard scores.

**TABLE XXII**

**SUMMARY TABLE FOR PREDICTION EQUATION FOR P-PST MATH:**

**COLLEGE APTITUDE = SAT VERBAL AND MATH**

<table>
<thead>
<tr>
<th>Step Variable</th>
<th>$R^2$</th>
<th>$R^2$</th>
<th>Adj $R^2$</th>
<th>$F$ for Equation</th>
<th>Sig of $F$ for Equation</th>
<th>$R^2$ Change</th>
<th>$F$ for Change</th>
<th>Sig of $F$ for Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. SAT Math</td>
<td>.7959</td>
<td>.6334</td>
<td>.6302</td>
<td>198.718</td>
<td>&lt;.001</td>
<td>.6334</td>
<td>198.718</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>2. Race 1</td>
<td>.8144</td>
<td>.6632</td>
<td>.6573</td>
<td>112.239</td>
<td>&lt;.001</td>
<td>.0298</td>
<td>10.076</td>
<td>&lt;.01</td>
</tr>
<tr>
<td>3. *Race 2</td>
<td>.8180</td>
<td>.6577</td>
<td>.6603</td>
<td>76.163</td>
<td>&lt;.001</td>
<td>.0059</td>
<td>2.014</td>
<td>=.159</td>
</tr>
</tbody>
</table>

*Race 2 is not a statistically significant predictor variable.*
The lowest $R^2$'s were found in the Prediction Equations for P-PST Writing. College Aptitude Verbal was the best predictor variable. The highest $R^2$ value was reported for P-PST Writing when College Aptitude was expressed as ACT Verbal or SAT Verbal scores, .43 and .42, respectively.

Summary

The purpose of this Chapter was to present, analyze, and discuss the data obtained from this study. The hypotheses were presented and the data were analyzed to determine acceptance or rejection of the Hypotheses. Hypothesis 1 was accepted. However, ACT and SAT scores were treated separately and combined in order to reflect the most data on College Aptitude scores for minorities. Hypotheses II, III, IV, were accepted for Total Students, Whites, Blacks, and Hispanics. One qualification must be considered. When the number of students were less than ten, statistically significant correlations were not always found. However, when dealing with numbers less than ten, the correlations were not treated as stable statistics.

Hypothesis V was rejected. Blacks did not show a correlation between P-PST Mathematics and College Aptitude Quantitative when the sample size was twelve. Total Students, Whites, and Hispanics did report a correlation between P-PST Mathematics and College Aptitude Quantitative.
Hypotheses VI-IX were rejected. College hours and P-PST Total, P-PST Reading, P-PST Writing, and P-PST Mathematics were not significantly correlated for Hispanics. Only total College hours and P-PST Mathematics was statistically correlated for Blacks. College hours and P-PST Total, P-PST Reading, P-PST Writing, and P-PST Mathematics had low statistically significant correlations for Total Students and Whites.

Hypotheses X-XIII were accepted. Statistically significant prediction equations were formed for all sections of P-PST: Total, Reading, Writing, and Mathematics. College Aptitude was the most consistent predictor variable for the P-PST. Race was second and college hours was third.
CHAPTER V

SUMMARY, FINDINGS, AND RECOMMENDATIONS

Summary

The purpose of this study was to determine the relationships between college aptitude, race, college hours completed and Pre-Professional Skills Test (P-PST) scores for education students in Texas public colleges and universities.

The Hypotheses were stated as follows.

I. There is no significant difference in the correlation of total American College Test (ACT) scores with total Pre-Professional Skills Test (P-PST) scores and the correlation of total Scholastic Aptitude Test (SAT) scores with total Pre-Professional Skills Test (P-PST) scores.

II. A statistically significant correlation exists between College Aptitude total score and Pre-Professional Skills Test (P-PST) total score for students of each racial group taken separately or together as a whole.

III. A statistically significant correlation exists between College Aptitude Verbal scores and Pre-Professional Skills Test (P-PST) Reading scores for students of each racial group taken separately or together as a whole.
IV. A statistically significant correlation exists between College Aptitude Verbal scores and Pre-Professional Skills Test (P-PST) Writing scores for students of each racial group taken separately or together as a whole.

V. A statistically significant correlation exists between College Aptitude Quantitative scores and Pre-Professional Skills Test (P-PST) Mathematics scores for students of each racial group taken separately or together as a whole.

VI. A statistically significant correlation exists between number of college hours completed and total Pre-Professional Skills Test (P-PST) scores for students of each racial group taken separately or together as a whole.

VII. A statistically significant correlation exists between college hours completed and Pre-Professional Skills Test (P-PST) Reading scores for students of each racial group taken separately or together as a whole.

VIII. A statistically significant correlation exists between college hours completed and Pre-Professional Skills Test (P-PST) Writing scores for students of each racial group taken separately or together as a whole.

IX. A statistically significant correlation exists between college hours completed and Pre-Professional Skills Test (P-PST) Mathematics scores for students of each racial group taken separately or together as a whole.
X. A prediction equation with a statistically significant R Square will be found where total Pre-Professional Skills Test (P-PST) score is the dependent variable and some combination of College Aptitude Verbal score, College Aptitude Quantitative score, college hours completed, and race are the independent variables.

XI. A prediction equation with a statistically significant R Square will be found where Pre-Professional Skills Test (P-PST) Reading score is the dependent variable and some combination of College Aptitude Verbal score, College Aptitude Quantitative score, college hours completed, and race are the independent variables.

XII. A prediction equation with a statistically significant R Square will be found where Pre-Professional Skills Test (P-PST) Writing score is the dependent variable and some combination of College Aptitude Verbal score, College Aptitude Quantitative score, college hours completed, and race are the independent variables.

XIII. A prediction equation with a statistically significant R Square will be found where Pre-Professional Skills Test (P-PST) Mathematics score is the dependent variable and some combination of College Aptitude Verbal score, College Aptitude Quantitative score, college hours completed, and race are the independent variables.

The subjects who participated in the study were 642 students from eight Texas public colleges and universities.
There were 512 White and Others, eighty-two Hispanics and forty-eight Blacks. Colleges with heavy Black and Hispanic students were requested to participate in this study. Colleges with predominantly White students were randomly selected. The subjects took the Pre-Professional Skills Test (P-PST) on the March, 1984 testing date. The students signed release forms so that colleges could furnish either the student's American College Test (ACT) scores or Scholastic Aptitude Test (SAT) scores for this study. In addition, colleges supplied the number of total college hours for each of the students that participated in this study.

After the data were gathered and tabulated, the results were statistically analyzed by using several techniques. First, a correlation analysis was utilized to determine significant relationships among variables of the study. A significance level of .05 was required for acceptance of the involved hypotheses. Secondly, additional analysis of the data was performed with a stepwise multiple linear regression procedure. This procedure allowed the variables most highly correlated with the Pre-Professional Skills Test (P-PST) to be entered into the prediction equation. A significance level of .05 was required for acceptance that a variable made a unique contribution to a prediction equation.

When the sample of students was ten or under, a stable statistic could not be determined. Therefore, inferences were not made on any statistic which had a sample of less than ten.
Findings

Hypothesis I was not accepted. The difference between College Aptitude SAT and College Aptitude ACT was not statistically significant at the .05 level. However, difference was close enough to the .05 statistically significant level that College Aptitude was treated in three ways: Combined College Aptitude Standard Score, College Aptitude SAT, and College Aptitude ACT.

Hypothesis II was accepted. A significant relationship existed between College Aptitude Total and P-PST Total for all students and for all racial subgroups except where there were ten or fewer students. The small numbers of Blacks and Hispanics having SAT College Aptitude scores and Blacks having ACT College Aptitude scores made those results statistically unreliable for those racial groups.

Hypothesis III was accepted. Where the number of students was above ten, a significant relationship existed between College Aptitude Verbal and P-PST Reading at the .05 level of significance or better.

Hypothesis IV was accepted. A significant relationship was reported between College Aptitude Verbal and P-PST Writing when the number in the sample was ten or greater.

Hypothesis V was not accepted. College Aptitude Quantitative and P-PST Mathematics were significantly correlated for Total Students, Whites and Hispanics; however, they were not significantly correlated for Blacks.
when the number was twelve. College Aptitude Quantitative and P-PST Math were not correlated for Hispanics when the number of students was less than ten (SAT Quantitative).

A strong correlation existed between College Aptitude scores and scores on the Pre-Professional Skills Test (P-PST). The Scholastic Aptitude Test (SAT) was the most highly correlated college aptitude test to the Pre-Professional Skills Test (P-PST), .75 with P-PST Total, .56 with P-PST Reading, .42 with P-PST Writing and .66 with P-PST Mathematics. College Aptitude expressed as American College Test (ACT) and College Aptitude expressed as combined ACT and SAT standard scores (Z-scores) were both also highly correlated with the Pre-Professional Skills Test (P-PST).

Colleges that were contacted with predominantly Black Students were reluctant to participate in this study. The Texas Education Agency was not able to obtain permission from these colleges to participate. The small number of Black students who participated in this study made Hypotheses I-V not reliable for Black students in the correlations with College Aptitude and P-PST.

Hypothesis VI was not accepted. College hours and P-PST Total were not significantly correlated for Blacks and Hispanics at the .05 level. There was a significant, but low correlation between P-PST Total and college hours completed for Total Students and Whites.
combination of predictor variables for PSF Total. 
College aptitude math, verbal, and race were the best
Total. When college aptitude was reported with SAT scores,
combination of independent predictor variables for PSF
College aptitude verbal, math, race and hours were the best
Total. When college aptitude was expressed in ACT scores,
combination of independent predictor variables for PSF
aptitude verbal and quantitative and race were the best
expressed as a combined standard score (SAT and ACT), college
was the dependent variable. When college aptitude was
a statistically significant R² was found where PSF Total
hypothesis X was accepted. A prediction equation with
between PSF mathematics and college hours completed.
Hypotheses did not. Blacks had the highest correlation (r=29)
between PSF Mathematics and college hours completed, but
Blacks and whites reported a statistically significant correlation
whites, and blacks reported a statistically significant correlation
hypotheses X was not accepted. Total students,
hours completed for total students and whites,
correlation existed between PSF writing and college
aptitude for Hispanics and Blacks, a very low statistically
significant correlation between PSF writing and college
hypotheses X was not accepted. There was no a

and Hispanics.

correlation existed between PSF reading and college
hypotheses X was not accepted. A statistically, but low

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Hypothesis XI was accepted. A prediction equation with a statistically significant $R^2$ was found where P-PST Reading was the dependent variable. When College Aptitude was expressed in combined standard scores, College Aptitude Verbal, race, and College Aptitude Quantitative were the best combination of independent predictor variables for P-PST Reading. When College Aptitude was expressed as ACT scores, College Aptitude Verbal, race and College Aptitude Mathematics were the best combination of independent predictor variables for P-PST Reading. When College Aptitude was expressed as SAT scores, College Aptitude Verbal, race, and College Aptitude Mathematics were the best combination of independent predictor variables for P-PST Reading. College Aptitude Math was a statistically significant predictor variable for P-PST Reading in all three cases (ACT, SAT, and combined).

Hypothesis XII was accepted. A prediction equation with a statistically significant $R^2$ was found where P-PST Writing was the dependent variable. Where College Aptitude Verbal was combined and reported in standard scores, College Aptitude Verbal and Quantitative, and race were the best combination of independent predictor variables for Pre-Professional Skills Test (P-PST) Writing. Where College Aptitude was expressed as ACT scores, College Aptitude Verbal was the best predictor variable for P-PST Writing. Where College Aptitude was expressed as SAT scores, College
Aptitude Verbal, Mathematics and race were the best independent predictor variables for P-PST Writing.

Hypothesis XIII was accepted. A prediction equation with a statistically significant $R^2$ was found where P-PST Mathematics was the dependent variable. Where College Aptitude was expressed as combined standard scores, College Aptitude Verbal, Quantitative and race were the best independent predictor variables for P-PST Mathematics. Where College Aptitude was expressed as ACT scores, College Aptitude Verbal, Quantitative and race were the best independent predictor variables for P-PST Mathematics. Where College Aptitude was expressed in SAT scores, College Aptitude Verbal, Mathematics, and race were the best combination of independent predictor variables for Pre-Professional Skills Test (P-PST) Mathematics.

Conclusions

The findings of this investigation support the following conclusions.

1. A strong correlation exists between College Aptitude scores and scores on the Pre-Professional Skills Test (P-PST) for students attempting to enter teacher education programs in Texas public colleges and universities. Colleges can evaluate students' College Aptitude scores for a preliminary indication of the probable success students will have in taking the Pre-Professional Skills Test.
2. College hours completed have very low or no significant correlation with the Pre-Professional Skills Test. The score a college student makes appears to be more a result of high school training than completed college hours. This accounts for the high correlation with college aptitude scores and the low or no significant correlation with the number of college hours completed.

3. Race correlates with the Pre-Professional Skills Test. Blacks and Hispanics appear to score lower on the Pre-Professional Skills Test (P-PST) than do Whites and others. The prediction equations often assigned minus points to Blacks and Hispanics in the calculations of predicted score. The numbers of Blacks having College Aptitude scores severely limits the applicability of this statement. However, the summary data from the March, 1984, testing date of the Pre-Professional Skills Test (P-PST) showed that a higher percentage of Blacks and Hispanics failed the P-PST than did Whites and others. The field testing that the Educational Testing Service conducted on the P-PST with 3,000 students also supported this statement.

4. Student scores on the Pre-Professional Skills Test (P-PST) can be predicted from some combination of College Aptitude scores, race, and to a much lesser extent, college hours completed. Prediction equations can be utilized by colleges who have this data on students, to forecast the
likelihood of success a student would have on the Pre-Professional Skills Test (P-PST).

Recommendations

Based upon the results of the study, the following recommendations are made.

1. Students furnish college aptitude scores to teacher education programs in Texas colleges and universities. These scores would not be used for entrance criteria to the colleges that presently do not require the American College Test (ACT) or Scholastic Aptitude Test (SAT) for admission, but rather to predict how students will score on the Pre-Professional Skills Test.

2. Prediction equations be used by the colleges to identify students who will experience difficulty in scoring passing grades on the Pre-Professional Skills Test (P-PST). The prediction equations can identify students early so that students can decide to get more help in basic skills or decide to not attempt to take the P-PST at that time.

3. Students who enter colleges with low college aptitude scores be given the opportunity to take non-credit basic skills classes to prepare them to take the Pre-Professional Skills Test.

4. This study be replicated to include more minorities. The small number of Blacks having American College Test (ACT) scores or Scholastic Aptitude Test (SAT) scores made the data on race correlations very unstable.
Hispanics had few Scholastic Aptitude Test (SAT) scores but had a fairly large sample of American College Test (ACT) scores. Minorities should have ACT or SAT scores as a prerequisite to participate in the study.

5. A longitudinal study be conducted to measure the effects of semester basic skills training on a student's score on the Pre-Professional Skills Test.
APPENDIX B

Availability of the P-PST

A copy of the Pre-Professional Skills Test is not contained in this dissertation. The Texas Education Agency uses this test as a screening instrument for those students who wish to enter teacher education programs. A student must attain a passing score to be admitted to any teacher education program in Texas.

Copies of the test can only be seen when one is actually taking the test. Close security measures are followed by the Educational Testing Service, the producers of the test. Reliability and validity measures would be violated if anyone but the students taking the test, had access to the actual test.

Anyone wishing information on the Pre-Professional Skills Test should write the Educational Testing Service, Southwest Tower, Suite 100, Austin, Texas, 78701.
August 9, 1984

Dr. Frank Halstead
Chairman
Doctoral Advisory Committee
North Texas State University
Denton, Texas 76202

Dear Dr. Halstead:

The State Board of Education adopted the Pre-Professional Skills Test published by the Educational Testing Service as an admission requirement to state approved teacher education programs. Prior to this adoption, the state studied the validity, suitability, and potential impact of the use of this test. There have been numerous other areas of study identified since this action was taken by the Board.

I have met with Mrs. Annette Griffin on numerous occasions and discussed her study entitled The Relationships Between College Aptitude, Race, College Hours Completed, And P-PST Scores In Texas State Colleges And Universities. This study will yield new research in a number of areas of interest to the state since this is a recently published test. Results of this study will be useful in future decisions concerning continued use or possible modifications.

I look forward to receiving a copy of Mrs. Griffin's research and I will gladly offer the state level data necessary for the study.

Sincerely,

Marvin Veselka
Associate Commissioner
for Professional Support

MV:sjs
APPENDIX C
RELEASE FORM

Passing the Pre-Professional Skills Test is now required for admission into teacher education programs in Texas. The Texas Education Agency is interested in a continued study of this test and the students required to take it. Your permission is needed to obtain test scores and match them with other achievement information. This is voluntary, but your assistance is needed. Thank you.

I hereby grant to researcher, Mrs. Annette Griffin, of North Texas State University, the right to receive my scores from the July 21, 1984 administration of the Pre-Professional Skills Test. Mrs. Griffin is also granted permission to request and obtain my ACT or SAT score from the institution I am attending or the appropriate testing company. I clearly understand that as soon as my scores are obtained and matched, my name or other identification will be erased from all records by the researcher before any analysis or report development is begun.

Print Full Name

Signature

DATA FOR STUDY

1. List the mathematics courses you completed in high school:

2. How many credit hours of mathematics have you completed in college?

3. How many years of English/Language Arts did you complete in high school?

4. How many credit hours of English/Language Arts have you completed in college?

5. At the end of last semester, how many total credit hours have you earned in college?

6. Give the name of the college or university at which you are now enrolled:

7. Circle the appropriate response:
   (a) I am a  male  female.
   (b) I am  black  Mexican American  white  other.

IF YOU HAVE AGREED TO PARTICIPATE IN THIS STUDY, PLEASE SHOW NORTH TEXAS STATE UNIVERSITY AS ONE OF THE INSTITUTIONS TO RECEIVE YOUR SCORES ON ITEM 12 OF THE P-PST ANSWER SHEET.
<table>
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<th>Name</th>
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<th>ACT or SAT</th>
<th>P-PST</th>
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