AN INVESTIGATION OF THE PREDICTIVE VALIDITY
OF THE TESTS OF GENERAL EDUCATIONAL
DEVELOPMENT FOR TWO-YEAR
COLLEGE STUDY

DISSERTATION

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By

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This study investigates the predictive value of the high-school-level battery of the Tests of General Educational Development (GED) for two-year college academic performance. Previously, numerous predictors of college grade-point average have been investigated. Two general classes of information have been found to be most useful in the prediction of college academic performance, and they include (a) measures of academic achievement, and (b) measures of scholastic aptitude obtained from scores on standardized tests such as the ACT and SAT. Measures shown to be effective in the prediction of academic performance in the four-year college appear equally effective in the prediction of this criterion in the two-year college. However, for the educationally-disadvantaged person who did not graduate from high school, such information is either not available or not entirely applicable. One alternative source of information, scores on the GED, is often available for the high school non-graduate desiring to attend college.

The Educational Testing Service recently published a monograph which strongly suggests that the GED holds promise
as a predictive device for college academic performance and also suggests that the GED may predict better for the two-year college than for the four-year college. It was therefore hypothesized that both mean GED standard score and GED subtest standard scores would provide significant prediction of the two-year college academic performance of high school non-graduates, and that this relationship would hold for both transfer and terminal associate degree programs. A total of thirteen hypotheses were formulated for empirical testing.

First semester, two-year college GPA data were gathered for three primary groups and three supplemental groups of two-year college freshman, and predictor data including scores on the GED as well as organismic information were gathered from a subject pool of first semester students at South Plains College in Levelland, Texas. The period sampled was from the Fall, 1970 semester through the Fall, 1973 semester. The first primary group was the major focus of the study. It was composed of a representative sample of high school non-graduates who had completed the GED. The other two primary groups were used for comparison purposes, and the N for each of the primary groups was 100.

Statistical analysis of the data was performed using a variety of statistical techniques including univariate and multivariate correlation methods, $t$-test, and analysis of variance. Of the thirteen hypotheses formulated and tested
in the study, eleven were statistically significant at the .05 level. With the acceptance of the majority of the research hypotheses, it is concluded that the GED is a valid predictor of first semester, two-year college GPA. It is also concluded that the use of the standard scores of individual component subtests of the GED as predictors provides valid and slightly more efficient prediction of first semester, two-year college GPA than the use of only mean GED standard score as a predictor, and that GED Test 4, Interpretation of Literary Materials, is the single most effective GED subtest in predicting this criterion.
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CHAPTER I

INTRODUCTION

The body of published research related to the prediction of college grade-point average is quite extensive. A wide variety of predictor variable categories have been investigated, including such factors as interest patterns, personality characteristics, sex of student, biographical and demographical items, high school rank, high school subject fields, and aptitude and achievement test results.

One of the most promising classes of predictors has been standardized test scores. The American College Test (ACT) and the Scholastic Aptitude Test (SAT) are both now widely used as aids in establishing expectancy tables and predicted first semester college grade-point average (GPA) for prospective college students. Another factor consistently shown to be a significant predictor of college academic performance has been high school academic performance. This variable seems quite satisfactorily utilized when complete high school records through the senior year are available. Measures such as high school class rank upon graduation (HSR) and overall three- or four-year high school grade-point average (HSGPA) have
proven their value in the prediction of college academic performance.

However, for the student who desires to obtain further training following secondary studies, but who has not completed formal high school studies through completion of the senior year, predictors such as cumulative HSGPA and HSR are not available. The 1971 manual for the high school battery of the Tests of General Educational Development (GED) indicates that these tests are designed to provide an estimate of the level of functioning in the area of high school academic skills for persons not having completed formal high school training (8). Those persons meeting a certain criterion for performance on these tests are considered to have the equivalent of a high school education and are issued a certificate of high school equivalency by a state educational agency. It might therefore be reasoned that for the high school non-graduate who does not have a complete high school record from which to obtain class rank and cumulative GPA information the GED tests scores provide the best estimate of high school performance, and in this sense, provide a logical substitute for the complete high school academic record.

The Educational Testing Service recently published a monograph entitled The Non-High-School-Graduate Adult in College and His Success as Predicted by the Tests of General Educational Development (15). This monograph
strongly suggested that the high school level GED had promise as a predictive device for college academic performance. The publication also suggested that the GED may predict better for the two-year college than for the four-year college. As a part of the present study, a survey was conducted of all accredited, degree-granting public and private two-year colleges in the State of Texas. It was found that of the fifty-seven institutions reviewed, fifty-two definitely accept GED scores as a basis for admission while only five did not specify their policy in this matter.

Since a major source of academic and occupational training for the high school non-graduate client is the wide variety of programs available at the two-year college level, a detailed investigation to clarify and extend the basic findings of the Educational Testing Service monograph seemed well-justified. This was particularly true in view of the documented accessibility of the two-year college to the educationally disadvantaged client who has completed the GED. To date, the criterion aspect of the GED has received considerable attention through its use as documentation of the level of academic achievement of the high school non-graduate student, while the predictive aspect has not. This study investigated the predictive value of the high-school-level battery of the GED for two-year college academic performance.
Statement of the Problem and Purposes of the Study

The problem under study was to investigate the validity of the high-school-level battery of the Tests of General Educational Development as a predictor of two-year college grade-point average.

To investigate this problem, the following purposes were formulated:

1. To extend the previous initial findings regarding the effectiveness of the high school level GED test battery as a predictor of overall two-year college GPA.

2. To determine the nature of the relationship between scores on the GED and academic performance in three different types of two-year college programs, including transfer degree, terminal degree, and technical certificate.

3. To determine the nature of the relationship between scores on the GED and academic performance in both transfer and terminal degree subject categories, as measured by GPA in major field and required general and elective courses.

4. To investigate the relationship between two-year college GPA of the subjects and such subject factors as sex, age, number of high school grades completed, GED completion status for high school non-graduate subjects, and high school graduation status.

Hypotheses

To accomplish these purposes, the following hypotheses were developed for testing:

I. There will be a significant positive relationship between mean GED standard score (SS) and first semester, two-year college GPA.
II. There will be a significant positive relationship between the SS of the component sections of the GED and first semester, two-year college GPA.

III. The prediction of first semester, two-year college GPA by the SS of the component sections of the GED will be significantly improved when the variables of age of subject and number of high school grades completed are added as predictors.

IV. There will be a significant positive relationship between the SS of the component sections of the GED and first semester, two-year college GPA when the GPA is predicted separately by sex.

V. There will be a significant positive relationship between the SS of the component sections of the GED and first semester, two-year college GPA when the GPA is predicted individually for transfer and terminal degree programs.

VI. There will be a significant positive relationship between mean GED SS and first semester, two-year college GPA when the GPA is predicted for two-year, technical certificate programs.

VII. There will be a significant positive relationship between the SS of the component sections of the GED and first semester, two-year college transfer degree GPA as recorded by course category (major field and required general plus elective courses).
VIII. There will be a significant positive relationship between the SS of the component sections of the GED and first semester, two-year college terminal degree GPA as recorded by course category (major field and required general plus elective courses).

IX. There will be no significant difference between the overall first semester, two-year college GPA of high school graduates and the overall first semester, two-year college GPA of high school non-graduates who completed the GED.

X. High school non-graduates who have completed the GED and high school graduates will have a significantly higher first semester, two-year college GPA than high school non-graduates who have not completed the GED.

XI. The mean vector of GED scores for high school non-graduates who have completed the GED and enrolled in a two-year college transfer degree program will be significantly different from the mean vector of GED scores for a similar group enrolled in a two-year college terminal degree program, with GED Test 1 the best discriminator between the groups.

XII. There will be no significant difference between the mean first semester, two-year college GPA of GED students pursuing two consecutive long semesters following initial enrollment and the mean first semester, two-year
college GPA of GED students pursuing only one long semester before interruption of study for at least one long semester.

XIII. High school non-graduates who have completed the GED and have scores on file will have a significantly higher first semester, two-year college GPA than high school non-graduates who have completed the GED but have submitted a copy of an equivalency certificate in lieu of the GED scores.

Background and Significance

The search for effective predictors of college academic performance is not a recent development. Predictors of all types have been studied. Use of univariate correlational techniques predominated in earlier studies, but more recent studies have taken advantage of computer development in order to utilize multivariate correlational techniques such as multiple regression analysis. Two general classes of information have been established as providing the best prediction of college academic performance. These may both be considered ability measures, and they include (a) measures of high school academic achievement usually expressed in the form of high school rank at graduation (HSR) or cumulative high school grade-point average (HSGPA), and (b) measures of scholastic aptitude which are obtained from scores on standardized tests such as the American College Test (ACT), the
Scholastic Aptitude Test (SAT), and the School and College Ability Test (SCAT). Other test information obtained either from group or individual mental ability tests have also been used with moderate success.

Michael, et al. (12), Burnham and Hewitt (4), and Scannell (14) have all demonstrated the predictive value of high school achievement for subsequent college academic performance. Other investigators have demonstrated that aptitude test scores are also substantial predictors of college performance, including DeSena and Weber (6), Lenning and Maxey (11), Conry and Plant (5), Siegelman (17), and Astor (1). Although the trend in prediction studies in this area has been to use data from four-year colleges and universities, the prediction of academic performance in the two-year college has also received attention, particularly in more recent years. Prediction of academic performance in the two-year college setting has been explored by Hoyt (10), Munday (13), Baird (2,3), and Gustafson (9), who have all demonstrated that the prediction of two-year college GPA can be at least as successful as for four-year colleges. In fact, Sharon (16) has shown that in some cases two-year college GPA is more predictable than four-year college GPA.

From the research, it may be documented that for the person wishing to enter either a four-year or two-year college, and who has completed high school, college
performance may be predicted rather well using high school data such as HSR and HSGPA. However, for the educationally-disadvantaged person who did not graduate from high school, and for whom neither HSR nor HSGPA is available, the research information may not be entirely applicable. One alternative, the use of scores on the high-school-level battery of the Tests of General Educational Development (GED), is often available for the high school non-graduate desiring to attend college. In early studies, Dressel and Schmid (7) and Tyler (18) established the positive predictive possibilities of the GED for college academic performance, and a recent, extensive study by Sharon (15) has further documented that the GED tests hold promise for prediction of college academic performance for both two-year and four-year college matriculants.

The GED tests may well prove to be representative of much of the same information encoded in HSR and HSGPA. This study will therefore attempt to investigate the predictive possibilities of the high school level of the GED for college academic performance at the two-year level, and to demonstrate that despite the lack of HSR and HSGPA information for the high school non-graduate, academic performance can be satisfactorily predicted for this client.
Definition of Terms

**Educationally Disadvantaged.**—This term is used to refer to persons who have not completed formal studies at the high school level that would result in the awarding of an earned high school diploma, despite the fact that they may have completed the equivalent of a high school education as defined by the high school battery of the *Tests of General Educational Development*.

**GED.**—This notation is used to refer to those tests which individually and collectively comprise the high-school-level battery of the *Tests of General Educational Development*, and has no reference to the college-level battery of the *Tests of General Educational Development* also published by the American Council on Education.

**HSGPA.**—This notation is used to refer to cumulative three- or four-year high school grade-point average, as computed arithmetically to obtain a resultant mean of high school grades.

**HSR.**—This notation is used to refer to a high school graduate's relative standing in his graduating class, termed "rank in high school graduating class." HSR is most frequently computed by simply reporting the student's numerical rank in the total number of students in the graduating class or by designating the student as falling in the upper quarter, lower one-half, or wherever the
academic performance placed the student in the graduating class.

**SS.**—This is a statistical notation used to denote reference to a standard score. In this study, the term SS is used to refer to a normalized standard score computed using the McCall T-Scale procedure. The actual conversion procedure for each raw score is to refer to a normative table in the GED manual which gives the normalized SS for each subtest raw score obtained by the subject.

**Limitations of the Study**

This study was limited to a single two-year college population. For this reason, the inferences which were drawn for two-year colleges in general were more limited than would have been the case had the investigation included a number of two-year colleges.

**Basic Assumptions**

It was assumed that the two-year college which was sampled was representative of two-year colleges which have a student population of less than 5000 and are located in the Southwest area of the United States. It was also assumed to be generally representative of two-year colleges with both technical-occupational and transfer academic curricula. It was further assumed that the sampling procedure which was utilized in this study produced a random sample and that no systematic source of error was involved in subject selection or data collection.
Procedures for the Collection of Data

The subjects in the study were first-year students at South Plains College in Levelland, Texas. High school non-graduates who had completed the GED and had enrolled in either a two-year transfer degree program or a two-year terminal degree program received primary emphasis in the study. The grade-point average predicted was the first semester, first year GPA at South Plains College. All information needed for each subject was contained in the permanent record file in the Registrar's Office, and all subjects were first semester freshman. A data card was prepared for each subject, and the data then were recorded on this card by an independent, but trained recorder. The subjects were then identified only by number after the initial selection had been made from student master lists for the semesters sampled. These master lists were computer printouts indicating by semester the classification of the student and the basis for his admission, whether by high school diploma, GED score record, or individual approval for high school non-graduates without the GED.

The sample drawn included three major groups. The first group was the primary focus of the study, and involved selection of a representative sample of high school non-graduates who had completed the GED. This group was composed of two subgroups of equal N, one containing GED subjects enrolled in a transfer degree curriculum, and
the other containing GED subjects enrolled in a terminal degree curriculum. Information recorded for this group from the permanent student records included name, age, sex, number of high-school grades completed, date of first South Plains College attendance, the SS of each GED test and the mean GED SS, as well as the type of program being pursued. In addition, first semester GPA, grades in the major field, and grades in required and elective courses as defined by the college catalog were recorded for the semester sampled.

The second and third groups were used for comparison purposes rather than the primary thrust of the study. The second group was composed of a representative sample of educationally-disadvantaged, high school non-graduates who had not completed the GED. The third group was composed of a representative sample of high school graduates. The N for each of the three major groups was 100, and the total N was 300. Appropriate sampling constraints and systematic selection procedures were imposed to maintain adequate representativeness of the sample, which included students enrolled in long semesters from the fall of 1970 through the spring of 1973. Information recorded for the second and third groups included name, age, sex, and first semester, first-year GPA.

In addition to the major groups, several supplemental groups were selected as an adjunct to the three major ones.
The first supplemental group selected included all GED students from the sampling period who met the constraints and were enrolled in a two-year, technical certificate program. The total N for this group was 30. The second supplemental group included all GED students, divided into two subgroups: GED students with scores recorded in the permanent record file and GED students without scores on file, but with only a copy of an equivalency certificate on file. The subgroup Ns were 162 and 118 respectively. The third supplemental group included all GED students from the sampling period, subdivided into two subgroups: GED students who had pursued at least two consecutive long terms of training and GED students who had completed only one long term before training interruption. The subgroup Ns were 153 and 127 respectively, and the sampling constraint that GED scores be on file was omitted for this supplemental group.

Organization of the Study

The second chapter, "Review of the Literature," includes studies pertaining to (1) prediction of college GPA by measures of high school achievement, (2) prediction of college GPA by measures of scholastic aptitude, and (3) prediction of college GPA by nonintellectual variables.

The third chapter, "Procedures of the Study," includes a description of the instrument that is the major focus of
The study, the GED, and research studies in which the GED has been used. Also included are descriptions of the methods used in obtaining the data for the study and procedures used in the statistical treatment of the data.

The fourth chapter, "Presentation of the Data," details the findings of this research.

The fifth and final chapter is a summary of the study, findings, conclusions, and recommendations relating to the use of the Tests of General Educational Development as a predictive instrument for two-year college academic performance.
CHAPTER BIBLIOGRAPHY

1. Astor, M. H., "Reading Test or Counseling Interview to Predict Success in College?" *Journal of Reading*, XI (February, 1968), 343-345.


CHAPTER II

REVIEW OF THE LITERATURE

An extensive review of the literature related to the prediction of college academic performance revealed that this area has been quite rigorously investigated. Much of the basic groundwork for more recent and detailed studies was done prior to 1960, and although now somewhat historical for this review, the research provided certain basic principles from which the impetus and direction for later investigation of the entire area of college academic performance prediction were derived.

In considering more recent research, it was noted that the trend has been toward prediction of college academic performance of specific student groups and academic performance areas from research-derived variables. New trends and emphases have appeared, while others have remained relatively unchanged. No attempt was made to report here all research related to prediction of college academic performance due to the vast amount of work reported in this area. Only those studies considered indicative of general trends in terms of variable types, investigation techniques, and reported results were cited unless they had specific implications for this study.
The research was divided into two categories for review: (1) prediction of college academic performance from measures of intellective functioning and potential, and (2) prediction of college academic performance from nonintellective measures.

Prediction from Intellective Measures

The question of what constitutes an adequate index of college student performance has been raised by Lavin in a discussion in which he acknowledged student academic performance as reflected by grades as the standard measurement, and also emphasized societal and personal goals and needs as variables to consider in the development of other, future criteria of student performance (28, pp. 16-17). College academic performance in all studies cited, unless specifically excepted as noted, was defined in terms of grade-point average.

Prediction of college performance from intellective ability or functioning came from two general classes of information. These two were (a) measures of high school academic achievement, usually represented in the form of high school rank at graduation (HSR) or cumulative high school grade-point average (HSGPA), and (b) measures of scholastic aptitude which were obtained from scores on standardized tests such as the American College Test (ACT), the Scholastic Aptitude Test (SAT), formerly known as the
College Entrance Examination Board (CEEB), and the School and College Ability Test (SCAT). This distinction, noted by Lavin, was undoubtedly relevant for this or any similar study, but research was difficult to report in a separate manner since most studies reviewed included both types of data as predictors within the same study (28, p. 51).

In a 1949 review, Cronbach reported that correlations between college level ability tests and college grade-point average were usually in the .40 to .50 range (13, pp. 264-265). This conclusion was corroborated in a 1950 review by Henry (21). The studies reviewed generally made use of simple Pearson product-moment correlational analysis in obtaining the reported coefficients, since multivariate technique usage was much more limited at that time than is now the case with the advent of widespread electronic computational techniques. However, Cronbach did report that some multiple correlations at the time of his 1949 review were in the .60 range (13, p. 267). The general approach at that time was to utilize what one author, Lavin, has termed the "global approach" to prediction, wherein all types of predictors and criteria were included without specific differentiation in the computation of predictor equations (27, p. 49).

More recently, Michael, et al. (33), Mann (32), Burnham and Hewitt (8), and Scannell (39) have all demonstrated the predictive value of high school academic
achievement for subsequent college academic performance. Michael investigated the predictive validity of CEEB scores and HSGPA for freshman GPA at a large major university. The authors obtained beta weights twice as large for HSGPA as for CEEB scores in predicting the criterion, but noted that a combination of these predictors produced better prediction than either used separately. Multiple correlation values of .61 for women and .45 for men were obtained by Michael (33, p. 400). Burnham and Hewitt found a zero-order correlation coefficient of .45 for HSGPA and a multiple correlation of .54 when CEEB scores were added to HSGPA in predicting freshman GPA (8, p. 23).

In a similar study, Scannell noted an even higher correlation of .67 for HSGPA with college freshman GPA. HSR proved the next best predictor of the criterion. Scores from the Iowa Tests of Educational Development (ITED) predicted less effectively than either of the other high school achievement measures in this study (39, p. 131). In the same study, scores from the Iowa Tests of Basic Skills (ITBS) were used as a predictor of college freshman GPA, and fourth grade ITBS scores yielded an R-value of .45 with the criterion, strongly suggesting that even elementary school standardized achievement measures can be useful as predictors of college performance (39, p. 132). Mann, in a 1961 study, demonstrated that both SAT and SCAT scores provided substantial prediction of first year
college GPA at a private woman's college, with SAT-Verbal correlating .68 with the criterion and SAT-Math correlating .63 with the criterion. SCAT-Verbal score correlated .66 with the criterion and SCAT-Quantitative correlated .61 with the criterion. However, it is important to note that HSR alone correlated .70 with the criterion, first semester, college GPA. Combining HSR with SAT and SCAT-Total scores provided R-values of .82 and .83 respectively (32, p. 482). It should be mentioned that all students were female, a factor which has drawn considerable attention in more recent studies involving prediction of college student academic performance.

Sex of student has been investigated as a concurrent variable with ability measures by Seashore (41), Lewis (29), and Worthington and Grant (46). Seashore recommended in 1962 the computation of prediction equations separately for males and females as well as pooling all data in prediction (41, p. 268). Lewis obtained R-values of .48 and .64 for males and females respectively when predicting first quarter college GPA from standard aptitude and achievement measures such as SCAT scores and HSR (29, p. 403). More recently, Worthington and Grant confirmed in a multivariate analysis of factors influencing success in college that the variable of sex of student is one which must be considered in prediction of college academic success and one that was too often overlooked (46, p. 9).
Other investigators have demonstrated that aptitude test scores are also substantial predictors of college academic performance. DeSena and Weber determined that SCAT-Total score correlated .67 with first year college GPA, while ACT Composite correlated .52 with the same criterion (14, p. 1151). Both SAT scores and HSGPA were investigated by Siegelman in a study which again documented that HSGPA was the better single predictor, but prediction by both variables combined yielded better overall prediction with R-values of .40 for males and .56 for females (43, pp. 948-949). Lenning and Maxey found in a recent comparison of ACT and SAT scores as predictors of college GPA that the two tests predict this criterion about equally as well, with R-values ranging from .40 to .45 (28, pp. 402-403). Conry and Plant observed that scores on the Wechsler Adult Intelligence Scale (WAIS) correlated slightly higher with first year, college GPA than scores on the ACE group intelligence test, with correlation coefficients of .44 and .38 respectively (12, p. 498). Passons found in a study investigating the predictive validities of the ACT, SAT, and high school grades for overall first semester, college GPA and individual freshman course grades that although HSGPA had a higher predictive validity for overall first semester GPA at the four-year college (r of .41), the test scores, including subtest and composite scores from both standardized instruments,
predicted individual course grades slightly but not significantly higher. The SAT and ACT were found to be roughly equivalent in their predictive power (38, pp. 1143-1149). Lanier and Lightsey studied SAT-Verbal scores and HSGPA as predictors of freshman English grades at a four-year college and reported that HSGPA proved a very worthwhile overall predictor, correlating .66 with the criterion, but that SAT-Verbal scores correlated .74 with the same criterion. The hypothesis of differential prediction was emphasized, in which specific predictors were utilized to predict specific subject area academic performance (26, p. 128). In fact, Astor found that even an achievement test of a specific skill such as reading can be of value in predicting overall college academic success (1, p. 344).

Lavin pointed out that the research of Horst has greatly contributed to the development of a new approach to prediction of academic performance, that of differential prediction:

The rationale here is that while global predictors and criteria emphasize overall academic performance, it is probable that the performance of most students differs qualitatively from one subject to another. That is, most students are good in some things and not so good in others. Furthermore, because of the specialized nature of our occupational system, people must choose to do one thing rather than many things. Thus, it is of practical importance to isolate those abilities on which they are high and those subjects in which they do well. Whereas global prediction cannot tackle this problem differential prediction can deal with it (27, p. 53).
Eells explored the advantages of developing a specialized battery of tests to predict academic success in several major subject matter curricula areas. In that study, conducted at the University of Illinois, the increase in predictability of student academic performance through the use of his special battery was only slightly greater than with the use of standardized tests as predictors. Standardized tests used by Eells included the SCAT-Verbal and SCAT-Quantitative, as well as the Cooperative English Test, two sections of the Differential Aptitude Test, and scores from the state high school achievement test battery. Liberal arts academic performance predictability was increased only from an R-value of .58 using the uniform test battery of standardized tests to an R-value of .61 using the specialized battery developed for this subject area. Similar slight improvements from R-values of .42 to .47 in engineering and from .53 to .55 for commerce-related subjects were also noted (15, pp. 468-469).

Horst developed a predictive battery utilizing stepwise multiple-regression techniques to predict academic performance in thirty-two different college course areas, as well as overall GPA. Using HSGPA in six areas of high school study and a seven section entrance examination developed by Horst, significant multiple correlations were obtained in the prediction of college performance. This result led Horst to conclude that long-range programs of
differential prediction batteries could be developed for any individual institution (24, pp. 468-469). There was no comparison made with global prediction techniques as in the study of Eells, however. Additionally, Travers has demonstrated that measures of verbal abilities correlate more highly with grades for English and foreign language than with grades for mathematics, and that quantitative ability correlates more highly with grades for mathematics than with grades for verbal subject matter areas (45, p. 53).

Agreement concerning the usefulness of differential prediction techniques has been far from unanimous. Cronbach (13) observed that his review revealed that multifactor tests used as predictors added little to the prediction of academic performance in particular courses beyond the prediction which the general intellectual factor yielded. Eells has also observed from his study that while his differential batteries did yield higher multiple correlations with grades in specific curricula than did a single, uniform test battery, the difference in predictability was not sufficient to warrant the additional effort involved in utilizing a differential battery (15, p. 469).

In relation to the prediction of college academic performance through the use of ability measures, a cogent point was raised by several researchers, chief among them Holland. In a series of studies with high-aptitude
students, National Merit Survey participants, Holland (22, 23) and Nichols and Holland (36) found that for such a group in which ability is relatively homogeneous, aptitude test scores such as SAT scores are poor predictors, while other nonintellective personality factors assume greater importance in the prediction process. Holland, in a study utilizing SAT scores and scores from the California Psychological Inventory (CPI), found that the CPI variables predicted the criterion, college freshman GPA, two to three times more effectively than did the standardized test scores, with CPI score correlations ranging to .37 (22, pp. 140-141). The author suggested that combining SAT scores with CPI scores could hold promise in such cases. In a follow-up study, Holland utilized scores from his own Vocational Preference Inventory (VPI), The Sixteen Personality Factor Questionnaire (16 PF), and SAT, as well as HSR to predict the first year, college GPA of National Merit Survey participants. HSR proved to be the best overall predictor, with coefficients ranging from .32 to .55, with SAT scores yielding coefficients from .02 to .11. The 16 PF and VPI scores yielded coefficients of .21 and .25 respectively for these high-aptitude subjects (23, pp. 246-247).

In an extensive monograph summarizing prediction of first year college performance in high-aptitude students,
Nichols and Holland provided excellent documentation for the hypothesis that for this population, ability measures such as the SAT and in some cases HSR and HSGPA used alone are relatively poor predictors and of limited use in selection and guidance since the group is homogeneous on this dimension, while nonintellective factors do prove of value in the prediction process. They stated that the significant correlation coefficients in the .30 to .40 range obtained with the personality measures from the CPI, VPI, and 16 PF were more important for prediction in this grouping because even though aptitude tests made good discriminators for unselected subject pools, they were not found to do so in the homogeneous subject pools utilized in their studies (36, pp. 28-29). Results such as these have prompted some investigators to search further into nonintellective measures in an effort to study possible interactions and relationships which may help improve upon the predictability already established through the use of intellective measures.

Although the majority of prediction studies in the area of college academic performance have utilized data from four-year colleges and universities, the prediction of academic performance in the two-year college has also received attention, particularly in recent years. Seashore, in an address to a national junior college convention in 1956, stressed the need for evaluation of
testing programs for the junior college in view of the
diversity of these institutions in terms of curricula,
philosophy and purposes, and related testing needs. At
that time, he urged that "psychometric research in junior
colleges should be expanded" (40, p. 506). Following this
lead, the prediction of college student academic performance
in the two-year institutional setting was subsequently
explored by Hoyt (25), Munday (34), Baird (2,3), and
Gustafson (19), who demonstrated that the prediction of
college GPA for the two-year institution can be at least as
successful as for the four-year institution. In fact, one
author, Sharon, has demonstrated that in some cases junior
college GPA is more predictable than four-year college GPA
(42, pp. 1057-1058).

Gustafson obtained correlations of .65 for the SCAT,
Form 1A and .71 for HSGPA when predicting first semester,
junior college GPA. A multiple correlation of .80 was
obtained when both predictors were combined in the pre-
diction equation (19, p. 148). In another related study,
Baird obtained multiple correlation coefficients of .50
for males and .62 for females when ACT and HSGPA were used
in combination to predict two-year college academic per-
formance. HSGPA alone produced correlation coefficients of
.45 for males and .59 for females. The conclusion of
Baird was that his findings confirmed earlier results that
when "traditional" predictors are used, two-year college GPA and four-year college GPA are equally predictable (2, p. 427).

The relationship of aptitude test (ACT) scores and academic performance in the two-year college was studied in detail by Hoyt (25), Munday (34), and Baird (3). In an investigation of the prediction of two-year cumulative GPA of twelve groups of students divided on the basis of enrollment in either academic or occupational curricula in twenty-seven junior colleges, Baird found that for men, grades in occupational curricula were predicted by ACT scores and HSGPA as well or better than grades in academic curricula. For women, grades in academic curricula were predicted better when ACT scores were used alone. There were no differential results between academic and technical curricula student performance when the two predictors were combined for women. The overall best single predictor was HSGPA, and multiple correlation coefficients ranged from .39 to .63 for men and from .47 to .68 for women, depending upon the institution sampled. Baird concluded from the results that standard aptitude measures were satisfactory predictors of academic success for two-year college technical-occupational students as well as for students in academic curricula (3, p. 249). In another study, Hoyt found that ACT scores and HSGPA yielded an R-value of .56 with occupational curricula GPA at the junior college.
level. Of special significance for the present study is that he also found no significant differences between the ACT scores of students in the two-year transfer and two-year terminal, technical curricula samples (25, p. 21).

In a study closely related to Hoyt's, Munday found that first-year junior college GPA for technical-occupational curricula students was predicted better by ACT scores than by HSGPA, while for transfer curricula students, first-year junior college GPA was predicted better by HSGPA than by ACT scores. When both ACT scores and HSGPA were combined in prediction, the criterion was predicted about equally as well for both groups of students. Multiple correlation coefficients ranged from .50 to .55 depending upon the school being sampled (34, p. 328). In contrast to the findings of Hoyt, Munday found transfer students, slightly but significantly higher in ACT Composite scores than terminal, technical-occupational curricula students, but found no significant differences between the two groups in HSGPA (34, pp. 326-327).

Several studies have dealt with novel techniques in either design or analysis in prediction of college academic performance using intellectual ability measures as predictor variables. Campell and Ignizo found in prediction of first year, college GPA from both SAT-Verbal and SAT-Math scores that a linear programming method was more accurate than the widely used least squares analysis
method, with the linear programming method of analysis yielding correlation coefficients in the .40 to .50 range. The least squares method tended to be more sensitive to extreme scores such as might be found in studies with smaller N sizes (9, pp. 399-400). Bashaw has suggested another alternate to linear multiple regression analysis in the prediction of college academic performance, although acknowledging its applicability as already demonstrated in the literature. He hypothesized that with a criterion of junior year college GPA, a junior college transfer student's upper division work could be more effectively predicted from junior college GPA and a state high school achievement test score through a model he termed "central prediction" than with the more conventional linear model. Bashaw's hypothesis that junior college and senior college grade distributions were not uniform from institution to institution was termed the "heterogeneity assumption," and the conclusion drawn was that as a result of this heterogeneity conventional regression relationships between predictor and criterion variables were not the same from institution to institution. The similarity of high school and junior college distribution heterogeneity to resultant predictor and criterion relationship variability was also specifically mentioned (4, p. 254). Bashaw did not mention the robustness of linear regression techniques with
respect to deviations from homogeneity of distribution variance, however.

A design variant was utilized in a relevant study by Berdie in which assessment of intra-individual variability was used as a predictor of academic performance. The study involved obtaining ten subscores from a mathematics test and then classifying the students in technological school into high- and low-variability groups. He designated those subjects who demonstrated considerable variation from one subscore to another as the high group and subjects whose ten subscores were highly consistent as the low group. Berdie hypothesized that the high variability group would be less predictable on grades than the low group. The results indicated that high variability subjects were less predictable than low variability subjects, given that they possess high intellectual ability. With subjects of lower ability, subject variability was unrelated to grades (5, p. 666).

Summary

Two general classes of information have been found to be useful for the prediction of college academic performance. These two classes may be termed ability measures, and they include (a) measures of high school academic achievement, usually in the form of high school rank at graduation (HSR) or cumulative high school
grade-point average (HSGPA), and (b) measures of scholastic aptitude which are obtained from scores on standardized tests, such as the ACT, SAT, and the SCAT. Other types of test information obtained from either group or individual mental ability tests have also been used with moderate success. Measures that have proved effective in the prediction of student academic performance in four-year college settings appear to be equally effective in the prediction of this criterion in two-year college settings. Most research conducted in this area has utilized linear regression analysis techniques, either univariate or multivariate, and maximum predictability in terms of correlation coefficients appears to be in the .60 to .70 range. In addition, the academic performance of college women is generally more predictable than that of college men.

Prediction from Nonintellective Measures

Numerous attempts have been made to improve upon what has been termed the "asymptotic" level of prediction in research involving the prediction of college academic performance (6, p. 246). Correlation coefficients in the .50 to .65 range seem to indicate the upper limit of predictability of this criterion using aptitude and achievement measures. Varied types of predictor variables and variable classes have been considered in the search for ways to improve upon the prediction of college academic
achievement. Perhaps the most frequent area of investigation has been that of personality information. Chahbazi (11), Nichols (35), Hackett (20), and Spielberger and Katzenmeyer (44) all attempted to predict college academic performance through the use of personality information.

Responses from formal tests of personality, both standardized and projective, have been investigated. In an attempt to isolate predictors of college academic performance from information other than aptitude and achievement measures, Nichols used responses of students to the California Psychological Inventory (CPI), the Vocational Preference Inventory (VPI), and the Adjective Check List (ACL) to develop measurement scales to predict academic performance. High school rank (HSR) remained the best predictor, with scores from the CPI having greater predictive validity than either the VPI or the ACL responses, but correlation coefficients obtained for the personality measures themselves were nonsignificant. Multiple regression analysis results indicated that the non-intellective scales did add to the overall prediction when combined with aptitude test information and high school rank, however (35, p. 912). Spielberger and Katzenmeyer noted that although manifest anxiety, as measured by the Taylor Manifest Anxiety Scale (MAS), had been previously investigated as a predictor of college academic performance,
with limited success, no studies had investigated the interaction of MAS score and differential intellectual level. The hypothesis investigated by the authors was that for the middle-ability level student, manifest anxiety does make a difference in performance. Separating 640 students into low, middle, and high ability groups on the basis of American Council on Education (ACE) group intelligence test scores, it was found that for the middle ability group manifest anxiety scores correlated only \(-.18\) with freshman GPA. The investigators also found that high ability students did well regardless of manifest anxiety as measured, while low ability students did poorly regardless of measured manifest anxiety (44, p. 278). The use of projective instruments was studied by Chahbazi with equally limited success, with correlation coefficients ranging from \(.35\) downward for prediction of first term college GPA from selected "achievement" indicators of two projective tests (11, p. 841).

Perhaps the most positive results in the area of academic performance prediction through the use of personality information has been obtained by Hackett using a "achievement scale" of seventy-two items from the Minnesota Multiphasic Personality Inventory (MMPI) selected for power in discriminating between upper and lower quartile first semester, college student GPA. A Pearson \(r\) of
.61 between this scale and first semester, college GPA for 545 college males was obtained, and a multiple R-value of .69 was obtained when this scale and ACE results were combined in prediction. Interestingly, the intercorrelation of Hackett's scale and ACE was only .10 (20, p. 216). The hypothesis of Hackett was that personalities of high and low achievers differ, and it seems that the hypothesis was supported in some measure by the results. Owens and Johnson found that college underachievers tend to have certain personality traits peculiar to them that are not found in either overachievers or average achievers, chief among these traits being social extroversion (37, pp. 43-44). Borislow investigated the relationship of self-evaluation by the student both in general functioning and in academic functioning as nonintellective factors in scholastic achievement. The results of the study provided some confirmation for the findings of Owens and Johnson (6, p. 253).

In a detailed attempt to utilize biographic information of students as a predictor of college academic performance through the coding of this information according to Roe's occupational classification, Lunneborg and Lunneborg obtained minimal success when this information was used alone to predict college GPA. The correlation coefficients obtained were in the .10 to .20 range.
Slight increases in prediction were noted when this biographic information was added to traditional ability predictors in a multiple regression format (31, p. 10). In another study in this area, the same authors noted that addition of nonintellective information, particularly biographic, obtained from student admission applications and short questionnaires did increase the predictability of batteries which differentially predicted college GPA in specific subject areas, although again overall prediction of college GPA was not significantly enhanced. When intellective criteria such as GPA in specific courses or overall freshman GPA were considered, the iterative multiple-regression technique always selected an intellective predictor first and usually by a substantial margin. Multiple R-values in the .50 to .70 range were obtained when predicting intellective criteria such as various types of academic performance, and the major value of nonintellective predictors used alone seemed to be in prediction of nonintellective criteria such as personal philosophies or extracurricular performance (30, pp. 920-921). Lunneborg and Lunneborg mentioned that Roe's system provided a measure of socioeconomic status (SES) in summary form (31, p. 15). Lavin has drawn attention to SES as another potential variable which may deserve future investigation through his review of studies related to SES effects upon academic performance in college:
The findings indicate that there are positive relations between socioeconomic status and academic performance at all levels except the upper, where the relationships become inverse. The central significance of SES lies in the fact that it summarizes a variety of other factors that are related to academic performance (28, pp. 149-150).

A final area that has been frequently selected by investigators for study as a possible predictor of college academic performance is that of college student study habits and attitudes. Brown and Holtzman (7) found an average correlation from pooled data from several senior and junior college populations of .36 between scores on their instrument, the Survey of Study Habits and Attitudes (SSHA), and college grade-point average. The finding proved significant, perhaps due in some measure to the large N involved, but it might be noted that only about fifteen per cent of the total variance was accounted for by the SSHA score prediction. Garcia and Whigham also investigated the validity of SSHA scores for freshman college student academic performance. The authors found a correlation of .24 between SSHA score and the criterion when the SSHA was administered prior to college entrance, but the coefficient increased to .32 when SSHA scores obtained after one to two college semesters were used in prediction (16, p. 848).

It might be noted that the first several semesters of college have been proposed as the most critical, however, and those for which prediction is therefore most needed in
guidance. The use of scores from the Brown-Holtzman SSHA to predict "academic competence" was subsequently studied by Goldfried and D'Zurilla. In this study, academic competence was defined not by student academic performance but rather by peer and student self-ratings, although student academic performance was also predicted. Higher correlations were obtained when these ratings were correlated with SSHA scores than when freshman GPA was used as a criterion, with correlations in the former category in the .40 to .50 range. Correlation of SSHA scores with first-semester college GPA yielded a coefficient of .16 and was nonsignificant. The authors concluded that the SSHA might measure certain factors correlated indirectly with grades and more directly with interpersonal variables and factors (17, pp. 121-122). A related study attempted to clarify this finding. Goldfried and Kent hypothesized that in the prior study, the criterion behaviors of non-objective ratings were more similar to the SSHA test responses and therefore the likelihood of obtaining favorable validity coefficients was higher for such criteria. They concluded that tests such as the SSHA measure more efficiently factors other than those related to college grades, providing what might be considered an index of effectiveness in areas such as the social and interpersonal spheres, and that the predictive power of
SSHA scores used alone for academic performance was therefore limited accordingly (18, p. 419).

Research already cited by Lewis (29) and Worthington and Grant (47) stressed the potential effect of organismic variables such as sex of student upon the prediction of college academic performance, and the diverse nature of social, interpersonal, and socioeconomic factors investigated in other studies cited further adds to the complexity of selecting nonintellective variables of sufficient value to merit consideration independent from intellective variables in predicting college student academic performance.

Summary

In an attempt to improve upon the prediction of college academic performance already demonstrated through the use of scholastic achievement and aptitude measures, various types of nonintellective predictor classes have been studied. These include personality variables, social and interpersonal functioning data, biographical information, socioeconomic status, student study habits and attitudes, as well as organismic variables such as sex of student.

Most research points to the conclusion that although certain variable classes and specific techniques for investigation of these variables may hold promise for improving the prediction of college academic performance,
no definitive statements can now be made to support a contention that prediction of student academic performance using only nonintellective measurement information yields anything more than very modest results. Of the information reviewed, certain types of personality information appear to hold the most promise, but at this point the greatest value of nonintellective measures in prediction of college academic performance seems to be in the use of these measures in combination with intellective measures.

Conclusions and Implications Related to Previous Research

From the overall review of the literature relevant to the prediction of college academic performance, some general conclusions were drawn:

1. High school scholastic performance measures generally were the most useful predictors of college scholastic performance.

2. Measures of scholastic aptitude appeared to be the next most useful type of predictor, and in some instances they predicted as well as high school academic performance measures.

3. The highest prediction level of college academic performance was attained when high school achievement and scholastic aptitude test information were combined in the prediction process.

4. Nonintellective prediction information generally proved of only minimal to moderate value when used alone in prediction, but such information proved of greater value when used to supplement the more traditional, intellective measurement information in the prediction of college academic performance and this was particularly true for certain selected subject groups.
5. The predictive relationships which held for prediction of four-year college academic performance also appeared to hold for prediction of two-year college academic performance.

It can therefore be demonstrated that for the person wishing to enter either a four-year or two-year college and who has completed high school, college academic performance is predicted rather well using high school information such as HSR and HSGPA. However, for the educationally-disadvantaged person who has not graduated from high school and for whom neither HSR nor complete HSGPA is available, the cited studies are not wholly applicable. Carbuhn attempted to predict performance on the high school level of the GED, and he reported correlations as high as .69 between certain GED tests and scores from the Stanford Achievement Test, General Aptitude Test Battery factors, and Gates Reading Survey scores (10, pp. 995-996). These results corresponded well with reported predictive coefficients of high school academic success as reported by Conry and Plant (12), who found mental ability test scores correlated from .62 to .72 with HSR, and by Scannell (39) who found scores on the Iowa Test of Basic Skills to predict HSGPA equally as well.

The GED may well prove to be representative of much of the same information encoded in HSR and HSGPA because scores on the GED tests themselves may be predicted as well as HSR and HSGPA and by similar types of predictors. It
is therefore probable that the GED may function as does HSGPA in the prediction of college academic performance, and the present study was an attempt to investigate the predictive possibilities of the high-school-level battery of the GED for college academic performance and to demonstrate that despite the lack of HSR and HSGPA information for the educationally-disadvantaged client, his college academic performance may be satisfactorily predicted at the two-year college level. Obtained standard scores on the five GED high school level tests, as well as mean standard score for all five tests, were used as an index of high school achievement in lieu of a complete high school academic record for the high school non-graduate. These GED scores were subsequently used as predictors of two-year college grade-point average. The predictive function of the GED was therefore emphasized in the present investigation to add to the already established usage of the GED as a credential to gain admission to an institution of higher learning.
CHAPTER BIBLIOGRAPHY

1. Astor, M. H., "Reading Test or Counseling Interview to Predict Success in College?" Journal of Reading, XI (February, 1968), 343-345.


43. Siegelman, M., "SAT and High School Average as Predictors of Four Year College Achievement," *Educational and Psychological Measurement*, XXXI (Winter, 1972), 947-950.


CHAPTER III

PROCEDURES OF THE STUDY

Description of the Sample

The subjects who comprised the sample in this study were freshman students at South Plains College in Levelland, Texas. The sample included three major groups. The first group, the primary group of the study, was formed through selection of a representative sample of educationally disadvantaged, high school non-graduates who had completed the GED, designated the "educationally-disadvantaged-GED" group. Sampling constraints imposed upon the selection of the educationally-disadvantaged-GED subjects were (1) each subject had GED scores on file at the college, (2) each subject had entered South Plains College for the first time in the semester sampled and had been attending a college for the first time at the time of entrance into South Plains College, and (3) each subject had completed the first semester with enrollment for a minimum of six semester hours. Adherence to these constraints insured that transfer students were not included and insured as well that no students enrolled for less than one-half time were represented. The N of the educationally-disadvantaged-GED group was 100, selected as follows: All high school
non-graduate, educationally-disadvantaged students who had been admitted on the basis of GED completion for each semester from Fall, 1970 through Fall, 1973 were recorded on an "educationally-disadvantaged-GED" master list, summer students being omitted, and two separate lists were then prepared from this master list.

The first list was composed of all students who had entered South Plains College in the designated terms, who had been admitted on the basis of GED completion, and who had enrolled in a two-year, transfer degree curriculum. The second list was similar in composition except that it was composed of students who had enrolled in a two-year, terminal degree curriculum. From each of the two lists, every other name was selected until 50 names had been selected from each list, providing the total N of 100 for the "educationally-disadvantaged-GED" group. A plus-minus procedure was utilized if the constraints were not met for the student whose name was initially selected. This procedure involved checking the name immediately preceding the name initially selected for compliance with the constraints if the first name selected did not meet the constraint conditions. If the alternate name was also unacceptable, the name immediately following the initial selection was then checked for constraint compliance.

The second and third major groups were used for comparison purposes rather than as the primary target of the
study. The second group was composed of a representative sample of educationally disadvantaged, high school non-graduates who had not completed the GED. The N for this group was 100. From the student master lists for all long semesters from Fall, 1970 through Fall, 1973 an "educationally-disadvantaged-no GED" master list was constructed. The procedure for selection of this group, designated "educationally-disadvantaged-no GED", from the master list was (as for group one) such that every other name was initially checked for compliance with the sampling constraints. Sampling constraints and subsequent adjustment procedures were the same as for group one except that the constraint that GED scores be filed was eliminated.

The third group was composed of a representative sample of high school graduates. A "high-school graduate" master list was constructed using the same semesters as for the other two master lists. A similar selection procedure was followed for this group, designated "high-school graduate," except that every thirtieth name was checked initially for compliance with the constraints. The N for this group was also 100. The same constraints and selection adjustment procedures applied to the selection of the third group as applied to the selection of the second group.
The sampling procedure also involved designation of several supplemental groupings. All supplemental groupings were derived from the "educationally-disadvantaged-GED" master list. The first supplemental group was composed of all GED students enrolled in a two-year, technical certificate program and who also met the constraints for students enrolled in two-year transfer and terminal degree programs who had been selected as subjects. A group N criterion of 50 was not used because there was an insufficient number of subjects in this type of program with GED scores recorded to do so. The N for this group was 30.

In addition, two other supplemental groups were formed from the "educationally-disadvantaged-GED" master list. The second supplemental group formed divided all students on the list into two subgroups. The first subgroup contained all students with the GED scores recorded in the permanent student file while the second subgroup contained all students without GED scores on file, but with only a copy of an equivalency certificate on file. The two subgroups were designated "GED-scores" and "GED-no scores" and had respective Ns of 162 and 118.

The final supplemental group formed from the "educationally-disadvantaged-GED" master list separated all list members into two different subgroups. The first subgroup contained all GED students who had pursued at least two consecutive long terms while the second subgroup
contained all GED students who had completed only one long term before interruption of college training. These two subgroups were designated "GED-two terms" and "GED-one term" and had respective Ns of 153 and 127. The sampling constraints applied in the first supplemental grouping were also applied in selection of the other supplemental groupings with exception of the requirement that GED scores be on file, which was omitted.

Description of the Instrument

The primary instrument utilized in this study was the high-school-level battery of the Tests of General Educational Development (GED).

Tests of General Educational Development

The GED was designed to provide a valid means of measuring the educational achievement of adult high school non-graduates, and to compare their competence with that of high school graduates (6). A primary use of the GED tests is to assess the educational maturity of those adults who have not completed formal high school training. For this reason, the tests have been constructed with some differences from standard school achievement tests such as the Iowa Tests of Educational Development and the California Achievement Tests Battery, which are designed to measure immediate objectives of instruction.
In view of the fact that (1) the educational experiences of persons not in school are likely to be the result of firsthand observation, direct experience, and self-directed reading and study, while the educational development of students in classroom settings is largely determined by vicarious experiences through the use of textbook and other instructional procedures presented in sequence, and the fact (2) that in schools there is more apt to be a more complete and detailed coverage of specific facts and ideas than in the great variety of learning situations and subject-matter arrangements present in out-of-school learning experiences, the GED tests have been designed to measure as directly as possible the attainment of some of the major objectives of the secondary school program of general education (6, p. 6). The emphasis, therefore, in the GED tests is on intellectual power rather than detailed content, on the demonstration of competence in utilizing major generalizations and concepts, and on the ability to understand exactly, evaluate critically, and to reason clearly in terms of concepts and ideas.

The high-school-level battery of the GED tests is composed of five tests, each yielding a raw score converted to a standard score and subsequently through extensive normative procedures converted to a percentile when necessary. The five tests are: (1) Test 1: Correctness
and Effectiveness of Expression, (2) Test 2: Interpretation of Reading Materials in the Social Studies, (3) Test 3: Interpretation of Reading Materials in the Natural Sciences, (4) Test 4: Interpretation of Literary Materials, and (5) Test 5: General Mathematical Ability. Standards for successful completion vary from state to state, but the State of Texas requires that each of the five tests be completed with a minimum standard score of forty, or that the overall mean standard score be forty-five or greater in order for a certificate of high school equivalence to be issued to the examinee. A standard score of fifty is the mean.

Test 1: Correctness and Effectiveness of Expression contains two parts. Part I is a spelling list of twenty items of four words each which requires the examinee to select the one misspelled word in each group. Part II consists of several themes which have been systematically constructed to include many common faults found in writing of high school students, and the examinee is required to select the one best or correct way of revising the faulty theme. Test 2: Interpretation of Reading Materials in the Social Studies consists of a selection of passages from the field of social studies at the high school level and a number of questions testing the examinee's ability to comprehend and interpret the content of each passage.
Test 3: Interpretation of Reading Materials in the Natural Sciences is one consisting of a selection of passages from the field of natural sciences at the high school level and a number of questions testing the ability of the examinee to understand and interpret the content of each passage.

Test 4: Interpretation of Literary Materials consists of a selection of both prose and verse passages taken from traditional and modern American and English literature, as well as a set of questions testing the ability of the examinee to understand and interpret the content of each passage. The final test, Test 5: General Mathematical Ability, is a test of general problem-solving ability of a very practical nature including items of a widely diverse nature such as understanding of basic arithmetical, algebraic, and geometric concepts as well as applied problems such as cost estimation and the use of tables and graphs.

There exists a notable lack of published research involving the use of the GED, particularly in more recent years, although the 1973 Annual Statistical Report published by the General Educational Development Testing Service of the American Council on Education (7) indicated that 422,953 GED examinations were administered in that calendar year with almost 69 per cent of the examinees successful in their attempt. Dressel and Schmid, in a survey evaluating numerous early studies of both the criterion and predictive validity of the GED examinations done
during the initial years of use of the GED (1942 through 1960), concluded that the general trend in those studies was that individuals who passed the GED tests were likely to be successful in college or in jobs which ordinarily required a high school education (5).

A comprehensive study, the Tyler 1954 fact-finding study sponsored by the Office of Armed Forces Information and Education (15), reviewed data from a large number of higher education institutions and was in part concerned with evaluation of the validity of the GED as an admission instrument for higher-education institutions. The general conclusion of this study was that a large number of persons successfully completing the GED did prove successful in college, and that the grade-point average for high school graduates was only slightly higher than for GED students. Subsequent to the Tyler study, a committee evaluated the Tyler study results several years later and strongly recommended that further research be conducted in the investigation of GED usage as a college admission instrument (3).

It remained for a decade and a half to pass before any sort of complete investigation of the predictive validity of the GED for college academic performance was published in a 1972 Educational Testing Service monograph (14). This recent, extensive study by Sharon involved a survey of both four-year and two-year college GED matriculants, and it
demonstrated that the GED tests may predict college academic performance as well as the more traditional Scholastic Aptitude Test (SAT). Pearson product-moment correlations obtained between standard scores (SS) of the five GED tests and college GPA ranged from .31 to .36 (p. <.01) in the study, and Sharon also noted that for all five of the GED tests the resultant correlation between the GED standard score and GPA was higher for two-year institution students than for four-year institution students (14, pp. 8-9). The correlations for two-year institutions ranged from .33 to .51. Grouping subjects by sex without differentiation by type of institution revealed that for all GED tests the prediction was better for females than for males, a finding consistent with other studies (9, 13, 16) involving prediction of college academic performance using more traditional predictors, such as the SAT and the ACT. In the case of four of the five GED tests, subjects over thirty years of age were more predictable than those under thirty, with Test 4: Interpretation of Literary Materials being the only exception to this rule. Correlation of SAT scores with GED scores for subjects for whom scores on both instruments were available led the author to conclude that to a large degree these two tests measure different factors (14, p. 10).

Although the Educational Testing Service study might be regarded as strong preliminary support for the predictive
validity of the GED for two-year college GPA, it does not appear to be comprehensive investigation. All types of two-year college instructional program GPA's were pooled for computation, despite implications from other studies with more traditional predictors, such as those of Baird (1) and Munday (11) already cited, which suggest that predictability of two-year college GPA may well vary with type of instructional program being pursued. In addition, the GPA criteria used were not consistent from subject to subject, since for some subjects grades from a single semester were used as the criterion while for others grades from as many as five semesters were used. Furthermore, both part-time and full-time students were included as subjects in the sample, but in this regard, in view of the demographical study of Harris (8, p. 43) of two-year college students in urban situations, some support for this sampling practice may be derived.

With reference to the criterion validity of the present GED forms, the GED high-school battery was initially normed in 1943 and then again in 1955. However, unlike some instruments still in use today, the GED has been kept current with respect to norming. The most recent national normative study was conducted in 1967, and the sampling was stratified according to enrollment size and included both public and private high school senior students (6). The
relationship of high school achievement to GED score is therefore quite clear, since through this normative procedure the average performance of all 21,000 students tested in 1967 was made the 50th percentile by definition through creation of a normalized standard distribution and then assigned a scaled score of fifty through subsequent scaling (6, p. 13).

A recent study by Carubhn (2) attempted to predict performance on the GED itself. Correlations as high as .69 for certain GED tests were obtained with the Stanford Achievement Test, General Aptitude Test Battery factors, and Gates Reading Survey scores. These results correspond well with reported predictive coefficients of high school academic success as reported by Conry and Plant (4) who found mental ability test scores correlated from .62 to .72 with HSR, and Scannell (12) who found scores on the Iowa Test of Basic Skills to predict HSGPA equally as well. It therefore seems probable that not only may the GED function as does HSGPA in the prediction of college academic performance, but that scores on the GED tests themselves may be predicted as well as HSR and HSGPA and by similar types of predictors. The GED may well prove to be representative of much of the same information encoded in HSR and cumulative HSGPA, neither of which is available for the educationally-disadvantaged person who is the focus of this study.
Procedures for the Collection of Data

All information needed for each subject was contained in the permanent record file in the Office of the Registrar at South Plains College. A data card was prepared for each subject and the information then recorded on this card by an independent and unbiased, but trained recorder. The subjects were identified only by number after initial selection had been made from the student master lists for each semester from which subjects were selected. The student master lists were computer printouts indicating by semester the classification of the student, various statistical and demographical information (but not ethnic origin), and the basis for his admission—whether by high school diploma, GED score record, or individual approval for high school non-graduates without the GED.

For the subjects in the group designated as "educationally-disadvantaged-GED," the data recorded included name, age, sex, number of high school grades completed, date of first South Plains College attendance, the SS of each GED test, the mean GED SS, and the type of program being pursued. In addition, first semester, first-year GPA, grades in the major field, and grades in non-major field courses as defined by the college catalog were recorded. For subjects in both the "high-school graduate" and "educationally-disadvantaged-no GED" groups, the data
recorded included name, age, sex, and first semester, first-year GPA.

For subjects in the first supplemental group, "GED-certificate," the data recorded were the same as for the primary "educationally-disadvantaged-GED" group, except that separate designation of grades by major and non-major was omitted. Data recorded for the second supplemental group, which included the two subgroups "GED-scores" and "GED-no scores," included name, age, sex, first semester, freshman GPA, and number of high school grades completed. Data recorded for the third supplemental group, which included the two subgroups "GED-one term" and "GED-two terms," were the same as for the second supplemental group.

Procedures for Treatment of Data

The individual hypotheses were treated statistically with a number of different statistical procedures. However, the predominate statistical technique used was correlational analysis. Multiple-regression analysis, canonical analysis, and simple Pearson product-moment analysis were used in the majority of hypothesis testing. All of the data were transferred from the data cards to IBM cards and all of the statistical computations were performed by computer. All of the computer-generated statistical analyses were performed through the use of the July, 1975 revision of the Biomedical Package prepared by the
University of California, Los Angeles. Data obtained from the "educationally-disadvantaged-GED" group, the primary focus of the study, were used in tests of Hypotheses One through Five and Seven through Eleven, while the data from the other two major groups, "educationally-disadvantaged-no GED" and "high-school graduate," were used only in tests of Hypotheses Nine and Ten. Data from the three supplemental groups were used in tests of Hypotheses Six, Twelve, and Thirteen.

Hypothesis One was tested through a test for significance of the simple r-value obtained from a Pearson product-moment correlational analysis between the mean GED SS (X variable) and first semester, two-year college GPA (Y variable). Hypothesis Two and Hypothesis Three were tested through the use of iterative, stepwise multiple-regression analysis as described and successfully used in the present type of study by Lewis (9). All multiple-regression analyses in this study were of the iterative type. In the stepwise iteration process, the first iteration selected the X variable which contributed most to the prediction of the Y variable. All iterations utilized the F-statistic to determine which predictor variable accounted for the most criterion variance. After the first step, each succeeding step in the analysis selected from the remaining X variables that predictor which accounted for the most residual criterion variance, entered that predictor into the
regression solution, and the iteration continued until no $X$ variable met the minimum preset $F$-statistic value of 1.0 for inclusion into the regression solution. In both analyses, the obtained multiple-$R$ value was tested for significance using the $F$-statistic. The variables in these two analyses were as follows:

<table>
<thead>
<tr>
<th>$X$ variables</th>
<th>$Y$ variable</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. GED Test 1 SS</td>
<td>1. First semester, two-year college GPA</td>
</tr>
<tr>
<td>2. GED Test 2 SS</td>
<td></td>
</tr>
<tr>
<td>3. GED Test 3 SS</td>
<td></td>
</tr>
<tr>
<td>4. GED Test 4 SS</td>
<td></td>
</tr>
<tr>
<td>5. GED Test 5 SS</td>
<td></td>
</tr>
</tbody>
</table>

utilized in the first multiple-regression analysis to test Hypothesis Two and the following $X$ variables were added:

6. Age of subject
7. Number of high school grades completed

in the second multiple-regression analysis to test Hypothesis Three, while retaining all used in the test of Hypothesis Two.

Hypothesis Four was tested through the use of multiple-regression analysis as well. Two multiple-regression analyses, one involving male subjects and one involving female subjects in the educationally-disadvantaged-GED group, were performed, and the resultant $R$-values tested for significance using the $F$-statistic. Hypothesis Five was tested through the application of two multiple-regression analyses, one for predicting transfer-degree
academic performance and one for predicting terminal-degree academic performance at the two-year level. The predictor variables in both analyses were the SS of the five GED component tests and the criterion was first semester, two-year college GPA. Each obtained multiple-R value was tested for significance using the F-statistic. Hypothesis Six was tested through the use of a Pearson product-moment correlational analysis between the mean GED SS and first semester, two-year college GPA for educationally-disadvantaged-GED subjects enrolled in a two-year technical certificate program. The obtained r-value was then tested for significance.

Hypothesis Seven was tested through application of canonical correlational analysis. All characteristic roots and resultant canonical correlations were tested for significance. The variables in the canonical analysis were the following:

<table>
<thead>
<tr>
<th>X variables</th>
<th>Y variables</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. GED Test 1 SS</td>
<td>1. First semester, two-year college GPA for major</td>
</tr>
<tr>
<td>2. GED Test 2 SS</td>
<td>college GPA for field courses in a transfer program</td>
</tr>
<tr>
<td>3. GED Test 3 SS</td>
<td></td>
</tr>
<tr>
<td>4. GED Test 4 SS</td>
<td>2. First semester, two-year college GPA for non-ma</td>
</tr>
<tr>
<td>5. GED Test 5 SS</td>
<td>major courses in a transfer program</td>
</tr>
</tbody>
</table>

Hypothesis Eight was tested in a similar manner, with all variables being the same except that the GPA's used were for courses in terminal two-year degree programs. The characteristic roots in each canonical analysis were tested
for significance using the Bartlett $\chi^2$ statistic, and the general approach to the canonical analyses was similar to that employed in the comprehensive Project TALENT study (10).

Hypothesis Nine was tested through the use of a simple $t$-test for unequal $N$ to investigate the difference between the mean first semester, two-year college GPA of the high-school graduates in the sample and all educationally-disadvantaged-GED subjects in the sample who had completed the GED. Hypothesis Ten was tested through the use of a one-way analysis of variance (ANOVA) with unequal $N$ to investigate the first semester, two-year college GPA differences between the three major groups in the study. Hypothesis Eleven was tested through the application of a discriminant function analysis (DFA) to determine if a significant difference existed between the vector of mean GED scores for Group A, educationally-disadvantaged-GED subjects enrolled in a transfer, two-year degree curriculum and the vector of mean GED scores for Group B, educationally-disadvantaged-GED subjects enrolled in a terminal, two-year degree curriculum. The DFA solution was then tested for significance using the F-statistic approximation of the Wilks' $\lambda$ statistic.

Hypothesis Twelve was tested through the use of a $t$-test for unequal $N$ between mean first semester, two-year
college GPA of GED students pursuing at least two consecutive long semesters following initial enrollment (Group A), and mean first semester, two-year college GPA of GED students pursuing only one long semester before interruption of college study for at least one long semester (Group B). Hypothesis Thirteen was tested through application of a two by three ANOVA between the two classes of independent variables, (a) GED score availability as indicated by admission status for all GED students in the sample, and (b) nature of the two-year college program being pursued by the GED subjects. The dependent measure was first term, two-year college GPA.

In addition to the statistical treatment of the data with respect to specific hypothesis testing, descriptive statistics were computed for all groups. With reference to the educationally-disadvantaged-GED group, the grand mean SS and the mean SS for all five subtests of the GED were computed for comparison to the national norms. The mean number of high school grades was computed for all educationally-disadvantaged subjects and reported in tabular form by group, and the mean age of subjects and the number of males and females were computed and reported in tabular form by group as well.
Summary

First semester, two-year college GPA data were gathered for three primary groups and three supplemental groups of two-year college freshman, and predictor data emphasizing scores on the high-school-level battery of the Tests of General Educational Development as well as organismic information were gathered from a subject pool of first-semester students at South Plains College for a sampling period of the Fall, 1970 semester through the Fall, 1973 semester. Procedures for sampling, selection of subjects, and grouping were outlined.

Procedures for collecting and treating the data were described. The data analysis procedures were detailed, with the predominate method of analysis being correlation in nature. Multiple-regression analysis, canonical analysis, and Pearson product-moment analysis were used in the majority of the tests of research hypotheses, supplemented by t-test, ANOVA, and DFA results. Descriptive measures were also computed.
CHAPTER BIBLIOGRAPHY


CHAPTER IV

PRESENTATION OF THE DATA

The purpose of this chapter is to present and analyze the statistical results of this study. The data were analyzed through the use of a variety of statistical techniques. The majority of the statistical techniques used were correlational in nature, both univariate and multivariate, although some inferential statistical methods were also utilized. A significance level of .05 was required for acceptance of the experimental hypotheses.

Analysis of the Data

In Hypothesis I, it was predicted that a significant positive relationship would exist between mean GED standard score (SS) and first semester, two-year college grade-point average (GPA). The mean GED SS for the test group, high school non-graduates who had completed the GED and were enrolled in a two-year college degree program, was 49.75 with a variance of 33.59. The mean first semester, two-year college GPA for this group was 2.68 with a variance of .61. The obtained Pearson product-moment correlation of .35 with an N of 100 proved significant beyond the .01 level. The intercorrelation matrix obtained in this analysis is
presented in Appendix A, and all variables utilized in this study are included in the intercorrelation matrix.

The hypothesis is therefore accepted. The analysis of data indicates that a significant positive relationship did exist between mean GED SS and first semester, two-year college GPA.

In Hypothesis II, it was predicted that a significant positive relationship would exist between the SS of the component sections of the GED and first semester, two-year college GPA. The multiple regression correlation analysis yielded a coefficient of .384. Complete iteration was performed, and the first variable entered was GED Test 4, Interpretation of Literary Materials, followed by GED Test 5, General Mathematical Ability. The results of the stepwise multiple regression analysis are presented in Table I.

<table>
<thead>
<tr>
<th>Variable Entered</th>
<th>Multiple R</th>
<th>Per Cent Increase in Prediction</th>
</tr>
</thead>
<tbody>
<tr>
<td>GED Test 4 SS</td>
<td>0.3626</td>
<td>13.15</td>
</tr>
<tr>
<td>GED Test 5 SS</td>
<td>0.3840</td>
<td>1.70</td>
</tr>
</tbody>
</table>

TABLE I
STEPWISE REGRESSION ANALYSIS PREDICTING FIRST TERM, TWO-YEAR COLLEGE GPA FOR GED STUDENTS ENROLLED IN TERMINAL AND TRANSFER DEGREE PROGRAMS
The resultant ANOVA for the regression yielded an F ratio of 8.391 (2, 97 df). The data for the sum of squares, mean square, degrees of freedom, F ratio, and level of significance used to test the R-value in Hypothesis II are presented in Table II.

**TABLE II**

ANALYSIS OF VARIANCE DATA FOR THE REGRESSION ANALYSIS PREDICTING FIRST TERM, TWO-YEAR COLLEGE GPA FOR GED STUDENTS ENROLLED IN TRANSFER AND TERMINAL DEGREE PROGRAMS

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>Sum of Squares</th>
<th>Mean Square</th>
<th>DF</th>
<th>F Ratio</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>8.9254</td>
<td>4.4627</td>
<td>2</td>
<td>8.391</td>
<td>&lt; 0.01</td>
</tr>
<tr>
<td>Residual</td>
<td>51.5921</td>
<td>0.5319</td>
<td>97</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>60.5175</td>
<td></td>
<td>99</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The obtained R-value of .384 proved significant beyond the .05 level, and the hypothesis is therefore accepted. The intercorrelation matrix for this analysis is presented in Appendix B. This finding indicates that a significant positive relationship did exist between the SS of the component sections of the GED and first semester, two-year college GPA.

In Hypothesis III, it was predicted that prediction of first semester, two-year college GPA by the SS of the component sections of the GED would be significantly
improved when the variables of subject age and number of high school grades completed were added as predictors. The multiple regression analysis yielded a multiple correlation coefficient of .472. Complete iteration was performed, and the first variable entered was GED Test 4, Interpretation of Literary Materials, followed next by age of subject, then by number of high school grades completed, next by GED Test 5, General Mathematical Ability, and finally by GED Test 1, Correctness and Effectiveness of Expression. The results of the stepwise multiple regression analysis are presented in Table III.

### TABLE III

STEPWISE REGRESSION ANALYSIS PREDICTING FIRST TERM, TWO-YEAR COLLEGE GPA FOR GED STUDENTS ENROLLED IN TERMINAL AND TRANSFER DEGREE PROGRAMS WHEN SUBJECT AGE AND NUMBER OF HIGH SCHOOL GRADES COMPLETED ARE INCLUDED IN PREDICTION

<table>
<thead>
<tr>
<th>Variable Entered</th>
<th>Multiple R</th>
<th>Per Cent Increase in Prediction</th>
</tr>
</thead>
<tbody>
<tr>
<td>GED Test 4 SS</td>
<td>0.3626</td>
<td>13.15</td>
</tr>
<tr>
<td>Age of student</td>
<td>0.3998</td>
<td>2.83</td>
</tr>
<tr>
<td>Number of high school grades completed</td>
<td>0.4371</td>
<td>3.12</td>
</tr>
<tr>
<td>GED Test 5 SS</td>
<td>0.4597</td>
<td>3.16</td>
</tr>
<tr>
<td>GED Test 1 SS</td>
<td>0.4718</td>
<td>1.13</td>
</tr>
</tbody>
</table>
The resultant ANOVA for the regression yielded an F ratio of 5.383 (5, 94 df). The data for sum of squares, mean square, degrees of freedom, F ratio, and level of significance used to test the R-value in Hypothesis III are presented in Table IV.

### Table IV

**Analysis of Variance Data for the Regression Analysis Predicting First Term, Two-Year College GPA for GED Students Enrolled in Terminal and Transfer Degree Programs When Subject Age and Number of High School Grades Completed Are Included in Prediction**

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>Sum of Squares</th>
<th>Mean Square</th>
<th>DF</th>
<th>F Ratio</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>13.4711</td>
<td>2.6942</td>
<td>5</td>
<td>5.383</td>
<td>&lt; 0.01</td>
</tr>
<tr>
<td>Residual</td>
<td>47.0464</td>
<td>0.5005</td>
<td>94</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>60.5175</td>
<td></td>
<td>99</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The obtained R-value of .472 proved significant beyond the .05 level, and the hypothesis is accepted. The intercorrelation matrix for this analysis is presented in Appendix C. In this analysis, following the entrance into the predictor equation of the primary predictor, GED Test 4 SS, age of subject and then number of high school grades completed entered before GED Test 5 SS in iteration, and the percentage of variance attributable to the regression increased as a result from 14.8 in the analysis without age
and number of high school grades completed to 22.2 when these variables were added. The results therefore indicate that prediction of first semester, two-year college GPA was significantly improved when age of subject and number of high school grades completed were added to the SS of the component sections of the GED as predictors.

In Hypothesis IV, it was predicted that a significant positive relationship would exist between the SS of the component sections of the GED and first semester, two-year college GPA when GPA is predicted separately by sex. The multiple regression analysis coefficients obtained were .386 for male GED students and .352 for female GED students. Separate multiple regression analyses were performed by sex, and in both analyses complete iteration was performed. In both analyses, the only variable to enter in the stepwise multiple regression analysis was GED Test 4, Interpretation of Literary Materials, although GED Test 1, Correctness and Effectiveness of Expression was close to entering for females and would have been the next variable to enter for males as well.

The resultant ANOVA for the stepwise regression analysis predicting first term, two-year college GPA for male GED students yielded an F ratio of 9.627 (1, 55 df). The data for the sum of squares, mean square, degrees of freedom, F ratio, and level of significance used to test the R-value for males in Hypothesis IV are presented in Table V.
TABLE V

ANALYSIS OF VARIANCE DATA FOR THE REGRESSION ANALYSIS
PREDICTING FIRST TERM, TWO-YEAR COLLEGE GPA
FOR MALE GED STUDENTS

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>Sum of Squares</th>
<th>Mean Square</th>
<th>DF</th>
<th>F Ratio</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>6.1675</td>
<td>6.1675</td>
<td>1</td>
<td>9.627</td>
<td>£0.01</td>
</tr>
<tr>
<td>Residual</td>
<td>35.2356</td>
<td>0.6406</td>
<td>55</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>41.4031</td>
<td></td>
<td>56</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The resultant ANOVA for the stepwise regression analysis predicting first term, two-year college GPA for female GED students yielded an F ratio of 10.045 (1, 71 df). The data for the sum of squares, mean square, degrees of freedom, F ratio, and level of significance used to test the R-value for females in Hypothesis IV are presented in Table VI.

TABLE VI

ANALYSIS OF VARIANCE DATA FOR THE REGRESSION ANALYSIS
PREDICTING FIRST TERM, TWO-YEAR COLLEGE GPA
FOR FEMALE GED STUDENTS

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>Sum of Squares</th>
<th>Mean Square</th>
<th>DF</th>
<th>F Ratio</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>6.2771</td>
<td>6.2771</td>
<td>1</td>
<td>10.045</td>
<td>£0.01</td>
</tr>
<tr>
<td>Residual</td>
<td>44.3700</td>
<td>0.6250</td>
<td>71</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>50.6471</td>
<td></td>
<td>72</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Both the obtained R-value of .386 for male GED students and the obtained R-value of .352 for female GED students proved significant beyond the .05 level, and the hypothesis is therefore accepted. The intercorrelation matrices for these analyses are presented in Appendixes D and E. The results indicate that a significant positive relationship did exist between the SS of the component sections of the GED and first semester, two-year college GPA for both males and females in the study. In contrast to most previous studies, males proved more predictable than females in this study.

In Hypothesis V, it was predicted that a significant positive relationship would exist between the SS of the component sections of the GED and first semester, two-year college GPA for both transfer and terminal degree programs. Stepwise multiple regression analyses for both transfer and terminal degree GED students yielded multiple correlation coefficients of .515 and .509 for transfer and terminal degree groups, respectively. Complete iteration was performed in both analyses, and for transfer degree GED students, the first variable entered was GED Test 4, Interpretation of Literary Materials, followed in succession by GED Test 3, Interpretation of Reading Materials in the Natural Sciences, GED Test 1, Correctness and Effectiveness of Expression, and GED Test 5, General Mathematical Ability. The results of the stepwise multiple regression analysis for GED students
enrolled in transfer degree programs are presented in Table VII.

**TABLE VII**

STEPWISE REGRESSION ANALYSIS PREDICTING FIRST TERM, TWO-YEAR COLLEGE GPA FOR GED STUDENTS ENROLLED IN TRANSFER DEGREE PROGRAMS

<table>
<thead>
<tr>
<th>Variable Entered</th>
<th>Multiple R</th>
<th>Per Cent Increase in Prediction</th>
</tr>
</thead>
<tbody>
<tr>
<td>GED Test 4 SS</td>
<td>0.3753</td>
<td>14.09</td>
</tr>
<tr>
<td>GED Test 3 SS</td>
<td>0.4287</td>
<td>4.29</td>
</tr>
<tr>
<td>GED Test 1 SS</td>
<td>0.4762</td>
<td>4.30</td>
</tr>
<tr>
<td>GED Test 5 SS</td>
<td>0.5148</td>
<td>3.82</td>
</tr>
</tbody>
</table>

The resultant ANOVA for the regression yielded an $F$ ratio of 4.056 (4, 45 df). The data for the sum of squares, mean square, degrees of freedom, $F$ ratio, and level of significance used to test the $R$-value obtained for transfer degree program GPA prediction in Hypothesis V are presented in Table VIII, page 81.

For terminal degree GED students, the first variable entered was GED Test 4, Interpretation of Literary Materials, followed in succession by GED Test 3, Interpretation of Reading Materials in the Natural Sciences and GED Test 2, Interpretation of Reading Materials in the Social Studies.
The results of the stepwise multiple regression analysis for GED students enrolled in terminal degree programs are presented in Table IX.

### TABLE VIII

#### ANALYSIS OF VARIANCE DATA FOR THE REGRESSION ANALYSIS PREDICTING FIRST TERM, TWO-YEAR COLLEGE GPA FOR GED STUDENTS ENROLLED IN TRANSFER DEGREE PROGRAMS

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>Sum of Squares</th>
<th>Mean Square</th>
<th>DF</th>
<th>F Ratio</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>6.7397</td>
<td>1.6849</td>
<td>4</td>
<td>4.056</td>
<td>&lt;0.01</td>
</tr>
<tr>
<td>Residual</td>
<td>18.6933</td>
<td>0.4154</td>
<td>45</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>25.4330</td>
<td></td>
<td>49</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### TABLE IX

#### STEPWISE REGRESSION ANALYSIS PREDICTING FIRST TERM, TWO-YEAR COLLEGE GPA FOR GED STUDENTS ENROLLED IN TERMINAL DEGREE PROGRAMS

<table>
<thead>
<tr>
<th>Variable Entered</th>
<th>Multiple R</th>
<th>Per Cent Increase in Prediction</th>
</tr>
</thead>
<tbody>
<tr>
<td>GED Test 4 SS</td>
<td>0.4471</td>
<td>19.99</td>
</tr>
<tr>
<td>GED Test 3 SS</td>
<td>0.4822</td>
<td>3.26</td>
</tr>
<tr>
<td>GED Test 2 SS</td>
<td>0.5086</td>
<td>2.61</td>
</tr>
</tbody>
</table>
The resultant ANOVA for the regression yielded an F ratio of 5.349 (3, 46 df). The data for the sum of squares, mean square, degrees of freedom, F ratio, and level of significance used to test the R-value obtained for terminal degree program GPA prediction in Hypothesis V are presented in Table X.

**TABLE X**

ANALYSIS OF VARIANCE DATA FOR THE REGRESSION ANALYSIS PREDICTING FIRST TERM, TWO-YEAR COLLEGE GPA FOR GED STUDENTS ENROLLED IN TERMINAL DEGREE PROGRAMS

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>Sum of Squares</th>
<th>Mean Square</th>
<th>DF</th>
<th>F Ratio</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>8.8974</td>
<td>2.9658</td>
<td>3</td>
<td>5.349</td>
<td>&lt; 0.01</td>
</tr>
<tr>
<td>Residual</td>
<td>25.5050</td>
<td>0.5544</td>
<td>46</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>34.4024</td>
<td>0.5544</td>
<td>49</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Both the obtained R-value of .515 for transfer degree program GED students and the obtained R-value of .509 for terminal degree program GED students proved significant beyond the .05 level. The hypothesis is accepted. The intercorrelation matrices for these analyses are presented in Appendixes F and G. The results indicate that a significant positive relationship did exist between the SS of the component sections of the GED and first semester, two-year college GPA for both transfer and terminal degree programs.
In Hypothesis VI, it was predicted that a significant positive relationship would exist between mean GED SS and first semester, two-year college technical certificate program GPA. The mean GED SS for the high school non-graduates who had completed the GED and were enrolled in a two-year college technical certificate program was 47.66 with a variance of 25.99, while the mean first semester, two-year college GPA for this group was 2.88 with a variance of 1.06. The obtained Pearson product-moment correlation coefficient of .36 with an N of 30 proved significant at the .05 level.

Hypothesis VI is therefore accepted, as the results indicate that a significant positive relationship did exist between mean GED SS and first semester, two-year college technical certificate program GPA.

In Hypothesis VII, it was predicted that a significant positive relationship would exist between the SS of the GED component sections and both major field and non-major field first semester, two-year college transfer degree program GPA. The results of the canonical correlation analysis used to test the hypothesis are presented in Table XI, page 84.

The first set of canonical weights yielded a statistically significant canonical correlation coefficient of .529, as tested by the chi-square method of Bartlett (2), a value which accounted for 28 per cent of the variance of the first canonical variate. The second set of weights yielded an $R_c$ value of .415, a value which did not reach the
TABLE XI

CANONICAL CORRELATION, $\mathbf{R}$, VALUE OF CHI-SQUARE STATISTIC, AND SIGNIFICANCE TESTS OF THE ROOTS OF THE INTERCORRELATION MATRICES

<table>
<thead>
<tr>
<th>Root</th>
<th>$R_c$</th>
<th>$\mathbf{R}$</th>
<th>$\chi^2$</th>
<th>DF</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>.529</td>
<td>.2798</td>
<td>23.29</td>
<td>10</td>
<td>0.010</td>
</tr>
<tr>
<td>2.</td>
<td>.415</td>
<td>.1725</td>
<td>8.52</td>
<td>5</td>
<td>0.074</td>
</tr>
</tbody>
</table>

(required .05 level of significance but was significant at the .07 level. This correlation accounted for 17 per cent of the second canonical variate. The canonical regression weights are presented in Table XII, page 85.

In the first canonical relationship, the GED subtest variate is best defined by Test 3, Interpretation of Reading Materials in the Natural Sciences, with Test 4, Interpretation of Literary Materials a substantial secondary contributor, while the GPA area variate is best defined by the non-major field GPA. In the second canonical relationship, the GED subtest variate is defined by Test 2, Interpretation of Reading Materials in Social Studies in the negative direction and Test 4, Interpretation of Literary Materials in the positive direction, while the GPA area variate is best defined by major field GPA.)
TABLE XII

CANONICAL REGRESSION WEIGHTS FOR THE TWO CANONICAL CORRELATIONS FOR GED STUDENTS ENROLLED IN TRANSFER DEGREE PROGRAMS

<table>
<thead>
<tr>
<th>Variable</th>
<th>$R_c^1 = 0.529$</th>
<th>$R_c^2 = 0.415$</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>GED subtest weights</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Test 1</td>
<td>0.636</td>
<td>-0.192</td>
</tr>
<tr>
<td>Test 2</td>
<td>0.696</td>
<td>-0.692</td>
</tr>
<tr>
<td>Test 3</td>
<td>0.907</td>
<td>-0.159</td>
</tr>
<tr>
<td>Test 4</td>
<td>0.751</td>
<td>0.298</td>
</tr>
<tr>
<td>Test 5</td>
<td>0.498</td>
<td>0.220</td>
</tr>
<tr>
<td><strong>GPA area weights</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Major field GPA</td>
<td>0.619</td>
<td>0.785</td>
</tr>
<tr>
<td>Non-major field GPA</td>
<td>0.999</td>
<td>0.041</td>
</tr>
</tbody>
</table>

The hypothesis is therefore accepted. The results indicate that a significant positive relationship did exist between the SS of the component sections of the GED and both major field and non-major field first semester, two-year college transfer degree program GPA.

In Hypothesis VIII, it was predicted that a significant positive relationship would exist between the SS of the GED component sections and both major field and non-major field first semester, two-year college terminal degree
program GPA. The canonical analysis yielded a correlation coefficient of .513 for the first canonical variate extracted, and a correlation coefficient of .14 was obtained for the second canonical variate extracted. The results of the canonical analysis are presented in Table XIII.

**TABLE XIII**

**CANONICAL CORRELATION, $R_c$, VALUE OF CHI-SQUARE STATISTIC, AND SIGNIFICANCE TESTS OF THE ROOTS OF THE INTERCORRELATION MATRICES**

<table>
<thead>
<tr>
<th>Root</th>
<th>$R_c$</th>
<th>$\gamma$</th>
<th>$\chi^2$</th>
<th>DF</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>.513</td>
<td>.2634</td>
<td>14.65</td>
<td>10</td>
<td>.145</td>
</tr>
<tr>
<td>2.</td>
<td>.140</td>
<td>.0197</td>
<td>0.90</td>
<td>4</td>
<td>.925</td>
</tr>
</tbody>
</table>

(N=50)

The first set of canonical weights failed to yield a statistically significant canonical correlation coefficient as tested by the chi-square method. The $R_c$-value of .513 proved significant at only the .15 level despite accounting for over 26 per cent of the variance of the first canonical variate. The subsequent second canonical correlation coefficient was highly nonsignificant. The hypothesis is therefore not accepted. The analysis indicates that a significant positive relationship did not exist between the SS of the component sections of the GED and both major field and
non-major field first semester, two-year college terminal degree program GPA.

In Hypothesis IX, it was predicted that no significant differences would exist between the first semester, two-year college GPA of high school graduates and high school non-graduates who had completed the GED. The mean first semester, two-year college GPA for the high school graduate groups was 2.639 with a standard deviation of .807, while the mean first semester, two-year college GPA for the high school non-graduate group who had completed the GED was 2.616 with a standard deviation of .971. The Ns for the two groups were 100 and 280 respectively. The t-test for unequal N yielded a t-value of .22 (279, 99 df), a value not significant at the .05 level of significance.

The hypothesis is therefore accepted. The results indicate that no significant differences existed between the first semester, two-year college GPA of high school graduates and high school non-graduates who had completed the GED. The mean GPA for the two groups are almost identical.

In Hypothesis X, it was predicted that high school non-graduates who had completed the GED and high school graduates would have a significantly higher first semester, two-year college GPA than high school non-graduates who had not completed the GED. The N and mean GPA for each group tested by the one-way ANOVA are presented in Table XIV.
### TABLE XIV

FIRST TERM, TWO-YEAR COLLEGE MEAN GPA AND GROUP N FOR HIGH SCHOOL GRADUATES, HIGH SCHOOL NON-GRADUATES WHO HAD COMPLETED THE GED, AND HIGH SCHOOL NON-GRADUATES WHO HAD NOT COMPLETED THE GED

<table>
<thead>
<tr>
<th>Group</th>
<th>Mean GPA</th>
<th>N</th>
</tr>
</thead>
<tbody>
<tr>
<td>High school graduates</td>
<td>2.639</td>
<td>100</td>
</tr>
<tr>
<td>Educationally disadvantaged-GED</td>
<td>2.616</td>
<td>280</td>
</tr>
<tr>
<td>Educationally disadvantaged-no GED</td>
<td>2.602</td>
<td>100</td>
</tr>
</tbody>
</table>

The one-way ANOVA for unequal N yielded an F ratio of 0.0448 (2, 477 df). The data for the sum of squares, mean square, degrees of freedom, F ratio, and level of significance used to test this hypothesis are presented in Table XV.

### TABLE XV

ONE-WAY ANALYSIS OF VARIANCE DATA WITH UNEQUAL N OF FIRST TERM, TWO-YEAR COLLEGE MEAN GPA

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>Sum of Squares</th>
<th>Mean Square</th>
<th>DF</th>
<th>F Ratio</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between</td>
<td>0.0731</td>
<td>0.0365</td>
<td>2</td>
<td>0.0448</td>
<td>0.9561</td>
</tr>
<tr>
<td>Within</td>
<td>388.7134</td>
<td>0.8149</td>
<td>477</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>388.7865</td>
<td></td>
<td>479</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The F ratio did not reach the required level of significance. Hypothesis X is therefore rejected. The results indicate no significant differences existed between the first semester, two-year college GPA of high school graduates, high school non-graduates who had completed the GED, and high school non-graduates who had not completed the GED.

In Hypothesis XI, it was predicted that the mean vector of GED SS of high school non-graduates who had completed the GED and were enrolled in a two-year college transfer degree program would be significantly different from the mean vector of GED SS of high school non-graduates who had completed the GED and were enrolled in a two-year college terminal degree program. GED Test 1 was predicted to provide the best discrimination between the two vectors of mean GED scores.

Results of the stepwise discriminant function analysis indicated that the two groups, high school non-graduates who had completed the GED and were enrolled in a two-year college transfer degree program and high school non-graduates who had completed the GED and were enrolled in a two-year college terminal degree program, were statistically discriminated by GED component section SS. GED Test 4 was the best discriminator, which entered in step one, followed by GED Test 5, which entered in step two. The discriminant function analysis solution was tested through use of the F-statistic as suggested by Lawlis and Chatfield (8, p. 85) and proved significant (F = 3.90, p < .05, df = 2, 97). The
discriminant function solution provided 57 per cent correct classifications, with best classification noted in the group containing students who were high school non-graduates who had completed the GED and were enrolled in a two-year college terminal degree program. Inspection of the mean vectors of GED subtest SS revealed that the group containing GED students enrolled in a transfer degree program had higher mean GED SS on every subtest than did the group containing GED students enrolled in a terminal degree program.

The hypothesis is therefore accepted. The mean vector of GED SS of high school non-graduates who had completed the GED and were enrolled in a two-year college transfer degree program did prove significantly different from the mean vector of GED SS of high school non-graduates who had completed the GED and were enrolled in a two-year college terminal degree program. However, GED Test 4 rather than GED Test 1 was noted to provide the best discrimination between the two mean vectors of GED scores.

In Hypothesis XII, it was predicted that no significant differences would exist between the mean first semester, two-year college GPA of GED students pursuing two consecutive long semesters following initial enrollment and GED students pursuing only one long semester before interruption of study for at least one long semester. The mean first semester, two-year college GPA for the GED students pursuing two consecutive long semesters following initial enrollment
was 2.653 with a standard deviation of 0.922, while the mean first semester, two-year college GPA for the GED students pursuing only one long semester before interruption of study for at least one long semester was 2.571 with a standard deviation of 1.028. The Ns for the two groups were 153 and 127 respectively. The t-test for unequal N yielded a t-value of -0.70 (126, 152 df), a value not significant at the .05 level of significance.

The hypothesis is therefore accepted. The results reveal no significant differences between the mean first semester, two-year college GPA of GED students pursuing two consecutive long semesters following initial enrollment and GED students pursuing only one long semester before interruption of study for at least one long semester.

In Hypothesis XIII, it was predicted that high school non-graduates who had completed the GED and had GED scores on file would have a significantly higher first semester, two-year college GPA than high school non-graduates who had completed the GED but submitted a copy of an equivalency certificate in lieu of the GED scores. The hypothesis was tested through the use of a 2 X 3 ANOVA with unequal N rather than a simple t-test in order to allow for greater potential information retrieval from the results. The mean first semester, two-year college GPA used to test this hypothesis are presented in Table XVI.
<table>
<thead>
<tr>
<th>GED Score Status</th>
<th>Type of Two-Year College Program</th>
<th>Transfer Degree Program</th>
<th>Terminal Degree Program</th>
<th>Certificate Program</th>
</tr>
</thead>
<tbody>
<tr>
<td>With GED scores</td>
<td></td>
<td>2.573</td>
<td>2.813</td>
<td>2.979</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(N = 70)</td>
<td>(N = 57)</td>
<td>(N = 35)</td>
</tr>
<tr>
<td>Without GED scores</td>
<td></td>
<td>2.119</td>
<td>2.234</td>
<td>3.038</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(N = 43)</td>
<td>(N = 39)</td>
<td>(N = 36)</td>
</tr>
</tbody>
</table>

The F ratio for the first main effect, type of two-year college program, was 11.2841 (2, 274 df), while the F ratio for the second main effect, GED score status, was 8.1279 (1, 274 df). The F ratio for main effects interaction was 2.6189 (2, 274 df). The data for the sum of squares, mean square, degrees of freedom, F ratio, and level of significance used to test this hypothesis are presented in Table XVII, page 93.

Both F ratios for main effects reached the required level of significance, while the F ratio for interaction effects did not reach the required level of significance.
TABLE XVII

ANALYSIS OF VARIANCE DATA (2 X 3) WITH UNEQUAL N OF FIRST TERM, TWO-YEAR COLLEGE MEAN GPA FOR TYPE OF TWO-YEAR COLLEGE PROGRAM AND GED SCORE STATUS

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>Sum of Squares</th>
<th>Mean Square</th>
<th>DF</th>
<th>F Ratio</th>
<th>P</th>
</tr>
</thead>
<tbody>
<tr>
<td>A: Type of</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>two-year college</td>
<td>19.2083</td>
<td>9.6042</td>
<td>2</td>
<td>11.2841</td>
<td>0.0001</td>
</tr>
<tr>
<td>program</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B: GED score</td>
<td>6.9179</td>
<td>6.9179</td>
<td>1</td>
<td>8.1279</td>
<td>0.0050</td>
</tr>
<tr>
<td>status</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>A X B: Type of</td>
<td>4.4581</td>
<td>2.2290</td>
<td>2</td>
<td>2.6189</td>
<td>0.0750</td>
</tr>
<tr>
<td>program X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>GED score status</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Error</td>
<td>233.2084</td>
<td>0.8511</td>
<td>274</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>263.7927</td>
<td></td>
<td>278</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

although it did approach the required significance level.
The significant result for the main effect of GED score status indicates that the first semester, two-year college GPA of high school non-graduates who had completed the GED and who had GED scores on file was significantly higher than the first semester, two-year college GPA of high school non-graduates who had completed the GED but had submitted a copy of an equivalency certificate in lieu of the GED scores. The hypothesis is therefore accepted.
The significant result for the main effect of type of two-year degree supplements the information obtained in the tests of Hypotheses V and VI, while inspection of Table XVI provides information to complement the data obtained in testing Hypothesis X. It is interesting to note from the data that while for all GED subtests, higher SS are obtained by GED students enrolled in a transfer two-year degree program than in a terminal two-year degree program, GED students with scores on file and enrolled in a terminal two-year degree made better grades than their counterparts enrolled in a transfer two-year degree. In the case of the main effect of GED score status, the two means may be assumed without testing to be significantly different, as Hays (4, p. 485) has stated that once a significant F ratio for a main effect is obtained, individual mean differences do exist. In the case of the main effect for type of two-year college program, inspection of Table XVI was substituted for application of post hoc statistical comparisons because subsequent statistical testing of means is a more appropriate function for testing hypotheses generated post hoc from this data and Hypothesis XIII has already been tested and accepted through the significant main effect for GED score status.

Inspection of Table XVI does reveal a definite pattern of steady increase in GPA by degree type, as certificate program GPA is greater than terminal degree program GPA which is in turn greater than transfer degree program GPA.
In the case of GED score status, GED students in both terminal and transfer degree programs have higher GPA's than their counterparts without scores, while for GED students in certificate programs, the GPA's are roughly equivalent.

Certain descriptive statistics in addition to these already given in the testing of specific hypotheses were computed. As compared to the national norm standard score of 50 for each GED subtest and mean GED, the non-high school graduate GED students in the sample enrolled in terminal and transfer two-year degree programs who had submitted scores had a mean GED SS of 49.75. The mean GED SS for those GED students in the sample who had submitted scores and were enrolled in a two-year certificate program was 47.66. The total N for the terminal and transfer degree program GED student group was 100, while for the certificate program the N was 30. The mean data for GED students in the sample differentiated by type of program are detailed in Table XVIII, page 96.

The mean data differentiated by sex of student for all GED students in the sample combined who submitted scores are presented in Table XIX, page 97. Of particular note is that mean GED SS for females was 50.00, equal to the national norm, while mean GED SS for males in the sample was slightly below the national norm at 48.33. First semester, two-year college GPA for females in the sample having submitted GED
<table>
<thead>
<tr>
<th>Variable</th>
<th>Transfer Degree</th>
<th>Terminal Degree</th>
<th>Transfer and Terminal Degree</th>
<th>Technical Certificate</th>
</tr>
</thead>
<tbody>
<tr>
<td>GED Test 1 SS</td>
<td>49.28</td>
<td>47.00</td>
<td>48.14</td>
<td>44.53</td>
</tr>
<tr>
<td>GED Test 2 SS</td>
<td>51.34</td>
<td>49.04</td>
<td>50.19</td>
<td>46.90</td>
</tr>
<tr>
<td>GED Test 3 SS</td>
<td>52.46</td>
<td>50.96</td>
<td>51.71</td>
<td>50.90</td>
</tr>
<tr>
<td>GED Test 4 SS</td>
<td>53.76</td>
<td>50.04</td>
<td>51.90</td>
<td>49.00</td>
</tr>
<tr>
<td>GED Test 5 SS</td>
<td>47.86</td>
<td>47.84</td>
<td>47.85</td>
<td>46.30</td>
</tr>
<tr>
<td>Mean GED SS</td>
<td>50.88</td>
<td>48.61</td>
<td>49.75</td>
<td>47.66</td>
</tr>
<tr>
<td>Number of high school grades completed</td>
<td>10.28</td>
<td>10.36</td>
<td>10.32</td>
<td>10.36</td>
</tr>
<tr>
<td>Age of student (years)</td>
<td>28.06</td>
<td>27.88</td>
<td>27.97</td>
<td>30.56</td>
</tr>
<tr>
<td>First semester GPA</td>
<td>2.60</td>
<td>2.77</td>
<td>2.68</td>
<td>2.88</td>
</tr>
<tr>
<td>Number of students</td>
<td>50</td>
<td>50</td>
<td>100</td>
<td>30</td>
</tr>
</tbody>
</table>
TABLE XIX

MEAN DATA FOR ALL GED STUDENTS IN SAMPLE WHO SUBMITTED GED SCORES DIFFERENTIATED BY SEX OF STUDENT

<table>
<thead>
<tr>
<th>Variable</th>
<th>Males</th>
<th>Females</th>
</tr>
</thead>
<tbody>
<tr>
<td>GED Test 1 SS</td>
<td>44.46</td>
<td>49.53</td>
</tr>
<tr>
<td>GED Test 2 SS</td>
<td>48.44</td>
<td>50.21</td>
</tr>
<tr>
<td>GED Test 3 SS</td>
<td>51.60</td>
<td>51.46</td>
</tr>
<tr>
<td>GED Test 4 SS</td>
<td>48.79</td>
<td>53.14</td>
</tr>
<tr>
<td>GED Test 5 SS</td>
<td>48.14</td>
<td>46.99</td>
</tr>
<tr>
<td>Mean GED SS</td>
<td>48.33</td>
<td>50.00</td>
</tr>
<tr>
<td>Number of high school grades completed</td>
<td>10.40</td>
<td>10.32</td>
</tr>
<tr>
<td>Age of student (years)</td>
<td>27.11</td>
<td>30.26</td>
</tr>
<tr>
<td>First semester GPA</td>
<td>2.70</td>
<td>2.75</td>
</tr>
<tr>
<td>Number of students</td>
<td>57</td>
<td>73</td>
</tr>
</tbody>
</table>

scores was only slightly higher than that for males in the sample having submitted GED scores.

Discussion of Data

The recent research report by Sharon (11) made no mention of multiple regression analysis in reporting relationships of individual GED subtest SS to overall two-year college GPA. It may be seen from the present data that the
The predominant single subtest which predicts first semester, two-year college GPA most effectively is GED Test 4, Interpretation of Literary Materials. In all analyses where individual GED subtest SS were utilized, this subtest proves itself most valuable in prediction in the iterative, step-wise regression technique initially described by Horst and Smith (5). However, beyond GED Test 4 the importance of other GED subtests in prediction varies with the type of two-year college program GPA being predicted as well as with the presence in the prediction process of other non-standardized measures such as student age and number of high school grades completed by the subject.

Further extending the initial findings of Sharon (11), it may be seen that the GED is a significant and positive predictor of transfer degree, terminal degree, and technical certificate program first semester, two-year college GPA. Although this was expected since other standardized measures such as the ACT and the SAT, as well as high school grade-point-average (HSGPA), have been shown by Hoyt (6), Baird (1), and Munday (9) to predict academic performance at the two-year college level in such programs, the present results confirm a similar relationship for GED subtest SS.

Perhaps a greater value of the extension of the demonstrated predictive applicability of the GED for specific two-year college program types is to make subsequent findings
in the study more meaningful. The data of the study demonstrate that the GED SS of two-year college students enrolled in transfer degree programs are higher than the GED SS of two-year college students enrolled in terminal degree programs. In earlier related research, Munday (9) did find two-year college transfer degree students significantly higher in ACT Composite scores than two-year terminal degree students although he found no significant differences in HSGPA between the two groups. Of interest to note in the present study is that the obtained first semester GPA of the terminal degree two-year college GED student is higher than the obtained first semester GPA of the transfer degree two-year college GED student.

The importance in the prediction of two-year college academic performance of the factors of GED student age and number of high school grades completed for the high school non-graduate, GED student is also documented. Although probably more valuable as supplemental predictors of first semester, two-year college GPA than as primary predictors (since GED SS appear to have the greatest predictive power in the study) these two factors increased overall prediction of two-year college degree GED students from .384 to .472 when they were added to the five GED subtest SS as predictors. This finding corroborates that of Sharon (11) as he found that the GED SS generally predicted academic
performance better for students over thirty than for students below thirty.

Consideration of the sex of the GED student in the prediction of two-year college GPA, suggested by Seashore (10) and Worthington and Grant (13), produced interesting results because the empirical relationships obtained from the regression analyses indicated that males were slightly more predictable than females. Since this finding is contrary to most prior research, additional study is indicated to determine whether this is an accurate description of the relationship for GED student performance or whether this is a spurious result characteristic only of this sample.

It was noted that from the standpoint of overall first semester, two-year college GPA, non-high school graduates who had completed the GED performed as well academically as did high school graduates. This result is generally consistent with the finding of Sharon (11), although Tyler (12) did note a slight advantage in college academic performance for high school graduates over high school non-graduates who had completed the GED. One unexpected result of significance for prediction of high school non-graduate academic performance at the two-year college level is the current finding that high school non-graduates who had not completed the GED performed academically as well in their first term at the two-year college level as did both high school
graduates and high school non-graduates who had completed the GED. Organismic variables such as age and general motivation of the high school non-graduate without the GED returning to an academic setting of his or her own volition may be factors for future consideration in studies of two-year college level academic performance.

Preliminary examination of the relationship of GED subtest SS to major field and non-major field academic performance at the two-year college level can be observed to provide results indicating mixed success but considerable support for additional study. In examining academic performance of two-year college GED students in both transfer and terminal degree programs, subtests other than the generally dominant predictor, GED Test 4, demonstrated potential usefulness as predictors. It may well be that specification of major field categories is necessary in order to maximize the predictive value of the individual GED subtest SS for major field and non-major field GPA. Transfer degree program relationships were more clearly demonstrated, although those for terminal degree programs showed promise for future study if prediction is attempted by specific major field categories.

Inspection of the data indicates that interruption of study shows no differential academic result between GED students pursuing only one long semester before interruption and GED students pursuing two or more long terms before
interruption of study. As Harris (3) has suggested, the two-year college student often encounters financial and family pressures which, although not necessarily adversely affecting academic performance, do affect the feasibility of continuous training. For the high school non-graduate GED student, such pressures may be a very real concern and a factor of interest for further study. The importance of non-intellective factors may be amplified by this finding, particularly in the case of information such as that of Lavin (7) on socioeconomic status previously cited.

Of interest also is the finding indicating that for high school non-graduate GED students, those reporting their GED scores on admission performed better academically than their counterparts who furnished only a copy of an equivalency certificate in lieu of the GED scores. One possible explanation is that those students with lower scores chose to submit the GED certificate rather than the scores, while those students with higher scores had no reservations regarding submission of their scores. Another possibility is that many of those students submitting certificates of high school equivalency rather than actual scores earned their certificate while on active duty in the armed forces. This factor is strongly suspected since South Plains College has a large extension center on a nearby United States Air Force base, and the United States Armed Forces Institute which awards the equivalency certificate to servicemen accepts as
passing a minimum SS of thirty-five while the minimum passing SS accepted by the State of Texas and many other states is forty. Therefore, the GED student group entering South Plains College without submitting a transcript of the GED scores may have lower GED SS than the GED student group submitting GED scores prior to admission, although by definition this factor cannot be confirmed due to unavailability of GED scores for the former group.

Examination of the descriptive statistics for GED students in the sample submitting GED scores indicates that those enrolled in two-year college degree programs are representative of the general population with respect to mean GED SS comparison and number of high school grades completed. The GED students submitting scores and enrolled in a technical certificate program had lower GED SS while making higher grades and being slightly older on the average. A self-selection process on the part of the GED student enrolled in a technical certificate program with respect to election of a non-academic program more consistent with both academic background and occupational interests may be demonstrated in this pattern and could suggest a topic for additional study.

Summary

The purpose of this chapter was to present, analyze, and discuss the data obtained for this study. The hypotheses
were presented and the data were analyzed to determine acceptance or rejection of the hypotheses. Tests of significance for the data involved in Hypotheses I, II, III, IV, V, VI, IX, XI, XII, and XIII yielded statistical values that were significant at the .01 level. The test of significance for the data for Hypothesis VII yielded a chi-square value that was significant at the .05 level. The test of significance for the data for Hypothesis VIII yielded a chi-square value that did not reach the required level of significance, and the test of significance for the data involved in Hypothesis X yielded an F ratio that did not reach the required level of significance.

The GED students in the sample enrolled in terminal and transfer two-year degree programs who had submitted scores had a mean GED SS of 49.75, almost identical to the national norm of 50.00, while GED students in the sample enrolled in technical certificate programs who had submitted scores had a mean GED SS of 47.66, somewhat below the national norm. Both average age and first semester GPA of technical certificate GED students in the sample were somewhat higher than similar measures for GED students in two-year degree programs.

General documentation was provided by the data for support of the basic premise that the GED is a valid and positive predictor of first semester, two-year college GPA. The single best GED subtest in the prediction of first semester, two-year college GPA was found to be GED Test 4,
Interpretation of Literary Materials, while the importance of the other GED subtests in the predictive process varied with the type of two-year college program in which the GED student was enrolled. Prediction of two-year college program GPA was improved when individual GED subtest SS were used as predictors rather than mean GED SS alone. Prediction by individual GED subtest SS of transfer and terminal two-year degree program GPA was improved when academic performance was predicted differentially for transfer and terminal degree GPA rather than combining the academic performance of GED students enrolled in the two types of degree programs. Academic performance of GED students enrolled in two-year transfer and terminal degree programs was predicted about equally as well by individual GED subtest SS.

Organismic variables such as sex of student and age of student, as well as number of high school grades completed, were also demonstrated to be relevant to the prediction of the two-year college academic performance of the high school non-graduate, GED student. The data also provided some support for prediction of two-year college GED student academic performance when differentiated by specific type of major field, although the results were not conclusive on this point. It was noted that no significant mean differences existed among the first semester, two-year college GPA of high school graduates, high school non-graduates who had completed the GED, and high school non-graduates who had
not completed the GED. It was found that interruption of training by GED students after only one semester of training produced no significant differences in first semester, two-year college GPA when this group was compared to GED students pursuing two or more semesters before interruption of training.


CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The problem under study was to investigate systematically the validity of the high school level battery of the Tests of General Educational Development (GED) as a predictor of two-year college grade-point average (GPA). The following purposes were formulated to investigate the problem:

1. To extend the previous initial findings regarding the effectiveness of the high school level GED test battery as a predictor of overall two-year college GPA.

2. To determine the nature of the relationship between scores on the GED and academic performance in three different types of two-year college programs, including transfer degree, terminal degree, and technical certificate.

3. To determine the nature of the relationship between scores on the GED and academic performance in both transfer and terminal degree subject categories, as measured by GPA in major field and required general and elective courses.

4. To investigate the relationship between two-year college GPA of the subjects and such subject factors as sex, age, number of high school grades completed, GED completion status for high school non-graduate subjects, and high school graduation status.

The hypotheses to be tested were stated as follows:

1. There will be a significant positive relationship between mean GED standard score (SS) and first semester, two-year college GPA.
II. There will be a significant positive relationship between the SS of the component sections of the GED and first semester, two-year college GPA.

III. The prediction of first semester, two-year college GPA by the SS of the component sections of the GED will be significantly improved when the variables of age of subject and number of high school grades completed are added as predictors.

IV. There will be a significant positive relationship between the SS of the component sections of the GED and first semester, two-year college GPA when the GPA is predicted separately by sex.

V. There will be a significant positive relationship between the SS of the component sections of the GED and first semester, two-year college GPA when the GPA is predicted individually for transfer and terminal degree programs.

VI. There will be a significant positive relationship between mean GED SS and first semester, two-year college GPA when the GPA is predicted for two-year, technical certificate programs.

VII. There will be a significant positive relationship between the SS of the component sections of the GED and first semester, two-year college transfer degree GPA as recorded by course category (major field and required general plus elective courses).
VIII. There will be a significant positive relationship between the SS of the component sections of the GED and first semester, two-year college terminal degree GPA as recorded by course category (major field and required general plus elective courses).

IX. There will be no significant differences between the overall first semester, two-year college GPA of high school graduates and the overall first semester, two-year college GPA of high school non-graduates who completed the GED.

X. High school non-graduates who have completed the GED and high school graduates will have a significantly higher first semester, two-year college GPA than high school non-graduates who have not completed the GED.

XI. The mean vector of GED scores for high school non-graduates who have completed the GED and enrolled in a two-year college transfer degree program will be significantly different from the mean vector of GED scores for a similar group enrolled in a two-year college terminal degree program, with GED Test 1 the best discriminator between the groups.

XII. There will be no significant difference between the mean first semester, two-year college GPA of GED students pursuing two consecutive long semesters following
initial enrollment and GED students pursuing only one long semester before interruption of study for at least one long semester.

XIII. High school non-graduates who have completed the GED and have scores on file will have a significantly higher first semester, two-year college GPA than high school non-graduates who have completed the GED but have submitted a copy of an equivalency certificate in lieu of the GED scores.

The subjects who comprised the sample were first-year students at South Plains College in Levelland, Texas. Although high school graduates, high school non-graduates who had completed the GED, and high school non-graduates who had not completed the GED were included in the sample, no transfer students or less than one-half time students were represented. All subjects were selected through a systematic and controlled sampling procedure from computer-generated master lists for the enrollment period from Fall, 1970 through Fall, 1973. Summer enrollment records were not included in the generation of the master lists.

The instrument used to predict the first semester, two-year college GPA was the high-school-level battery of the Tests of General Educational Development (GED). All scores on this instrument were retrieved from the permanent student record files of the subjects, as were the first semester grades used as the criterion measure.
After the data were gathered and tabulated the results were statistically analyzed using a variety of statistical techniques including univariate and multivariate correlational techniques, t-test, and analysis of variance. A significance level of .05 was required for acceptance of the hypotheses. The statistical analysis of the data yielded the following results.

Hypothesis I was supported. A significant positive relationship did exist between mean GED SS and first semester, two-year college GPA.

Hypothesis II was supported. A significant positive relationship did exist between the SS of the component sections of the GED and first semester, two-year college GPA.

Hypothesis III was supported. The prediction of first semester, two-year college GPA by the SS of the component sections of the GED was significantly improved when the variables of age of subject and number of high school grades completed were added as predictors.

Hypothesis IV was supported. A significant positive relationship did exist between the SS of the component sections of the GED and first semester, two-year college GPA when the GPA was predicted separately by sex.

Hypothesis V was also supported. A significant positive relationship did exist between the SS of the component
sections of the GED and first semester, two-year college GPA when the GPA was predicted individually for transfer and terminal degree programs.

Hypothesis VI was supported. A significant positive relationship did exist between mean GED SS and first semester, two-year college GPA when the GPA was predicted for two-year, technical certificate programs.

Hypothesis VII was supported. A significant positive relationship did exist between the SS of the component sections of the GED and both major field and non-major first semester, two-year college transfer degree program GPA.

Hypothesis VIII was not supported. A significant positive relationship did not exist between the SS of the component sections of the GED and both major field and non-major first semester, two-year college terminal degree program GPA.

Hypothesis IX was supported. No significant differences existed between the overall first semester, two-year college GPA of high school graduates and high school non-graduates who had completed the GED.

Hypothesis X was not supported. High school non-graduates who had completed the GED and high school graduates did not have a significantly higher first semester, two-year college GPA than high school graduates who had not completed the GED.
Hypothesis XI was supported. The mean vector of GED scores for high school non-graduates who had completed the GED and enrolled in a two-year college transfer degree program was significantly different from the mean vector of GED scores for a similar group enrolled in a two-year college terminal degree program, although GED Test 4 proved the best discriminator between the groups rather than GED Test 1.

Hypothesis XII was supported. No significant differences existed between the mean first semester, two-year college GPA of GED students pursuing two consecutive long semesters following initial enrollment and GED students pursuing only one long semester before interruption of study for at least one long semester.

Hypothesis XIII was supported. High school non-graduates who had completed the GED and had scores on file did have a significantly higher first semester, two-year college GPA than high school non-graduates who had completed the GED but had submitted a copy of an equivalency certificate in lieu of the GED scores.

A relatively high positive relationship between GED standard scores and two-year college GPA for high school non-graduate students was generally demonstrated throughout all phases of the data analysis. The primary overall purpose of the study to document the predictive validity of the GED for two-year college academic performance was therefore accomplished.
Statement of Conclusions

All experimental hypotheses except for Hypotheses VIII and X were supported. The following conclusions are based upon the analysis of the data of this study and it seems likely that similar results would be obtained if the study were replicated in other junior college and community college settings.

With the acceptance of the majority of the experimental hypotheses, it is concluded that the high school level battery of the GED is a valid and positive predictor of first semester, two-year college GPA. The previous findings of Sharon (9) regarding the effectiveness of the GED as a predictor of two-year college academic performance have been both confirmed and considerably extended.

It is concluded from consideration of the data that GED Test 4, Interpretation of Literary Materials, is the single most effective GED subtest in predicting the academic performance of two-year college, high school non-graduate GED students. On the basis of the findings regarding the value of GED Test 4 as the single most effective GED subtest predictor of two-year college GPA, it is further concluded that the factor of verbal comprehension plays a major role in the determination of success of high school non-graduate GED students in two-year college study.

It is concluded from the basic data that out-of-class educational experiences are sufficient to compensate for lack
of formal educational background in those high school non-
graduates who elect to return to formal academic training
at the two-year college level, a basic assumption of the
GED reported by Graff (4). Support for this conclusion comes
from both the positive relationship between GED scores and
two-year college academic performance and the lack of
observed differences in academic performance between high
school graduates and high school non-graduates.

It is concluded that the use of the SS of individual
component subtests of the GED as predictors provides valid
and slightly more efficient prediction of overall first
semester, two-year college GPA than the use of only mean GED
SS as a predictor of that criterion. It is also concluded
that prediction of first semester, two-year college GPA
through the use of the SS of component sections of the GED
is enhanced when nonintellective data such as age of subject
and number of high school grades completed by the subject
are added in the prediction process.

It is concluded that the GED is a valid predictor of
all three major types of two-year college programs, including
transfer and terminal degrees and technical certificates.
In regard to the two major types of degree programs offered
at the two-year college level, it is concluded that GED
component SS predict high school non-graduate GED student
academic performance equally well for both programs.
It is concluded that prediction of major and non-major academic performance at the two-year college level by GED component SS is a valid procedure to use with high school non-graduate GED students pursuing two-year college transfer degree programs and holds promise for the prediction of differential academic performance of high school non-graduate GED students pursuing terminal degree programs as well.

It is concluded that high school graduates, high school non-graduates having completed the GED, and high school non-graduates without the GED perform equally well academically in their initial semester of study at the two-year college. It is also concluded that high school non-graduate GED students enrolled in a two-year college transfer degree program have higher GED SS than do high school non-graduate GED students enrolled in a two-year college terminal degree program. Additionally, it is concluded that GED Test 4, Interpretation of Literary Materials, distinguishes between GED transfer degree students and GED terminal degree students most effectively on the dimension of GED SS.

On the basis of the data, it is concluded that whatever the factors are that lead to interruption of two-year college study after completion of only one long semester, they do not adversely affect the academic performance of high school non-graduate GED students when the academic performance of that group is compared to the academic performance of high
school non-graduate GED students completing two or more long semesters of two-year college study before interruption of study.

It is concluded that high school non-graduate GED students who submit scores upon admission to two-year college study perform better academically in their first semester of study at the two-year college level than high school non-graduate GED students who submit a copy of an equivalency certificate in lieu of the GED scores upon admission to two-year college study.

Etaugh, et al. (3) stressed that only through the application of multivariate statistical techniques more powerful than simple regression analyses can research investigating the validity of new predictors of college academic performance prove fruitful and that more accurate prediction of certain specific components of college scholastic performance is the most likely result of such multivariate research studies. It may be concluded from the data in this study that this proposition has been largely supported. Sufficient information has been obtained to warrant additional extension of the general research format utilized in this study in future investigation of the predictive validity of the GED for two-year college study.
Statement of Recommendations

It is recommended that for the high school non-graduate who has completed the GED and who expresses a desire to attend a two-year college, performance on the GED be used as a major counseling aid in advising the prospective student and in estimating probability for success at that level of study.

It is recommended that the counseling process with the high school non-graduate who desires to attend a two-year college combine both standardized measures such as GED scores with non-intellective measures, such as age and sex of student as well as number of high school grades completed by the student to maximize the prediction of academic success of the high school non-graduate at the two-year college level.

In cases where the GED scores are used in the counseling process with prospective high school non-graduate two-year college students, it is recommended that performance on GED Test 4, Interpretation of Literary Materials, be weighted most heavily by the counselor in discussion of prospective success at the two-year college level of study. It is also recommended, however, that other GED subtest scores be considered for their appropriateness by the counselor in the counseling and advising process, depending upon the nature of the two-year college program being explored by the prospective student.
It is recommended that research be conducted to determine whether combining GED scores with scores on standardized achievement instruments obtained during elementary school years is potentially a productive source of information in predicting academic performance of the high school non-graduate GED student at the two-year college level, since Scannell (8) has demonstrated the value of achievement test scores obtained during elementary school experiences in the prediction of post-secondary study.

It is recommended that additional research be conducted to further extend the potential usefulness of the GED as a predictive instrument for two-year college performance. Although such early reviews such as that of Cronbach (1) reported predictive coefficients generally equivalent to those obtained in the present study and those obtained by Sharon (9), the multivariate approaches now available for prediction of the academic performance of specific groups in specific settings and in specific curricula have been demonstrated to have potential value for the counseling process at the two-year college level. Examination in greater detail of the prediction of academic performance at the two-year college level for specific groups and curricula seems warranted. Perhaps the research mode of differential prediction, proposed by Horst (5) and successfully used to varying degrees by Lanier and Lightsey (6), Eells (2) and
Horst (5) in the prediction of GPA in specific subject matter areas through the use of specific, differential predictors, deserves investigation that includes GED scores as predictors.

It is recommended that high school non-graduates who have completed the GED and who wish to attend a two-year college program be required to submit a transcript of their GED scores rather than merely a copy of the equivalency certificate. Such a requirement would increase the effectiveness of the counseling process in estimating probability for success in training at that level for the high school non-graduate GED student as well as assisting the counselor in advising the student in areas such as curriculum choice and course load.

It is recommended that expectancy tables utilizing GED scores be developed locally at two-year colleges to assist in the advisement of high school non-graduate GED students attending or considering attendance at that institution.

It is recommended that the hypothesis that no significant differences exist between the intellectual ability of high school graduates and high school non-graduates who elect to pursue two-year college study be subjected to an empirical test. This recommendation is made because the observed lack of differences in two-year college academic performance between high school graduates and high school non-graduates would suggest that factors other than intellectual ability contributed to the withdrawal of students from formal high school studies prior to completion.
It is recommended that research be conducted to determine to what extent differential motivation factors might exist between high school graduates and high school non-graduates who elect to pursue training at the two-year college level. Packwood (7) has developed a measurement instrument for student motivation in the form of his Motivation Check-Sheet developed and validated at the junior college level. This instrument has been used with moderate success in predicting academic performance at the two-year college level and does so independently of standard ability measures such as HSGPA and ACT scores. For many high school non-graduates, the return to a formal educational environment such as the two-year college of their own volition represents an attempt to restructure an incompleted experience into a completed one. Despite lack of a complete secondary school academic background, high school non-graduates have demonstrated through the data of this study that they can perform equally as well in the academic sphere at the two-year college level as do high school graduates. One possible explanation for at least a portion of the observed success of the high school non-graduate in post-secondary, two-year college training is greater motivation on the part of the high school non-graduate than the high school graduate. Factors such as increased maturity and opportunity to observe the value of formal educational experiences in the labor market may be
postulated as possible contributors to this increased motivation.

The final recommendation is that in order to fully utilize the results of the present study, those of Sharon (9), and other related studies to follow, in counseling the high school non-graduate who aspires to train at the two-year college level, the high school non-graduate should be encouraged, if not required, to attempt completion of the GED prior to application for admission to two-year college study. If the student successfully completes the equivalency examination, the counselor possesses much more information with which to work when advising the prospective student regarding his plans for study at the two-year college level. Adult education programs funded by the federal government and available at no cost to eligible persons provide a readily accessible vehicle to assist the high school non-graduate in satisfactorily completing the GED.
CHAPTER BIBLIOGRAPHY


APPENDIX A
INTERCORRELATION MATRIX OF ALL VARIABLES UTILIZED IN ALL ANALYSES IN PREDICTING FIRST TERM, TWO-YEAR GPA FOR GED STUDENTS ENROLLED IN TRANSFER AND TERMINAL DEGREE PROGRAMS

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<th>NGSOC</th>
<th>GED 1</th>
<th>GED 2</th>
<th>GED 3</th>
<th>GED 4</th>
<th>GED 5</th>
<th>GED MEAN</th>
<th>GPA FIRST</th>
<th>MAJOR GPA</th>
<th>NONMAJ GPA</th>
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APPENDIX B
INTERCORRELATION MATRIX OF VARIABLES IN THE STEPWISE REGRESSION ANALYSIS PREDICTING FIRST TERM, TWO-YEAR COLLEGE GPA FOR GED STUDENTS ENROLLED IN TRANSFER AND TERMINAL DEGREE PROGRAMS

<table>
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INTERCORRELATION MATRIX OF VARIABLES IN THE STEPWISE REGRESSION ANALYSIS PREDICTING FIRST TERM, TWO-YEAR COLLEGE GPA FOR GED STUDENTS ENROLLED IN TRANSFER AND TERMINAL DEGREE PROGRAMS WHEN SUBJECT AGE AND NUMBER OF HIGH SCHOOL GRADES COMPLETED ARE INCLUDED IN PREDICTION

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APPENDIX D
INTERCORRELATION MATRIX OF VARIABLES IN THE STEPWISE REGRESSION ANALYSIS PREDICTING FIRST TERM, TWO-YEAR COLLEGE GPA FOR MALE GED STUDENTS

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INTERCORRELATION MATRIX OF VARIABLES IN THE STEPWISE REGRESSION ANALYSIS PREDICTING FIRST TERM, TWO-YEAR COLLEGE GPA FOR GED STUDENTS ENROLLED IN TRANSFER DEGREE PROGRAMS

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APPENDIX G
INTERCORRELATION MATRIX OF VARIABLES IN THE STEPWISE REGRESSION ANALYSIS PREDICTING FIRST TERM, TWO-YEAR COLLEGE GPA FOR GED STUDENTS ENROLLED IN TERMINAL DEGREE PROGRAMS

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BIBLIOGRAPHY

Books


Articles

Astor, M. H., "Reading Test or Counseling Interview to Predict Success in College?" *Journal of Reading*, XI (February, 1968), 343-345.


Bashaw, W. L., "Central Prediction and the Junior College Transfer," *College and University*, XL (Spring, 1965), 249-256.


Horst, P., "The Differential Prediction of Success in Various College Course Areas," College and University, XXXI (Summer, 1956), 456-471.


Lanier, D. and R. Lightsey, "Verbal SAT Scores and High School Average as Predictors," Intellect, CI (November, 1972), 127-128.


———, "Women are More Predictable Than Men," *Journal of Counseling Psychology*, IX (Fall, 1962), 261-270.


Siegelman, M., "SAT and High School Average as Predictors of Four Year College Achievement," *Educational and Psychological Measurement*, XXXI (Winter, 1971), 947-950.


**Reports**


