

A COMPARISON OF GED PERFORMANCE WITH TESTING
ADMINISTRATION METHOD: ONE DAY vs. TWO DAYS-
IMPLICATIONS FOR POLICY-MAKERS AND COUNSELORS

by

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(ABSTRACT)

This study, a replication of Carbol's (1986), sought to compare GED test performance of first-time GED examinees in Virginia according to the method of testing administration experienced, one day or two half days. Carbol's study was extended to include an examination of how testing administration method affected the relationship of test performance and selected characteristics of the GED examinees (age, gender, race, highest grade completed, geographical location, preparation for the GED and motivations for taking the GED). These selected characteristics were also analyzed for their predictive usage for successful completion of the GED. No significant differences were found with test performance between the two treatment groups either with mean total test scores, pass/fail rate, first and second half of testing, or according to the order in which the five subtests were taken (sequence). Of the selected characteristics of GED examinees examined, testing administration method only affected the relationship of test performance and race of the GED examinees. The method marginally affected the relationship of test performance and age, geographical location and preparation for the GED.

The method did not affect the relationship of test performance and any other of the GED examinee characteristics. Those characteristics deemed appropriate predictors of success included race, highest grade completed and preparation for the GED.

Two conclusions were drawn from this study. First, the initial testing policy currently utilized in Virginia with respect to method of testing administration utilized does not warrant further review due to the very small difference found between test scores earned in one and two half days of testing. Secondly, counselors should be aware of the various characteristics which might affect test performance and utilize this information in evaluating and updating current screening procedures to assist in advising prospective GED candidates.

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TABLE OF CONTENTS

	Page
List of Tables.	x
List of Figuresxiii
 CHAPTER	
1. INTRODUCTION	
Background of the Problem.	2
Statement of the Problem	9
Objectives of this Study	10
Significance of the Study.	11
Definitions of Terms	13
Limitations of the Study	14
 2. REVIEW OF RELATED LITERATURE	
The GED Testing Program.	17
History	17
GED Tests	19
GED Examinees	21
General Test Performance of Adults	24
Age	25
Gender.	26
Race.	27
Educational Level	28
Geographical Location	28
Noncognitive Factors.	29
Summary	30
Relationship of GED Performance & Demographic Variables.	31
Testing Administration Method	31
Current practice	32
Related studies.	37
Selected GED Examinee Characteristics	39
Age.	40
Gender	43
Race	44
Highest grade completed.	45
Geographical location.	46
Preparation for the GED.	47
Motivations for taking the GED tests	48
Predictive Usage of GED Examinee Characteristics.	49
Summary	50

CHAPTER	Page
2. REVIEW OF RELATED LITERATURE (continued)	
Summary.	51
Testing Administration.	52
Age	52
Gender.	53
Race.	53
Geographical Location	53
Highest Grade Completed	53
Preparation for the GED Tests	54
Motivation for Taking the GED Tests	54
3. METHODS	
Research Design.	56
Population & Sample.	59
Instrumentation.	61
Data Collection.	64
Analysis of Data	66
Summary.	73
4. FINDINGS OF THE STUDY	
Description of the Sample.	74
Participation of GED Testing Centers.	74
Selected Characteristics.	80
Age.	80
Gender	83
Race	83
Highest grade completed.	84
Geographical location.	84
Preparation for GED.	84
Hours of preparation	87
Motivations for taking GED	88
Test sequencing.	88
Pass/Fail Groups.	89
Age.	92
Gender	92
Race	94
Highest grade completed.	94
Geographical location.	98
Preparation for GED.	100
Hours of preparation	100
Motivations for taking GED	103

CHAPTER

Page

4. ANALYSIS OF DATA (continued)

Testing of Hypotheses.	105
GED Performance & Testing Administration Method	105
GED Performance in 1st and 2nd Half Testing	109
GED Performance & Test Sequencing	114
GED Performance & Pass/Fail Rates	116
GED Performance & Age	123
GED Performance & Gender.	126
GED Performance & Race.	134
GED Performance & Highest Grade Completed	146
GED Performance & Geographical Location	148
GED Performance & Preparation for GED	151
GED Performance & Contents of Preparation Choices	156
GED Performance & Hours of Preparation.	163
GED Performance & Motivations to Take GED	165
Summary	170
Prediction of GED Success.	171

5. SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary.	175
Population Sample	177
Findings.	180
Conclusions.	186
For Policy-Makers	189
For Counselors.	190
Recommendations for Further Study.	200

REFERENCES.	201
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APPENDIXES

A. Introductory Letter to Testing Center Directors	208
B. Implementation of Study Letter and Instructions to Testing Center Directors	209
C. Candidate Data Sheet.	211
D. Directions for Completing the Candidate Data Sheet.	213
E. Testing Centers in Virginia	214
F. Content of the GED Tests.	215

CHAPTER

Page

APPENDIXES (continued)

G.	Frequency Distribution of Ages of GED Examinees	217
H.	Frequency Distribution of Testing Sequences for GED Examinees	219
I.	Test Sequencing Numbers and Order of Testing.	222
J.	Frequency Distribution of Total Test Scores Received on GED Tests According to Method of Testing Administration	225

TABLES

TABLE	Page
1. GED Testing Administration Methods Utilized in the U.S. and D.C.	32
2. Participation of GED Testing Centers in Va.	76
3. Frequency Distribution of First-Time GED Examinees According to Selected Characteristics in One Day and Two Half Days Testing.	81
4. Frequency Distribution of Preparation Choices by GED Examinees While Preparing for the GED	85
5. Summary Table of Pass/Fail Groups According to GED Examinees' Selected Characteristics and Testing Administration Method	90
6. Analysis of Variance of GED Performance by Selected Characteristics of GED Examinees According to Pass/Fail Groups	93
7. T-test Results of One Day versus Two Half Days Testing Administration.	106
8. Wilk's Lambda Test of Overall Method Effect on First and Second Half of Testing by Sequences	110
9. Analysis of Variance for Comparing First Half of Testing Sequence According to Testing Administration Method	111
10. Analysis of Variance for Comparing Second Half of Testing Sequence According to Testing Administration Method	112
11. Mean Total GED Test Scores by Test Sequence Number According to Testing Administration Method.	115
12. Analysis of Variance of Test Sequence and Test Performance According to Testing Administration Method.	117
13. Mean Total Scores for Pass/Fail Groups According to Testing Administration Method.	120

TABLE

Page

14.	Analysis of Variance of Pass/Fail Rate and Test Performance According to Testing Administration Method.	121
15.	Mean Total Test Scores Received on GED Tests According to Selected Characteristics of GED Examiness and Testing Administration Method	124
16.	Analysis of Variance of Age and Test Performance According to Testing Administration Method.	127
17.	Analysis of Variance of GED Performance by Gender and Testing Administration Method	131
18.	Analysis of Variance of Race and GED Test Performance According to Testing Administration Method.	135
19.	Covariance of Reading Scores with Race According to Testing Administration Method.	139
20.	Analysis of Variance of Highest Grade Completed and Test Performance According to Testing Administration Method	147
21.	Analysis of Variance of Geographical Location and Test Performance According to Testing Administration Method	150
22.	Analysis of Variance of Preparation Choice and Test Performance According to Testing Administration Method	155
23.	Analysis of Variance of Review Class Content and GED Test Performance According to Testing Administration Method	160
24.	Analysis of Variance of Self-Study and GED Test Performance According to Testing Administration Method.	161
25.	Analysis of Variance of Hours of Preparation and GED Test Performance According to Testing Administration Method	164

TABLE

Page

26.	Analysis of Variance of Motivations for Taking the GED and GED Performance According to Testing Administration Method	168
27.	Weighted Regression Analysis Showing Percent of Variance Accounted for in Total GED Scores by Selected Examinee Characteristics According to Testing Administration Method	172
28.	Advisory Table for Prediction of GED Success.	187

FIGURES

FIGURES	Page
1. Comparing Percentage Passed with Testing Administration Methods.	34
2. Main Effects of Race According to Pass/Fail Groups.	95
3. Interaction Effects of Method of Testing Administration and Race According to Pass/Fail Groups.	96
4. Main Effects of Highest Grade Completed According to Pass/Fail Groups	97
5. Main Effects of Geographical Location According to Pass/Fail Groups	99
6. Main Effects of Preparation for the GED According to Pass/Fail Groups	101
7. Main Effects of Hours of Preparation According to Pass/Fail Groups	102
8. Main Effects of Motivations for Taking the GED According to Pass/Fail Groups	104
9. Histogram of GED Mean Total Test Scores for One Day Testing	107
10. Histogram of GED Mean Total Test Scores for Two Half Days Testing	108
11. Main Effects of Test Sequences and GED Test Performance	118
12. Main Effects of Pass/Fail Groups and Test Performance	122
13. Main Effects of Age and Test Performance.	128
14. Interaction Effect of Method of Testing Administration and Age.	129
15. Main Effects of Gender and Test Performance for One Day Testing	132

FIGURES

Page

16.	Main Effects of Gender and Test Performance for Two Half Days Testing	133
17.	Main Effects of Race and Test Performance	136
18.	Interaction Effect of Race and Testing Administration Method	137
19.	Interaction Effect of Method of Testing Administration and Race of GED Examinees According to Writing Test Scores Covaried with Reading Test Scores.	141
20.	Interaction Effect of Method of Testing Administration and Race of GED Examinees According to Social Studies Test Scores Covaried with Reading Test Scores	142
21.	Interaction Effect of Method of Testing Administration and Race of GED Examinees According to Science Test Scores Covaried with Reading Test Scores.	143
22.	Interaction Effect of Method of Testing Administration and Race of GED Examinees According to Math Test Scores Covaried with Reading Test Scores.	144
23.	Main Effect of Highest Grade Completed and Test Performance.	149
24.	Main Effect of Geographical Location and Test Performance.	152
25.	Interaction Effect of Geographical Location and Testing Administration Method	153
26.	Main Effect of Preparation Choices and Test Performance.	157
27.	Interaction Effect of Preparation Choice and Testing Administration Method	158
28.	Main Effect of Specific Content Covered While Preparing for the GED in Self-Study and Test Performance.	162

FIGURES

Page

29.	Main Effect of Hours of Preparation and Test Performance.	166
30.	Main Effect of Motivations to Take the GED and Test Performance.	169

CHAPTER ONE

INTRODUCTION

Many adults have not completed a regular four-year high school program. In addition, 27 to 28 percent of all high school students currently drop out each year. These persons stopped short of graduation for many reasons. They do, however, have available to them a "second chance" to obtain a high school equivalency credential through the successful completion of the General Educational Development (GED) Tests as determined by scores received on this test battery.

The purpose of the GED tests, as stated in the GED Examiner's Manual (1987, p. 5), is "to enable persons who have not graduated from high school to demonstrate the attainment of developed abilities normally acquired through completion of a high school program of study." The premise of the GED testing program is that though formal education ended for these persons who left school early, their educational growth has continued informally through the various experiences encountered in everyday living.

Patience and Whitney (1982a, p. 3) stated that awarding of a high school equivalency credential based upon the scores received on the GED tests rests on two logical foundations: (a) tests are constructed from a representative sampling of high school curriculum content and skills; and (b) candidate test performance is evaluated relative to the demonstrated achievement of a representative sample of graduating high school seniors.

According to the GED Information Brochure (1986, n.p.), these two features of test development continue to contribute significantly to the GED testing program's credibility, acceptance and continued growth.

The GED is increasingly becoming the way that adults who did not complete high school gain high school credentials. From 1971-1981, the number of test-takers nearly doubled (Valentine and Darkenwald, 1986, p. 23). Cervero and Peterson (1982, p. 6) stated that "14% of high school credentials issued in this country in 1981 were based on GED scores. . . . Clearly the GED testing program is an important social phenomenon in this country which affects the lives of many adults."

Background of the Problem

The GED Testing Service (GEDTS) continually attempts to update and improve the GED testing program so that it remains a reliable and valid measurement of major outcomes generally associated with four years of regular high school instruction. The tests currently utilized by the GED testing program were introduced in 1978. The latest update on score scales for these tests was completed in the norming study of 1980. This ongoing evaluation process is doubly important to the users of the GED testing program when considering the impact that earning a GED credential has on individual lives and society-at-large. Thus, various facets of the GED testing program should be reviewed periodically. Included in the various facets of the testing program is test administration.

Policies and procedures for test administration are established by the Commission on Educational Credit and Credentials of the American

Council on Education (ACE), which is also responsible for the administrative supervision of the GEDTS. These policies and procedures are specifically stated in the GED Examiner's Manual (1987, p. 28-39). In the preface of this same manual it is stated that adherence to the policies and procedures is essential to a successful GED testing program (p. 5).

Test administration encompasses several components, including eligibility requirements, use of the secure test forms, initial testing and retesting, recommended passing scores, and official transcripts. Specific procedures are outlined for the testing administration under standard conditions, including admission to the testing center, scheduling of test dates and publicity thereof, favorable testing environments, time limits given for each of the five subject area tests, and instructions to be read verbatim to the examinees during the testing period.

Each participating state, province or territory of the GED testing program (which presently includes all 50 states in the United States, Washington, D.C., six United States territories, and ten Canadian provinces and territories—representing approximately 3,300 Official GED Testing Centers), establishes its own eligibility requirements, testing schedules, requirements for retesting, minimum scores required to receive a GED credential, and testing admission policy. Each must subscribe to the national policies and procedures stated in the 1987 GED Examiner's Manual, but may add any additional requirements deemed appropriate. This

autonomy has proven valuable in the adaptation of the GED testing program to allow for local circumstances, needs and standards. These requirements are set by the jurisdiction's department of education. A GED Administrator is employed by each jurisdiction and it is that person's responsibility to insure that testing centers in the jurisdiction conform to the national policies of the Commission and GEDTS and state-wide guidelines. An annual contract is signed by each testing center with the GEDTS.

One aspect of the testing administration's requirements of particular concern in this study was that of initial testing policy. As specifically stated in the GED Examiner's Manual (1987, p. 30), "Examinees taking the GED tests for the first time must be given the opportunity to complete the entire test battery before they are retested on any of the five tests. It is recommended that this initial testing be completed in two testing sessions within a maximum period of six weeks." The latter part of the policy was most probably recommended when the GED tests from 1942-1978 required ten hours to complete. When the tests were shortened to six hours in 1978 (then extended to six and three quarter hours after Whitney and Patience's (1981) study on work rates), many jurisdictions opted to administer the GED tests in one testing session due to the decreased testing time involved. The GED Information Brochure (1986, n.p.) states that "all five parts of the GED tests may be taken in one day, however, most examinees prefer to schedule testing over two or more dates."

As noted earlier, each jurisdiction is given the autonomy to select the method of initial testing that is best for them according to their local circumstances and needs. These testing schedules may or may not reflect the preferences of the GED examinees. Some states may have a state-wide policy for all testing centers in the state. Other states may allow each testing center the option to determine the testing schedules that they would prefer, as in Virginia.

There are several reasons why the method of initial testing varies from testing center to testing center. Testing may depend upon availability of facilities and staff, budgetary constraints, and the perceived needs of the testing program in any one area, all of which allow for administrative efficiency. Therefore, one might find that in any one state, different centers may offer the test administered in one day (total six and three-quarter hours), two half days (approximately three and one-half hours at each sitting), or one test at a time (varies from one to one and one-half hours per sitting).

The fact of varied test schedules from center to center raises two questions: (a) Do the adults who are allowed or required to take the GED test battery in two or more sittings (three and one-half hours or less) have an advantage over those who take the whole battery in one sitting (six and three-quarter hours)? (b) How are adults effectively counseled concerning which testing administration method option might be best for them?

The knowledge of how the method of testing administration (one day vs. two and one-half days) might affect test performance as it is related to certain characteristics of the GED examinee could provide important information to administrators responsible for policy-making, either at individual testing centers, state-wide, or at the national level. It was thought this information might also be useful to counselors, or teachers who act in that capacity. Even with alternative testing administration methods, GED examinees should be expected to demonstrate that they have acquired a level of learning comparable to that of high school graduates. This was not a study to examine how or whether the GED tests could be made easier for the GED examinee to pass. Certainly the public has a right to expect rigor of the testing program and assurance that GED credential holders have competencies equivalent to high school completers. The issue was whether testing administration methods affected the test performance of GED examinees and if so, the implications for providing examinees with an equal opportunity to demonstrate their acquired skills.

GED has been a subject of much research, particularly in the last decade. Some of the characteristics of GED examinees that have been studied in previous correlational research include age, gender, race, highest grade completed in school, preparation for the GED and motivation for taking the GED as related to GED performance. Gender (except when looking at certain subtest scores) has no apparent effect on total GED scores, while the other factors have been linked to performance. Some of

these have even been found useful predictors of GED success. None of these studies, however, had addressed the method of testing administration experienced by the GED examinees. Nor did they examine successful completion of the GED tests according to whether or not the examinees were first-time takers or retakers of the tests.

Only two studies had examined the issue of method of testing utilized (one day vs. two days) as it related to GED performance, but no correlational data were presented as to how the performance related to characteristics of the GED examinees. These studies (British Columbia Ministry of Education, 1987), conducted by Carbol (1986), found that GED examinees who took the tests in one day outperformed those taking the tests in two half days. In Carbol's (1987, p. 2) most recent study, he found that the characteristics of GED examinees in British Columbia were very similar to those of their American counterparts, thus allowing generalizations of his study to the American population. Carbol is currently examining scores of the two half days' examinees to determine whether GED examinees performed better on the first or second half of testing.

There is considerable variation in the way GED tests are administered. The testing administration method chosen by those responsible for test scheduling is done so, in part, on the basic assumptions held by those individuals about adults in test-taking situations. This was ascertained during a phone survey to the 50 states' GED Administrators to discover the testing administration method used

most often in their GED testing centers, data which were not currently available from the GEDTS. Comments such as those that follow illustrate this point:

The GED tests are about the same length as the SAT's and "they" take it in one sitting. (offers test in one day—Tennessee)

The test is about seven hours long and our adults would become too tired and not perform as well if required to take it in one sitting. (offers tests in two or more sittings—Vermont, West Virginia)

We leave it up to the GED examinee in whatever way he'd prefer to take this test as he will be more comfortable making his own decision as to how he feels he could do best. (offers test according to examinee's preference—Minnesota)

Our adults have so many other responsibilities, especially with work and family, so we must be flexible to suit their needs and very few would be able to, if just for time's sake, take it in one sitting. (offers a mixture of schedules—Indiana)

(Jones, 1987a)

Whether these variations are important or not are unknown as evidenced by this comment from an employee of the College Board. O'Reilly stated that "most administrators underestimate adults' abilities and overestimate what their barriers are." (Jones, 1987b) Therefore,

considering the various characteristics of GED examinees, might not their performance, as evidenced by their GED scores and pass/fail rate, be affected by the method of test administration experienced? Also, could some of these characteristics be utilized as predictors of GED success which would be useful in counseling the prospective GED candidate?

Do the simple mechanics of test scheduling and/or counseling make a difference in GED scores? And if so, what is the magnitude of that difference? It was determined that a study on this question was needed. If a difference could be found in test performance of GED examinees related to specific examinee characteristics and the testing administration method employed, would those differences be of sufficient significance for Virginia and the GEDTS to examine more closely current initial testing policy?

Statement of the Problem

The problems investigated in this study were: (a) How does the method of testing administration affect the successful completion of the GED tests on the first-take for the different subgroups of examinees? (b) Which of the selected characteristics of GED examinees and testing administration method would have predictive value for successful completion of the GED tests?

The collection and analysis of data were guided by the following research questions:

1. What is the overall difference, if any, in GED test performance

(total test scores) between first-time candidates who take the tests in one day versus those who take them in two half days?

2. Does the sequence in which the GED subtests are taken affect GED performance between the first and second half of testing, i.e., morning vs. afternoon in one day testing and Friday evening vs. Saturday morning for two half days testing, as well as overall test performance?

3. What is the overall difference, if any, in GED test performance (pass/fail) between first-time candidates who take the tests in one day versus those who take them in two half days?

4. What is the relationship between age, gender, race, highest grade completed, geographical location, preparation for the GED and motivation to take the GED with GED test performance according to the method of testing administration experienced by the GED examinee?

5. Can advisory tables be formulated to aid GED staff in directing individuals to the appropriate testing administration method according to specific characteristics of the examinee?

6. What are the implications of this study's findings for policy-makers, counselors and teachers in terms of initial testing policy and counseling services provided to first-time GED examinees?

Objectives of this Study

The overall objective of this study was to assess current test performance of first-time GED examinees in the State of Virginia.

Specific objectives of the study were:

1. To determine if a difference existed in total test scores of those first-time GED examinees who took the GED tests in one day versus two half days.

2. To determine if test sequencing (the order in which the five subtests are taken) affected final GED total test scores, and to determine where the weaker performance occurred, in the first or second half of testing.

3. To ascertain the pass/fail rate of GED examinees depending upon the method of testing administration experienced by GED examinees.

4. To determine what relationship existed between test performance and age, gender, race, highest grade completed, geographical location, preparation for the GED and motivations for taking the GED as a consequence of the method of testing administration experienced by the GED examinee.

5. To formulate advisory tables for use in counseling GED candidates for successful completion of the GED in terms of the various characteristics of examinees and method of testing administration.

6. To interpret the implications for policy-makers, counselors and teachers in terms of initial testing policy and counseling services provided to first-time GED examinees.

Significance of the Study

This study has significance for several reasons. First, this study was a replication of two previous studies on method of testing administration (one day vs. two and one-half days) conducted by Carbol

(British Columbia Ministry of Education, 1987), in British Columbia, Canada, utilizing an American sample and a different research design. The findings of this study were significant in the fact that through replication similar findings were found. This information will be most useful for the Virginia Department of Education--Adult Services Division and local testing center directors. As the differences found in test performance between the two groups were so small, the current testing policies and schedules utilized within the state does not warrant any review at this time.

Secondly, this study extended Carbol's (1986) study to include how the method of testing administration affected the relationship of test performance and selected characteristics of the GED examinees. The findings of this study will be useful to counselors and teachers of prospective GED candidates in that of all of the characteristics examined, only test performance by race of the GED examinees was found to be affected by the method of testing administration experienced and marginally affected by age, geographical location, and preparation choices. An advisory table was formulated to include the variables of race, highest grade completed, and preparation for the GED which accounted for the largest variance (though small) in test scores by this group of GED examinees. This information will be helpful in understanding the performance of this sample and the possible effects these variables could have on future GED examinees, though cautioned to

remember that these tables were formulated only for this sample of GED examinees.

Thirdly, though the findings of this study are not generalizable to the entire GED population, this study was the first research study to investigate the issue of testing administration method as it affects the relationship of test performance and selected characteristics of GED examinees. This study will hopefully provide an impetus for further extended study in attribute-treatment interaction research to include other selected characteristics of GED examinees.

Lastly, of these three studies (two of Carbol's and this study), a statistically significant difference in test performance between one day versus two half days was found in only one, but all three derived a higher mean test score with the one day examinees. From this information, the GEDTS might be interested in exploring this issue of testing administration method with other testing programs throughout the United States.

Definitions of Terms

The following terms are defined as they were used in this study:

1. Testing Administration Method: scheduling for giving the GED tests, be it one day or two half days.

2. One Day Testing: the GED tests that were administered in one session, a total of 6 3/4 hours of testing time. It was given on all day Saturday, from 7:30 - 4:30, allowing one-half hour for lunch and additional time for administrative matters.

3. Two Half Days Testing: the GED tests that were administered in two sessions. The first half was given on a Friday evening, 6:00 - 9:30, and the second half was given on the adjacent Saturday morning, 7:30 - 12:00.

4. Independent Variables: these include age, gender, race, highest grade completed, geographical location, preparation choices when preparing for GED, hours of preparation, motivations for taking the GED and test sequences. These data are self-reported by GED candidates on data sheets provided.

5. Age: any person eighteen years or older is eligible to take the GED tests in Virginia, as set by the Virginia Department of Education. In some instances, individuals aged 16 and 17 are permitted to take the GED tests based on special circumstances. Age groupings for comparison were the same used by Cervero (1983): 15-18, 19-22, 23-29, 30-39, and over 39.

6. Geographical Location: areas in which the GED candidates live, either in urban, suburban or rural.

7. Preparation Choices: methods utilized by GED candidates to prepare for the GED. If they attend review classes, they either choose to study subject matter, test-taking skills, or both subject matter and test-taking skills. If they choose to initiate self-study, they may choose to utilize GED manuals and/or other textbooks, take the practice GED tests, have a tutor or use TV instruction. Another choice is to do nothing to prepare for the GED tests.

8. Hours of Preparation: GED candidates estimate the amount of time they actually spent in preparing for the GED tests, ranging from 0 hours to over 100 hours.

9. Motivations for Taking the GED: GED candidates are motivated for different reasons for taking the GED. These motivations might include for present job requirements, future job requirements, educational admission to a postsecondary institution or vocational training program, personal satisfaction, enlistment into the military or a combination of these reasons.

10. Sequences: the order in which the five subtests of the GED tests are taken. There are 120 possible sequences to be used; 117 different sequences utilized by testing centers in this state.

11. Dependent Variable: the two dependent variables in this study include the total test score earned on the GED tests or the pass/fail status of the GED candidates based upon the scores that are received on the GED test battery.

12. Successful completion of the GED: passing the GED tests in the state of Virginia requires (a) no subtest score falls below 35; (b) an average score on all five subtests must be 45; and (c) an aggregate score of 225 must be attained. If all of these requisites are not met, the GED candidate does not pass the GED tests.

Limitations of the Study

The major limitation to this study was in the generalizability of its findings due to the quasi-experimental research design utilized. The

two testing groups were not randomly selected from the GED population in Virginia. Only two demographic statistics were available on all GED examinees for 1987, age and highest grade completed. Only highest grade completed was similar with both testing groups; therefore, there is no way of knowing if the two testing groups were representative of the total GED population tested in 1987 on all variables examined. Also, the method of testing administration could not be assigned to each GED examinee due to advanced testing schedules for each testing center. Though the two testing groups were very similar in composition with regards to the characteristics examined, there may have been other variables on which the two groups were not comparable. Therefore, the similarity or "equivalency" of the two testing groups cannot be assured. Since the variables could affect the internal validity of the study, they could also affect the generalizability.

CHAPTER TWO

REVIEW OF RELATED LITERATURE

Chapter Two reviews three major areas of related literature. The first area provides an historical approach dealing with the progression of the General Educational Development (GED) testing program since its inception to its present form and universal usage. The second area will address a general review of what is known about adults in testing situations. The third area will present specific research conducted on testing administration methods utilized and selected characteristics of GED examinees and their predictive value in relation to GED test performance.

The GED Testing Program

History

The General Educational Development (GED) testing program has been in existence since 1942. The examination staff of the United States Armed Forces Institute (USAFI) developed a battery of tests to measure the major outcomes and concepts of a four-year high school program. The USAFI examination staff included civilian testing experts working closely with an advisory committee that was established with the support and cooperation of the American Council on Education (ACE), the National Association of Secondary School Principals (NASSP), and regional accrediting associations.

These tests were to be administered specifically to military personnel who had not completed or graduated from high school before the war. Completion of a high school equivalency program before leaving the military service would enable the veteran to readjust to civilian life through continuation of educational, vocational and/or personal goals without having to return to high school.

In 1945, the ACE established the Veteran's Testing Service (VTS) to disseminate the testing program for the military. In 1946, the Commission on Accreditation of Service Experiences (CASE) became responsible for the policy direction and supervision of the VTS. Both of these were under the auspices of the ACE.

By 1947, considering the success of the GED testing program thus experienced, as well as the knowledge that a large number of civilians also had not completed traditional formal high school requirements, many state departments of education and colleges began administering the GED tests to civilian adults in need of a high school equivalency certificate. By 1959, more civilians were taking advantage of the GED examination than were veterans.

In 1963, in recognition that the testing population had changed, several modifications occurred. CASE changed the name of the VTS to the General Educational Development Testing Service (GEDTS) and CASE was renamed to the Commission on Educational Credit. In 1988, the program continues to be guided and directed by the ACE, the Commission and the

GEDTS, each continuing to fulfill the purposes for which they were initially responsible.

The GED testing program, 1942-1988, has expanded its initial testing focus to include all 50 states, the District of Columbia, six United States territories (American Samoa, the Canal Zone, Guam, Puerto Rico, Virgin Islands, and Kwajalein), and ten provinces and territories of Canada (Alberta, British Columbia, Manitoba, New Brunswick, Newfoundland, Northwest Territories, Nova Scotia, Prince Edward Island, Saskatchewan, and the Yukon territory).

The approximately 3,300 official GED testing centers operating today are under the joint supervision of the respective jurisdictional department of education (each of which has its own policy for issuance of high school equivalency certificates) and the GEDTS.

GED Tests

The GED test battery is designed to measure the major concepts and lasting outcomes of a high school education. Many of the GED test questions measure the general ability to evaluate, synthesize and draw conclusions, rather than the ability to recall specific facts in a given area. These skills, based upon a representative sample of the high school curriculum, are tested in five subject areas: Writing Skills, Social Studies, Science, Reading Skills and Mathematics. The test battery is discussed in detail in Chapter Three.

Periodically, the content of the five subject area tests in the GED test battery has been updated to ensure that the skills measured

represent those currently found in a typical high school curriculum. Thus, the GED tests underwent a reassessment by the ACE in January, 1974. According to the Educational Testing Service (ETS, 1978, p. 1-23), the current tests utilized, introduced in 1978, differ from the older forms of the GED used from 1942 to 1977 in several ways: (a) The length of test administration was shortened from ten hours to six. (b) Two subtests were renamed. Interpretation of Literary Materials was changed to Reading Skills, and Correctness and Effectiveness of Expression to Writing Skills. (c) Emphasis in reading was reduced as a testable skill in the Social Studies and Science Tests; inclusion of "concept" item-type test questions were introduced for a third of the Social Studies and Science tests. (d) Effort was made to include in all test items more relevancy to adult's everyday experiences while maintaining the linkage to secondary education. These tests were developed in such a way as to make the content interesting to GED candidates (thus, reducing intimidation level) while at the same time maintaining their academic credibility.

The GED tests were reassessed in 1984 and the new tests are to be introduced in 1988. The greatest changes will be in the inclusion of a writing sample to be required as part of the Writing Skills test and more items will be added to test a higher level of thinking and problem-solving skills.

In 1981, the length of the tests was extended from six hours to six and three-quarter hours due to adjustments made in the time limits set

for the Mathematics and Writing Skills tests following a study of work rates on the GED tests by Whitney and Patience (1981).

To ensure that score requirements are similar to high school graduates' achievement level, norming studies were completed in 1943, 1955, 1967, 1977, and 1980 (also 1987 for the new forms of the 1988 tests). Patience and Whitney (1982, p. 5) stated that each norming study may reveal the need for adjustments in the standard score scales so that they continue to represent the levels of achievement of recent high school graduates.

The tests are currently available in English, Spanish, and French, as well as special editions with audiocassettes, braille, and large print. These different types of tests are essential in order that individuals of various language-orientation and/or handicapped conditions will have an opportunity to attempt the examination to obtain a high school equivalency certificate.

GED Examinees

Since its inception, over ten million adults have achieved their high school equivalency certificate. According to the GED Information Brochure (1986, n.p.), "more than 700,000 people complete the GED tests each year at one of the approximately 3,300 official GED testing centers. High school credentials presented on the basis of successful GED test scores constitute about 14% of the high school diplomas issued in the United States each year."

Malizio and Whitney (1981) conducted a national survey of Spring, 1980, GED examinees to ascertain the national profile of candidates' characteristics. The following characteristics were identified (p. 6-13):

1. Half of the GED candidates were 21 years old or older.
2. Nearly 70% of the candidates had completed the 10th grade or higher before leaving school.
3. Women constituted 58% of the examinees.
4. The races of candidates included 79% white, about 18% black and 3% were of other races, with 93% of the sample having been born in the United States.
5. English was spoken by 92% of the sample, with the next highest percentage of language being Spanish.
6. Reasons cited for leaving school before graduation included: 41% for personal reasons; 20% needed to work; 13% had experienced unsatisfactory academic progress.
7. More than 75% reported grades of "C" or better while enrolled in school.
8. The primary motives reported for taking the GED included: 39% for job-related reasons, nearly 30% for admission to postsecondary educational institutions or training programs, 25% for personal satisfaction and 5% for military requirement.
9. About 80% of the examinees prepared in some manner for the GED tests, averaging about 20 hours, with relatively low amounts reported on

incurred costs to do so. About 46% attended some type of class, about 34% studied individually and about 20% said that they did not prepare in any way for the GED.

10. Reading materials reported by 90% of the sample included books, magazines or newspapers.

11. At least 80% were currently employed or had been at the time they took the tests.

The most current data concerning the GED testing program were cited in the GED Statistical Report (1986). The following data were presented (p. 1-18):

1. During 1986, 739,683 people took the GED tests, with 489,629 examinees earning scores that qualified them for an equivalency certificate.

2. Retakes totalled 87,851 of the total number tested.

3. The average age was 26.5 years, with approximately 28% being 19 or younger and nearly 11% being 40 years or older.

4. Examinees completed an average of 9.9 years of schooling, with approximately one third completing the 10th grade.

5. About 54% reported that they were planning to continue their education or training beyond the high school level.

Specifically addressing the data available for the GED testing program in the State of Virginia, utilizing the same statistical report, the following can be found (p. 5-17):

1. During 1986, 15,122 people took the GED tests, with 9,238 examinees earning scores that qualified them for an equivalency credential (from 48 testing centers).

2. Retakes totalled 3,542 of the total number tested.

3. The average age was 27.8 years, with approximately 28% being 19 or younger and approximately 13% being 40 or older.

4. Examinees completed an average of 9.6 years of schooling, with approximately 30% completing the 10th grade.

5. About 67% reported that they were planning to continue their education or training beyond the high school level.

In summary, the growth of the GED testing program is evident, since its development for the military, through the extension of the program to civilians and the vast numbers which have earned the GED certificate. The program has continued its credibility and usefulness by continuous upgrading of the test battery and/or standard score scales through the norming studies conducted. It is a vital component to the adult education field under the direction and guidance of the ACE, the Commission and the GEDTS.

The next section presents general studies completed on adults and testing and basic conclusions that can be drawn from their findings.

General Test Performance of Adults

Several factors commonly associated with test performance of adults were reviewed. These factors included age, gender, race, educational

level, geographical location and other noncognitive factors. Each factor is discussed separately.

Age

At one time it was generally assumed that as adults increased in age, intellectual ability decreased due to an inevitable decline in intelligence. This assumption was inferred through the use of cross-sectional studies. Kidd (1959, p. 76-81) and Knowles (1984, p. 166) summarized and interpreted the findings of such studies which concluded that intellectual stability peaks by the early 20's; thereafter, a decline of 1% is experienced each year, particularly in timed performance on visual and reaction measures.

However, this myth has long been put to rest by the findings of longitudinal studies conducted. Kidd (1959, p. 89), Botwinick (1973, p. 223, 225), Jarvik, Eisdorfer and Blum (1973, p. 6) and Long (1983, p. 5, 45-46) summarized and interpreted the findings of these studies which concluded that intellectual ability remained fairly constant throughout the adult life cycle and in some cases showed an increase with age, particularly on verbal measures; the research suggest that any decline in intellectual ability starts much later in life.

Jones, Garrison, and Morgan (1985, p. 454) and Colarusso (1981, p. 111) cited studies which inferred that if illness does not intervene and adults continue to be involved in mental and physical activity (use/disuse theory), cognitive stability can be maintained to a much older age than once expected.

The issue of cognitive stability can also be explained by analyzing the intelligence quotient. Belsky (1984, p. 111) and Troll (1982, p. 164) summarized the existence of two types of intelligence: fluid and crystallized. Fluid intelligence is biologically based and is tied to the psychoneurology of the brain, which follows a downward path based upon the brain changes, usually in young adulthood. This type of intelligence is measured by the performance scales (visual and reaction measures) of IQ tests. Crystallized intelligence, on the other hand, is culturally based. It is that stored knowledge and information acquired through education, experience and culture. This remains stable or increases up to the 70's. This type of intelligence is measured by the verbal scales of the IQ tests. As the intelligence quotient is an average of these two types of intelligence, with one declining and the other increasing, the mean score depicts the stability of intellectual ability throughout an adult's lifetime. In fact, Botwinick (1967, p. 108) called this phenomenon of increase in verbal measures and decline in performance measures as the classic aging pattern.

Thus, from the previous discussion of age and intellectual ability, it can be concluded that middle-aged and older adults can perform as well or better than younger adults on aptitude tests due to the stability of intellectual ability or increase in crystallized intelligence.

Gender

Kidd (1959, p. 36) stated that "as far as the evidence goes there do not appear to be significant differences between the sexes at any time

during adulthood, either on tests of academic performance or in learning capacity."

Jarvik, Eisdorfer and Blum (1973, p. 6), in their summary of studies conducted on this factor, cited that though men and women perform similarly in terms of general aptitude, women tend to outperform men in the areas of linguistics and vocabulary; men tend to outperform women in arithmetic skills. These findings were attributed to two factors which reflect either an inherent, innate ability by each and/or differential socialization of boys and girls where boys are encouraged to take math, science, and shop while girls are encouraged to take English, home economics and typing.

Other issues suggested which might influence test performance according to gender included anxiety (Walsh, Engbretson, & O'Brien, 1968, p. 575) and sexist wording or sex-biased content of a test (Walsh & Betz, 1985), but no studies were offered in defense of these.

Therefore, men and women should perform equally well on aptitude tests, with the possible exceptions noted.

Race

The literature reviewed was devoid of any studies that indicated ethnic group as a significant predictor of success on aptitude tests, with the exception of one reference. Walsh and Betz (1985, p. 379) stated that differences do exist on aptitude test scores based on race due to two possible explanations, though differences are seen within each race. First, the most current controversy, based on the judgment of

some, is that many standardized tests are culturally biased towards the "majority culture, that of white, middle-class, English-speaking citizens. Secondly, the mere fact that whites, blacks and other minority groups are reared in different cultures and environments, having varying socioeconomic and educational advantages, affects test performance.

Educational Level

A relationship has been found between the educational level obtained and intellectual functioning: the more years of schooling completed, the higher the aptitude test scores. This conclusion was interpreted by Kidd (1959, p. 82-83) and Kuhlen (1978, p. 22) from previous studies cited.

Bischof (1974, p. 140) cautioned, however, that the factor of educational level should be a controlled variable when testing intelligence so as not to further exaggerate the differences in intelligence with increased age, as older adults tend to have fewer years of schooling than their younger counterparts. It was even suggested that instead of looking at the present age of a person, it would be more beneficial to look at the year in which he/she was born, to note the difference in educational systems experienced.

Geographical Location

The research on this factor is very limited. Only one study was discussed by Bischof (1976, p. 141) which concluded that research findings found in one geographical location cannot be generalized to other areas of the country. The only reason attributed to this finding was due to the regional influence on cognitive stability.

Noncognitive Factors

Other than the previously discussed factors, other noncognitive factors have been found which might affect test performance. These findings were compiled after reviewing published works by Kidd (1959), Botwinick (1973), Bischof (1974), Troll (1982), Long (1983), Belsky (1984) and Knowles (1984). The following can be concluded:

1. Adults' aptitude and ability to perform on tests may be influenced by factors such as heredity, environment, and the health and personality of the individual.
2. Adults tend to be motivated to do those things which they feel will satisfy their needs and interests. This direction and intensity of motivation will affect test performance. Performance also varies according to whether or not the adults are taking the tests voluntarily or for compulsory reasons.
3. Adults' attitudes and feelings towards test-taking, usually influenced by past experiences, will affect test performance.
4. Adults tend to perform better on tests if the content is more closely related to real life situations.
5. Adults who have not taken a test for 20 to 30 years were found to be more anxious and this level of anxiety was associated with lower test scores received. When anxiety is reduced or eliminated, the quality of test performance increases.
6. Adults who remain both physically and mentally active have less problems with speed of response on timed tests. It has been suggested

that possibly older adults value accuracy more than speed, yet individual differences can be found in all age groups. Older adults do benefit from extra time or self-pacing during testing than do younger subjects.

7. Adults tend to be more cautious as they get older and are less prone to guess on test questions, unless encouraged to do so before testing.

8. Older adults tend to perform better when given additional testing sessions instead of a single long session.

9. Younger adults have an advantage in being more familiar with standardized testing formats and computerized answer sheets ("test-wise") and in taking timed tests than do older adults.

Summary

Most of the research available on adults and testing involves intelligence tests. From the findings of these studies, some general conclusions can be drawn. They are: (a) Middle and older adults can be expected to perform as well or better than younger adults on tests due to the stability or increase of intellectual capability. (b) No overall difference in performance can be expected for men and women, with the exception of women scoring higher in verbal areas and men scoring higher on mathematics, due to either innate ability or socialization as a child. (c) A difference in performance might be expected between whites, blacks and other minority groups either due to culturally-biased tests or varying socioeconomic and educational advantages. (d) Better ability or performance can be expected from individuals who obtained a higher

educational level. (e) No generalizations can be made concerning geographical location. (f) Other noncognitive factors affect test performance, i.e., heredity, environment, health and personality of the individual, motivation to take tests, attitudes and feelings towards test-taking, types of materials covered on tests, anxiety, speed, cautiousness, number of testing sessions, and being "test-wise."

Relationship of GED Performance and Demographic Variables

The final section of Chapter Two examines those available studies specifically conducted with the GED testing program which have examined methods of testing administration and the relationship of GED performance with selected characteristics of the GED examinees. The illustrative studies included in this literature review focus only on the independent variables included in this study, though in many instances additional variables of interest were included.

The independent variables are addressed separately, beginning with the principal variable of testing administration method.

Testing Administration Method

The method of testing administration was the principal variable in this study as the interest was in finding whether or not the testing administration method experienced by GED examinees would affect test performance as related to specific characteristics of the GED examinees. Testing administration method is defined in this study as method used for scheduling the GED tests, be it one day or two half days.

Current practice. The 47 testing centers in Virginia offer the GED tests in one of these two formats. Because information was not readily available as to how other states offer the GED tests, a telephone survey was conducted in September, 1987, to each GED Administrator in the United States and the District of Columbia. A variety of test schedules was found. This survey found eight different testing schedules which are depicted in Table 1.

Categories "A" and "C" included those states which set testing schedules at the state's department of education level and each GED testing center within the state administers the test in one day ("A") or two half days ("C"). Categories "B" and "D" and "E" included those states in which testing centers decide upon their testing schedules, with the majority of GED tests being administered, with some exceptions, in one day ("B"), two half days ("D"), or one day or two half days ("E"). Category "F" included those states in which testing centers decide upon their own testing schedules, utilizing all possible combinations of administering the tests: one day, two half days, two tests at a time, or one test at a time. Category "G" included those states which give no more than two tests at a time throughout the state. Category "H" included those states which administer the GED tests in whatever fashion the GED examinee would prefer.

Those states utilizing a variety of testing administration methods do so in order to have a flexible schedule to meet the needs of their clients. This flexibility is also based upon the available facilities,

Table 1. GED Testing Administration Methods Utilized in the U.S. and D.C.

One Day	Two Half Days	Mixture
<u>Category "A"</u>	<u>Category "C"</u>	<u>Category "E"</u>
Uniform throughout the state in all testing centers: Alabama D.C. Maryland North Dakota South Carolina Tennessee	Uniform throughout the state in all testing centers: Nevada New York	Dependent upon centers, either 1 day or 2-1/2 days: Delaware Illinois Missouri Virginia
<u>Category "B"</u>	<u>Category "D"</u>	<u>Category "F"</u>
Dependent upon centers, most in 1 day, with some exceptions: Arkansas Idaho Kentucky Louisiana Mississippi Oklahoma Rhode Island	Dependent upon centers, most in 2 1/2 days, with some exceptions: Alaska Georgia Indiana Maine Michigan Montana New Jersey Oregon Vermont Washington West Virginia Wyoming	Dependent upon centers, Mixture of Schedules: (all combinations possible): California Colorado Connecticut Florida Kansas Massachusetts New Hampshire New Mexico North Carolina Ohio Pennsylvania Texas
OTHERS		
<u>Category "G"</u>	<u>Category "H"</u>	
No more than two tests given at any one time: Hawaii Wisconsin	Dependent upon what the GED examinee prefers: Arizona Nebraska Iowa South Dakota Minnesota Utah	

Responses received in phone survey in September, 1987. (Jones, 1987a)

staff, and costs involved. One state even charged additional costs for those who wanted the most flexible of testing schedules possible. As is evident from the table, very little uniformity exists with regard to testing administration methods utilized from state to state and within states, even with the recommendation of the GEDTS that the test be given in two testing sessions.

A few observations might be made when looking at this set of data. Many more states offer a variety of testing administration methods within the state than those who have uniformity in all testing centers within the state. Most states could identify the method utilized most often by GED examinees and testing centers. Only one state, Nebraska, could not say with any certainty which method was used most often, as that information had never been collected. West Virginia and Wisconsin offer no one day testing options; Arizona does not recommend one day testing to their GED examinees; Oklahoma encourages two days of testing, but most GED examinees prefer to take the test in one sitting.

Figure 1 depicts the comparison of the passing rates of each of the eight testing administration categories found in Table 1. Visually, the highest passing rate is experienced by Category "H" which included those states which administer the GED tests according to what the GED examinees prefer. There is, however, no way to ascertain how these GED examinees took the tests, either in one day, two half days, two tests at a time or one test at a time. The lowest pass rates are experienced by Categories "A" and "C" which included those states which have uniform testing in all

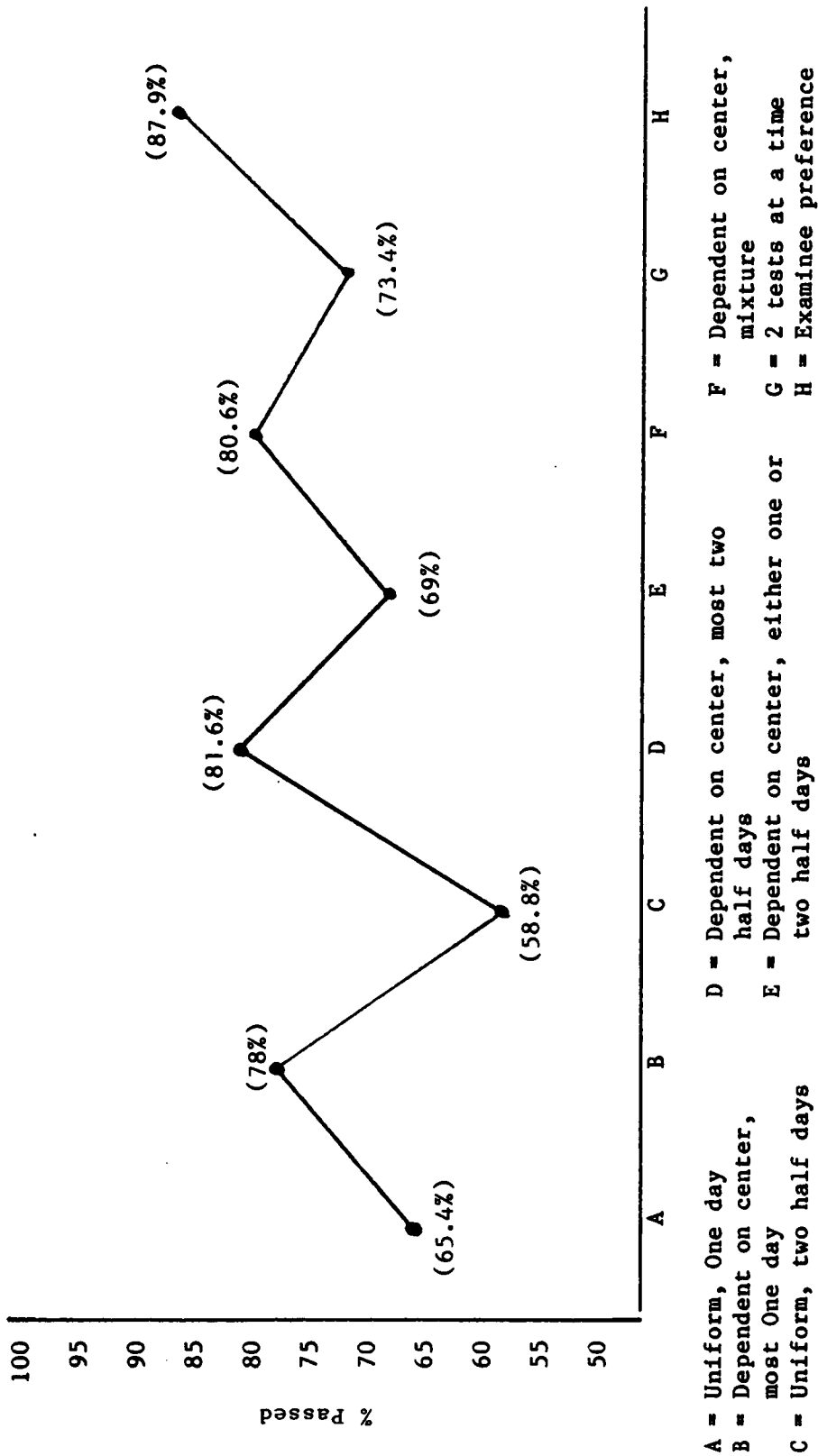


Figure 1
Comparing Percentage Passed with Testing Administration Methods

* Information garnered from telephone survey, September, 1987. Jones, S.
Reference: GED Statistical Report (1986, p. 4-6)

testing centers within the state, either all one day or all two half days with the lowest pass rate experienced by those states who administer the GED tests in two half days ("C").

It might be concluded from this graphic that those centers which utilize more flexible testing administration methods or those centers in which GED examinees are allowed to select the method they would prefer perform better on GED tests. When analyzing the data through use of a one-way analysis of variance, a statistically significant difference is found at the .01 level of confidence. This would bear out the premises in adult education that encourages flexibility (Knowles, 1984, p. 31) and collaborative planning (Kidd, 1959, p. 83).

However, this simplistic comparison may have resulted in spurious results. According to Douglas Whitney, Director of the GEDTS (1987), this conclusion cannot be drawn definitively as there are confounding variables involved that might have an effect on the differences observed. Uniformity of data collection and reporting by all states could affect this difference. A specific example given would be the way in which New York reports the number of individuals taking the GED tests, due to usage of their computer program, which counts each retest as additional persons tested; for example and clarity, if a GED examinee wrote the tests the first time and then retested two other times during that year, this one individual would be counted three times, thus deflating the percentage pass rate.

Another difference in percentage passed could be due to the minimum score requirements of the particular state. Requiring a minimum score of 40 and an average score of 45 is more difficult to attain than if a state requires a minimum score of 35 and an average score of 45 or even just a score of 40 expected on each test.

Other possible explanations for the difference in percentage passed is due to the abilities of the adults who take the tests, their level of preparation or readiness to take the tests, number of years completed in high school before leaving, the length of time since leaving school, their reading ability, and/or other factors which would affect test performance.

Thus, at the time of this study, no conclusions could be drawn concerning testing administration method procedures and the percentage of those passing.

Related studies. Research on how testing administration method utilized affects test performance on the GED tests is very limited. Barry Carbol (1986), the GED Administrator in British Columbia, recognized the need for such a study when testing center directors approached him as to the possibility of changing the jurisdiction's testing schedule from two half days to one day due to the travel time involved in reaching the testing centers. He conducted his study with a random sample of 1,000 first-time GED candidates from the four testing centers to determine if there was a statistically significant difference between the mean GED test scores of candidates who took the tests in one

day versus those in two half days, and to see if there would be a statistically significant difference in GED test scores among candidates testing at the various testing centers. The GED candidates randomly chosen at each testing site were then randomly assigned to a testing administration method, one day or two half days. Carbol found that those who tested in one day outperformed those who tested in two half days at a .01 significance level, with one day mean performance of 57.2 as compared to two half days mean performance of 54.3. No interaction effect was found between the type of testing administration method experienced and writing centers.

The original assumption was that those GED examinees testing in two half days would do better than those one day examinees because they would be less fatigued. That did not prove to be true. The scenario that Carbol offered to explain this fatigue factor was based upon the scheduling of the GED tests on a Friday evening and Saturday morning. After having worked all day on Friday and driving to the centers, testing for three and one-half hours, returning home only to return the next morning for another three and one-half hours testing was tiring in itself. Two other possible explanations for one day examinees performing better was due to the two half days examinees having to overcome pre-exam jitters twice, as well as having to experience two "settling-in" times. Test scores were not studied for the first and second half of testing to confirm this.

Recently, Carbol (British Columbia Ministry of Education, 1987) replicated the first study by examining the test performance of 950 GED candidates. No significant difference in mean test scores was found. However, the candidates testing in one day still outperformed those testing in two half days by .4 points.

In summary, two specific points can be derived on the issue of testing administration methods. First, a variety of testing administration methods are currently being used in the GED testing program throughout the United States and the District of Columbia. Secondly, the only available data concerning the relationship with testing administration method experienced and GED test scores conclude that individuals who take the GED tests in one day outperform those who take them in two half days. These findings, however, do not address the possible relationship between characteristics of the GED examinee, GED test scores and testing administration procedures.

Selected GED Examinee Characteristics

Seven GED examinee characteristics have been chosen for this study in an attempt to determine if a relationship exists between characteristics of the GED examinee and GED test scores which might be affected by the testing administration procedure. The audience using the GED testing program is indeed varied when considering age, gender, race, highest grade completed, geographical location, preparation for the GED tests and motivations for taking the GED, the independent variables of this study. Previous studies conducted with the GED testing program on

these variables will be discussed. It has been suggested in many of these studies that the results be viewed as treating GED examinees as a group, not as individuals. However, none of these studies addressed the testing administration method experienced by the subjects. Therefore, there are no conclusions that can be drawn concerning the relationship of specific characteristics of the GED examinees and GED test scores as they might be affected by testing administration procedures.

Age. The age of adults taking the GED tests may range from as early as 16 in some states to 60 years or older (ages beyond 60 are not specified in reporting). Studies can be found which conclude that there is no substantial relationship with age and test performance while others have found a slight to moderate significant relationship.

Several studies have found no significant difference in test scores attributable to age. These include Pipho's (1967) study of 279 GED candidates in Colorado; Carbuhn's (1970) study of urban civilian job corpsmen; Dowling and Lash's (1972) study of 200 predominantly midwestern, rural white GED candidates who attended the Mattoon Area Adult Education Center in Illinois; Lewis's (1977) study of GED graduates in Mississippi; Racette's (1978) study of 600 GED candidates in Connecticut; Cabanillas's (1980) study of 193 male United States Army personnel stationed at Fort Bragg, North Carolina; Sonnenblick's (1980) study of GED candidates aged 16 to 57 in Staten Island and Queens, New York; and Cervero's (1983) analysis of data garnered in the nationwide study by Malizio and Whitney (1981) of 3,341 GED candidates.

A slightly positive, but significant, relationship of test performance with age has been found in several other studies which conclude that test scores increase as the age of the GED examinee increases. These studies were conducted by Moser and Muirhead (1948), Van Winkle (1956), and Gillmore (1970). Though significant differences were found, the relationship was so slight that these studies concluded that age was deemed useless as a predictor for GED scores.

One study found a moderately positive relationship between test performance and age. Moss (1985) compared ages of 262 GED examinees with subtest scores and total test scores in Southeast Mississippi from 1980 to 1984. The age groups analyzed were those of K. Patricia Cross's research: Group I (17 years old); Group II (18-22); Group III (23-28); Group IV (29-34); and Group V (35 & older). This study concluded that there were significant differences among GED test scores and the five age groups. Moss (1985, p. 3226) found that

as the ages of the selected life cycle groups increased, there was an improvement on test scores. Group V, the oldest age group, obtained the highest scores on Social Studies, Reading, and total GED battery. The lowest scores on Social Studies, Science, Reading, Math and total GED battery were obtained by the youngest age group, Group I.

Carlin (1979) reported an even different finding concerning age and test performance. He found that younger and older GED examinees obtained higher scores than did the middle-aged GED examinees. No explanation was offered as to why this occurred, but further research was suggested in this area.

When examining pass/fail rates according to age, a couple of studies found that those examinees in the pass group were older than those in the non-pass group. The United States Employment Service (1977), in their Minnesota study, found that the GED pass group was 2 1/2 years older than the non-pass group. Carbol and Maguire (1986) surveyed 200 GED candidates in Canada from each GED pass and GED fail group between 1981 and 1983. The GED fail group was significantly younger than the GED pass group. The only difference in age was found in the scores of those 19 to 25 years of age, which were significantly lower from those of the other age groups. This would suggest "that individuals who were closer in time having attended school were also the least successful in terms of GED experience" (Carbol and Maguire, 1986, p. 70).

Another factor which might affect test performance of GED examinees according to age as inferred from general research findings of performance on aptitude tests is that of speed or work rates of the adults taking the tests, as the GED tests are considered to be primarily power tests. This means that the time limitations are set for the number of items in each test which are intended to permit at least 85% of GED examinees to complete each test at a comfortable rate. Previous studies have concluded that older adults perform less well on timed tests due to the speed or work rate decline as an individual becomes older. This premise was noted by Whitney and Patience (1981, p. 2) when they stated that "it is generally presumed that older persons and those who are not experienced test takers typically require more time to complete tests

than do experienced and younger examinees." So does the fact that the GED tests are timed affect a difference in scores among the adult age groups? The research says not.

In their study on work rates on the GED tests with a group of Wisconsin GED examinees, Whitney and Patience (1981, p. 11) found that

for all five tests, the positive correlations (ranging from .21 for Writing Skills to .32 for Science) confirm this generalization; older examinees do, on the average, prefer to work at a slower rate than do younger examinees. These correlations, however, are not large, thus, this relationship is interpreted to be present, but weak.

In fact, a wide variation in work rates was found in all age groups, not just the older adult. Though age was concluded not to be a significant factor in explaining the wide variation in work rates or test scores found in this sample of GED examinees, the evidence found did warrant an adjustment to be made to the time limits set on the Writing Skills and Mathematics test, thus increasing the total test time from six hours to six and three-quarter hours.

A previous study concluded an opposing view to this issue of time limitations allowed for the GED tests. Flores and Seamon (1976, p. 5) suggested that "the time limitations placed on testing discriminates against adult learners, their abilities, fears and strengths in comparison to pre-adults." However, their data presented do not appear to support this interpretation.

Gender. Men and women were found to do equally well on the GED tests from the findings of studies conducted by Dowling and Lash (1972),

Gillmore (1974), Cervero (1983), Carbol and Maguire (1986), and Carbol (1987b).

Other studies affirm these overall test performance findings, but with women scoring higher on some subject area tests. Higher scores by women were found on the Writing Skills and/or Reading Skills tests by Lewis (1977); Racette (1978); and Sonnenblick (1980). Though Carlin (1979) found that women obtained higher scores on the GED tests than did men, the pass/fail rate was approximately the same. No specific studies were found where men outperformed women on the GED on GED subtest scores.

An item review procedure utilized by the GEDTS staff strives to include items which are sexually neutral, lacking in sex role stereotyping or gender-related wording, and with content familiar to both men and women. These can be reviewed in Patience and Whitney (1983) and Harnisch (1983).

Race. This variable as related to GED test scores has been studied on a limited basis. Carbuhn (1970, p. 81) concluded that ethnic group classification was important but was not directly related to GED performance. A person's race or cultural background became significant because of socioeconomic reasons. Cervero's (1983) analysis of a nationwide survey found just the opposite. He found that whites outperformed Hispanics by nearly 28 total score points and blacks by over 30 total score points. Cervero's explanation of these differences in test scores was attributed to the differential levels of reading ability which exists between blacks and whites. He argued that

the results are an accurate reflection of the true population subgroup differences on the important dimensions of the test (e.g., reading and math). These differences are seen in elementary and high school, and there is no reason to believe they do not exist in adulthood. (p. 28)

According to Cervero, any differences found between race and GED test scores might be explained by the varying socioeconomic, educational and cultural backgrounds rather than concluding that the GED tests are culturally biased. To guard against the possibility of the GED being culturally biased, Patience and Whitney (1983, p. 16) stated that the item review procedure utilized by the GEDTS staff strives to include items on the tests which contain context and language appropriate to a variety of ethnic experiences and content of such a nature that comparable experience and familiarity can be expected across examinee groups.

Highest grade completed. Several studies concluded that the more years of high school completed before quitting, the higher the GED test performance. Moore (1982) found that the average number of years of school completed was the common success factor for Kentucky adults passing the GED in 1976. Bundrick (1986) has gathered data over the past two years for DANTES. One factor that was stated with certainty in this study was that on both the pre-test (practice GED tests) and the post-test (GED test battery), those individuals having completed the most formal high school training did better in the science and math areas. Even when comparing pass/fail groups, the United States Employment

Service's (1977) study found that the GED pass group had .4 years more formal education than the non-pass group.

Other studies have found only a slight positive relationship between highest grade completed and GED test scores. They included Moser & Muirhead (1949), Mosel's (1954) study with 304 males enlisted in the United States Army, Van Winkle (1956), Dowling and Lash (1972), Racette (1978) and Cervero (1983).

However, several studies did not confirm this relationship. These studies concurred with the premise of the GED testing program which states that though formal education ended before graduation for these GED candidates, these adults continued to gain knowledge through experiences encountered in everyday life. These studies included Andrew's (1954) study of 95 males accepted into the University of Utah, Pipho (1965), Carbuhn (1970), Gillmore (1974), Carlin (1979), Cabanillas (1980), Carbol and Maguire (1986) and Carbol (1987). As suggested by Cervero (1983, p. 27), if it is true that there is no relationship between highest grade completed and test performance, then the findings would be "consistent with the view that the GED is measuring long-term outcomes rather than specific course content and that it recognizes learning that occurs after having left the formal schooling process."

Geographical location. The effect of geographical location, as defined in this study, as it relates to GED test performance has not been studied. Geographical location as defined in this study refers to individuals who live either in urban, suburban, or rural areas. It might

be assumed that persons in varying areas might have available to them differing resources or experiences encountered which might affect their continued educational growth.

Preparation for the GED tests. Several studies have examined the relationship of preparation for the GED with test performance. Findings of a slightly positive relationship, an adverse relationship, and a conditional relationship have been concluded.

For those studies which found no difference in test scores between GED examinees who did or did not prepare for the GED tests, it might be presumed that the individuals tested possessed very similar skills at the time of testing. These included Racette (1978), Cabanillas (1980), and Bundrick (1986). Bundrick even stated that no clear interpretation could be made of these results as there was no way to discern whether those individuals in the control group in his study had utilized any of the available preparatory materials on the market.

It could be assumed, though, that those who prepare in some way would certainly elevate their skills in order to perform better on the GED. The findings in GED research studies, however, are quite surprising, and sometimes misleading, particularly when an adverse relationship is found with the amount of time spent in preparation and GED scores. Dowling and Lash (1972) and Cervero (1983) found that those with higher GED scores actually spent less time in preparation. Cervero cautioned the reviewer that more information is needed, i.e., pre/post tests, before making this finding definitive.

Probably the most plausible finding was reported by Buesse (1972) when he concluded that preparation for the GED aided the GED examinee on a conditional level. With aptitude being controlled in this study, his findings were that the low ability personnel were aided by the preparatory activities, while such courses had little or no effect upon higher ability personnel whose logic and general knowledge were probably already fairly developed.

Motivation for taking the GED tests. GED examinees have cited several motives for taking the GED tests: present job requirements, seeking promotions on present jobs, future job requirements, educational admission requirements to postsecondary institutions or training programs, military requirement or their own personal enrichment or satisfaction. Differences in test scores were found in some studies in relation to motivation, but not in others.

Carlin (1979, p. 37) cited a study which concluded that "individuals who had specific goals, needs and motivations appeared to do significantly better on the GED exam than individuals who were not sure of their purpose." Cervero's (1983) study discovered that individuals who took the tests for personal reasons scored 25 total score points higher than those who reported taking the tests to fulfill a present job requirement, while only four total score points higher than those for educational admission and 12 total score points higher than for those taking the tests for future job requirements. The same general finding was found by Carbol and Maguire (1986). Individuals motivated to take

the GED tests for employment and educational reasons (mostly reported by young examinees) had the most difficulty in passing the GED tests. Older individuals who sought the GED certificate for personal reasons were more successful.

From Cervero (1983) and Carbol and Maguire's (1986) studies, it could be assumed that less anxiety is placed on an individual who chooses to take the test for personal reasons without worrying whether their test performance will affect future employment or educational opportunities.

Another factor which affected test scores and motivation to take the GED was found by the United States Employment Service's (1977) study. This study concluded that GED candidates who voluntarily took the GED did significantly better than those whom were in compulsory programs (referrals from social services, courts, or employers).

Therefore, it can be concluded that the GED examinees who voluntarily select to take the GED tests and those who have a clear purpose for taking the test battery, particularly for personal satisfaction, will perform better on the GED tests.

Predictive Usage of GED Examinee Characteristics

Of the seven independent variables on GED examinee characteristics, age, gender, and race have been utilized in the past in predictive models for successful completion of the GED tests. Age was deemed an appropriate predictor of success by Carlin (1979). Gillmore (1974) found age to be particularly useful for predicting scores on the Science and Reading tests and gender particularly useful in predicting English and

Social Studies test scores. Race was concluded to be a good predictor of total test performance by Cervero (1983).

Other studies have not found certain characteristics of GED examinees to be useful predictors of GED success. Age and highest grade completed were not deemed to be useful by Moser and Muirhead (1949), Van Winkle (1956), Cabanillas (1980), and Cervero (1983). Cabanillas (1980) and Cervero (1983) also found preparation before taking the GED tests less than useful predictor of GED success.

In fact, Cabanillas (1980) recommended that variables such as age, years of schooling, preparation time, and motivations for taking the tests should be used with caution, while Carlin (1979) strongly recommended that other adult learning centers should be encouraged to develop their own predictive model as a means to determine the strengths and weaknesses of their students and for remediation purposes before adults attempt to take the GED tests.

It has also been strongly recommended that predictive models be used for groups only. While the predictive model may be useful for individual GED candidates, it should not be developed with that intent because of the variability in adults on all aspects. Therefore, implications for counseling may be limited.

Summary

Section three has reviewed studies using the GED testing program. No studies have been conducted which examine how testing administration methods experienced by first-time GED examinees interacts with test

performance and selected characteristics of the GED examinees. The studies cited either addressed testing administration methods or the relationship of test performance with selected characteristics of GED examinees. These characteristics included age, gender, race, highest grade completed, geographical location, preparation for the GED and motivations for taking the GED, all of which were independent variables in this study. Lastly, a discussion on the usefulness of these selected characteristics of GED examinees as predictors of GED success was included.

Summary

Chapter Two has presented an overview of the GED testing program with discussion of its history, GED tests, and the audience utilizing this program. It has also presented studies conducted on adults in a testing situation, generally, and specifically, to the performance on the GED tests. The following conceptual framework of adults' performance on tests can be developed after perusal of this literature. Though the research is non-existent concerning how the method of testing administration (one day vs. two half days) might affect GED test scores in relationship to selected characteristics of the GED examinees, this conceptual framework can be utilized as an explanation for certain possible findings in this study. Each variable will be interpreted for the total group of GED examinees in this sample, not individually.

Testing Administration

Previous studies have found that adults perform better in a single session when taking the GED tests rather than two sessions. This was attributed to a fatigue factor, adjusting to pre-exam jitters twice, and having to "settle-in" twice to the testing situation for the examinee in two half days of testing.

If an interaction effect is found between method of testing administration and the variable being considered, then it can be suggested that the specific method of testing administration does have an effect on that variable and GED test scores.

Age

Middle-aged and older adults have been found to perform as well or better on tests than younger adults when measuring verbal skills, but less well on timed performance tests. If no difference is found with the age groups, difference has generally been attributable to stability of intellectual ability throughout the adult life stages. If differences in performance where middle and older adults do better than younger adults, this can be attributed to increased crystallized intelligence (store of experiences, education, and culture). If younger adults perform better than older adults, the issues of anxiety, cautiousness, and fatigue can only be surmised as being factors in this poorer performance. Relevancy of material covered on the GED tests, speed, and experience in test-taking should not pose a problem on the GED tests for middle and older adults.

Gender

No test difference should be found in overall GED test scores. A difference might be seen in which women outperform men on Writing Skills and men outperform women on Mathematics. If this occurs, the difference has generally been attributable to innate capabilities possessed by each or differential socialization of males and females. If women do more poorly, it can be assumed that anxiety played a role in their test taking.

Race

Differences might be expected between races and GED test scores. If so, differences have generally been attributable to their socioeconomic, educational and cultural backgrounds or differential levels of reading ability as proposed by Cervero (1983), rather than concluding that the GED tests are culturally biased.

Geographical Location

Differences have been found in performance due to regional influences. Whether or not differences will be found when comparing rural, suburban and urban areas is not known. However, if a difference does occur, the difference has generally been attributable to the fact that each location has varying resources and experiences encountered which might affect their continued educational growth.

Highest Grade Completed

General studies have concluded that performance and ability increases as the number of years attended in formal education increases.

If those with more years of school perform better than those with fewer years of formal education, then this has generally been attributable to this explanation. However, with GED tests, this relationship has not been as profound. If the number of years of schooling has little or no effect on GED test scores, then this would further the premise that GED tests allow individuals who leave school before graduation the opportunity to be recognized for the learning that occurs by informal means in everyday living situations after having left formal schooling.

Preparation for the GED Tests

There have been no general conclusions drawn about this variable as it relates to GED test scores, and studies on the GED testing program have concluded that it is next to impossible to draw any definitive conclusions on how preparation for the GED tests affects test scores. This is due to the non-availability of pre-test/post-test scores to determine any knowledge and skills acquired while preparing for the GED and the fact that those more able at the onset of preparation require fewer hours of preparation before attempting the GED tests. If a difference is found according to the types of preparatory activities encountered, it might be assumed that these activities were more useful than others.

Motivation for Taking the GED Tests

Those individuals who voluntarily take any test perform better than those in a captive audience. Also, it has been found that those who have a clear purpose for taking the GED tests, particularly for personal

satisfaction, will perform better. If a difference is found in test scores according to motivation for taking the GED tests, the difference is generally attributable to either of these reasons. If personal satisfaction is the motive for which those individuals score the highest, the difference is generally attributable to less anxiety and pressure encountered with taking the GED tests for this reason than for those whose motives are job related or for postsecondary educational pursuits.

CHAPTER THREE

METHODS

This chapter describes the methods utilized to determine the following: (a) how testing administration method (one day vs. two half days) affects GED performance in relation to selected characteristics of first-time GED examinees and (b) which of these selected characteristics of first-time GED examinees according to method of testing administration could be useful predictors of successful completion of the GED tests. Discussion on research design, population and sample, instrumentation, data collection and data analysis will be included.

Research Design

This research study was, in essence, a replication of Carbol's (1986) study in British Columbia, Canada, in which the critical elements examined were the methods of testing administration (one day vs. two half days) with first-time GED examinees and their performance on the GED tests. These same critical elements were examined in this study and extended to determine if the method of testing administration affects the relationship of test performance and selected characteristics of first-time GED examinees.

Carbol (1986) utilized an experimental design through use of randomization and treatment assignment at the official GED testing centers to first-time GED examinees. The findings produced surprising results which were counterintuitive to generally accepted views in adult

education. This present study sought to replicate the previous work completed by Carbol and to determine if these same results were consistent with the Canadian's GED counterparts in the United States.

Methods utilized for this study differed from those used by Carbol (1986). A quasi-experimental design was employed, as first-time GED examinees were not randomly selected from the GED population in Virginia, nor were they randomly assigned to a treatment group (one day vs. two half days). The examinees were tested as an intact group at the testing center in which they attended. Random selection and random assignment to treatment were not possible because the tests had been scheduled a year in advance. All GED examinees were administered the GED test battery according to the method of testing administration utilized by the particular testing center.

This study also included the associational or comparative method of research, or of the ex post facto realm. As relationships were sought between test performance and selected characteristics of first-time GED examinees, these selected characteristics could not be assigned to the GED examinees. This research revealed existing relationships, and in no way offered any causal patterns underlying these relationships. These relationships have been examined in numerous research studies and the findings of this study were compared to previous findings, but that was not the main focus of this study.

The main focus of this study was to determine if method of testing administration (one day vs. two half days) affected the relationships

sought. In order to determine this, factorial designs were utilized, quasi-experimentally, as they involve simultaneous manipulation of two or more variables. Of particular interest was the attribute-treatment interaction (ATI) research, emphasizing the interaction effect of testing administration method with each of the selected characteristics of the GED examinees. This research design enabled the researcher to explore effective "matches" between the characteristics of the GED examinees and different testing administration methods which may have educational significance. The independent variables included in this study were age, gender, race, highest grade completed, preparation for the GED and motivations for taking the GED, as these are the characteristics most frequently addressed in the related literature. The additional variables of test sequencing, geographical location and method of testing administration (one day vs. two half days), the principal variable in this study, were included as the research on these are very limited.

The dependent variable was the performance of first-time GED examinees as evidenced via subtest and total test scores on the GED test battery. Percentages of those who passed or failed were also considered based upon test scores and method of testing administration experienced by the GED examinees.

The findings of this study were described only according to this sample; no generalizations were attempted due to the lack of randomization in this research design. Though the two groups were similar in composition on the independent variables examined, without

randomization these two groups could be significantly different on many other variables not considered. The results were compared to previous research findings to ascertain concurrence or inconsistency with this study's findings.

Population and Sample

The GED testing program in the State of Virginia was employed in this study. Very little information is known about the description of the "typical" GED examinee in Virginia. In 1987, according to the latest statistical information available (Jones, 1988), the GED candidates' average age was 27.3 (0.5 years younger than 1986) and the average highest grade completed was 9.7 (0.1 year higher than 1986). These figures were derived from the information collected on the 14,415 total GED examinees tested in 1987 (a 4.6% decrease from 1986). Of this total number, 11,751 were first-time GED examinees who took the English version of the GED test battery. This total number approximated the projected 14,500 to take the GED tests in 1987.

The sample utilized for this study was a sample in time; the subjects were all first-time GED examinees who chose voluntarily to take the GED tests in November and December, 1987. The total number of subjects was 2,864, approximating the estimated 2,500 to 3,000 expected to take the tests during these two months. Of this total number, 2,087 were first takers (72.8%) and 777 were retakers (27.13%). The one day testing group equalled 1,291 and the two half days testing group equalled 796. All GED examinees in this sample took the English version of the

GED test battery. This sample represented 17.8% of the total first-time GED examinees who took the English version of the GED tests in 1987.

These examinees reported to all but 4 of the 47 official GED testing centers throughout Virginia. The four centers not included in this study did not have any scheduled testing dates during the time frame of this study: Bath County, Greensville County, Northampton County and Williamsburg City. A pictorial presentation of centers and areas covered is found in Appendix E. Four other centers chose not to participate in this study: Buchanan County, Louisa County, Portsmouth City, and Prince William County. These centers' GED examinees' scores were included only in overall comparison of test performance.

These subjects were not randomly selected from the total GED population in Virginia, nor was the treatment assigned to each examinees. However, the two groups were similar in composition according to age, gender, race, highest grade completed, hours of preparation, motivation to take the GED and test sequencing. Table 3 and 4 in Chapter Four completely describes these two GED groups. The mean age for one day testing was 26.85 and 27.59 for two half days testing. In both groups, approximately 58% were female, 77% were white, 20% were black and 3% were other minorities. The average highest grade completed in one day testing was 9.76 and 9.69 for two half days testing. In both groups, the mode for hours of preparation was 1 to 10 hours and motivations for taking the GED reported most often were for personal satisfaction and future job

requirement. Both groups also experienced a wide variety of test sequencing, the order in which the five subject area tests were taken.

The two variables with which the two groups differed significantly were for geographical location and preparation for the GED. More urban examinees tested in one day and more rural examinees tested in two half days, with similar suburban examinees in each group. For one day testing, 83.4% prepared in some way for the GED while 84.9% prepared in some way for the GED in two half days testing.

Instrumentation

Two dependent variables were utilized in this study: (a) the total test score on the GED test battery and (b) pass/fail status based on GED test scores. The tests were developed after close examination of current high school curriculum and was introduced in 1978, requiring six hours of testing time. In July, 1981, the test was extended to six and three-quarter hours of testing time after adjustments were made on the time limitations for the Math and Writing Skills tests (Whitney and Patience, 1981).

The GED test battery includes five subject area tests: Writing Skills, Social Studies, Science, Reading Skills, and Mathematics. They were developed to test intellectual skills, major generalizations and concepts, and application of knowledge that are generally expected after the completion of a four-year high school program. These tests are considered to be primarily power tests as the time limitations provided for the number of items in each test are intended to permit at least 85%

of GED examinees to complete each test at a comfortable rate. A delineation of the content of each of the five subject area tests, the number of items included and the time limits set for each can be found in Appendix F.

In each test, items cover a wide range of subject matter and are ordered from easiest to most difficult concepts. All test items are multiple choice questions, and the GED examinees must select the best choice from the five listed for each question.

According to Patience and Whitney (1982, p. 5), these tests require a number of specific content-related skills, as well as the ability of the examinee to read and comprehend written materials. The reading load is purposely held at a pre-high school level, with directions written on an eighth grade level and the remainder of the test passages varying throughout the range of reading ability attained by most high school graduates.

The high degree of reliability (internal consistency and parallel forms) and consistent reporting of its validity (content, concurrent and predictive) for the GED tests are reported in the Educational and Psychological Measurement (Whitney, Malizio, and Patience, 1986).

GED test scores obtained by GED examinees are reported by use of a standard score and a percentile rank score. This standardization of test scores is derived by utilizing the raw scores (number of items answered correctly) received by United States high school seniors during the norming studies.

The first norming study for the current GED tests was conducted in the Spring, 1977. A second norming study for the current tests occurred in 1980, the fifth such national norming study since the initiation of the GED testing program. At this time, 3,600 high school seniors were tested. This norm group earned slightly lower scores than the 1977 norm group; therefore, standardized scores were readjusted so that scores received on the GED tests by adult examinees would be based upon the achievement level of current high school graduates.

Spille (1981b) defined standard score thusly:

The standard score scale used for reporting GED test performance is called the T-score; it has an average of 50, a standard deviation of 10, and a "bell-shaped" (normal) distribution. Percentile rank is another type of standard score and is commonly used because it is easy to interpret.

(p. 4)

Spille (1981b, p. 6) also states that "the relationship between standard scores and percentile ranks . . . has been maintained throughout the history of the GED testing program. Any adjustments necessitated by shifts in norm group performance affect the conversion of raw scores to standard scores."

Patience and Whitney (1982, p. 59) state that minimum score requirements in each testing jurisdiction are usually stated in one of three ways: (a) minimum score on each of the five subtests; (b) average or mean score of all of the five subtests; or (c) a combination of

minimum and average scores. The Commission on Educational Credit and Credentials recommends that the state minimum score requirements be set so as to permit only about 70% of recent high school graduates to qualify for the credential.

Virginia's minimum score requirements consists of having no subtest score below 35, having an average score of 45 on all five subtests, and an aggregate score of 225. These score requirements are such that only 69% of the graduating seniors were able to meet these requirements, which is more stringent than the Commission's recommendation.

Data Collection

Permission and full cooperation was secured from the Associate Director of Adult Education and the GED Administrator with the Virginia Department of Education, Adult Services Division, for the implementation of this study. Letters were sent to all official GED testing center directors throughout the state introducing the study in September, 1987 (Appendix A). Information concerning its implementation was sent to the same individuals in October, 1987 (Appendix B). The information was developed cooperatively by the researcher and the education department officials who gave permission for this study. The material was signed by the education department officials to solicit cooperation of testing center directors. Candidate data sheets and instructions on completing them were also sent by officials in October, 1987 (Appendix C and D). The information was provided to insure that all testing centers adhered

to the policies and procedures of the GEDTS and for uniformity in data collection.

The Candidate Data Sheet (Appendix C) supplied the data collected for this study. All GED examinees completed one of these. The data reported included the testing center attended, the method of testing administration experienced, the sequence in which the five subtests were taken, and selected characteristics of the GED examinees, i.e., age, gender, race, highest grade completed, geographical location, preparation for the GED tests and motivation for taking the GED. GED test scores for each of the five subtests and total scores were secured from official score report cards on each first-time GED examinee.

Individuals who desired to take the GED tests registered with the appropriate authorities, either the local school system or testing center, prior to taking the GED tests. At that time, the GED candidate was assigned to one of the official GED testing centers for that locale. In November and December, 1987, the GED candidates completed the examinations at the designated testing center. The method of testing was predetermined during the year's planning of testing schedules. The one day testing administration was given on a Saturday and two half days administration was held on Friday evening and Saturday morning, with a few exceptions at larger testing centers.

After admission to the testing session, each GED examinee completed the Candidate Data Sheet, followed by the administration of the GED test battery.

After the testing date, the testing center directors sent the Candidate Data Sheets and GED tests' answer sheets to the GED Administrator in Richmond. The answer sheets were scored and the results were printed on official score report cards.

The researcher collected the data sheets and scores from this office. Subtest and total test scores were transcribed onto the Candidate Data Sheets as they appeared on the official score report. These scores were utilized for analysis purposes as well as in determining pass/fail rates for each testing administration method. Only those scores and data sheets for first-time GED examinees were included in this study; retakes' sheets were discarded. All scores and other data remained confidential by designating an identification number to each examinee's scores.

Analysis of Data

Data collected in this study were first reported via a description of the two groups utilized for comparison in this study. Frequency distributions were presented showing the official GED testing centers and characteristics of the first-time GED examinees (age, gender, race, highest grade completed, geographical location, preparation for the GED, motivations for taking the GED tests and test sequencing) by method of testing administration, one day versus two half days. A description of the pass/fail groups was also provided according to the major variables addressed in this study.

An independent samples chi-square analysis was performed with each independent variable to detect any significant differences between the category proportions of each with respect to the two methods of testing administration, one day or two half days. Chi-square was an appropriate nonparametric statistical test to use as the data were in the form of frequency counts (nominal data) and the categories were discrete (one day vs. two half days). The X^2 test yielded a value which was produced by the disparity in each of the data categories (cells) between the expected and observed frequencies to determine if the observed frequencies were significantly different from what might be expected by chance. The larger the disparity, the larger the X^2 value. If the value of X^2 was statistically significant, there was a considerable difference between the category proportion of the two testing groups with respect to the dependent variable in this study.

The pass/fail groups by method of testing administration experienced were analyzed through use of an analysis of variance factorial design by each of the independent variables examined in this study. The dependent measure for these analyses was the pass or fail status of the GED examinees to determine if any interactions occurred according to selected characteristics of the GED examinees and testing administration method based on whether the GED examinees passed or failed on their first attempt in taking the GED tests.

Secondly, mean subtest and total test scores were presented with standard deviation and range of scores according to the method of testing

administration when appropriately addressed in the testing of the hypotheses. A frequency distribution of all scores earned on the GED tests is found in Appendix H.

The remainder of the data analysis tested the following hypotheses:

1. There is no difference in overall GED performance, as indicated by mean total test scores, between those first-time GED examinees who tested in one day versus those who tested in two half days.

2. There is no difference in GED performance, as indicated by mean subtest scores, between scores received in the first half and second half of testing of those first-time GED examinees who take the tests in one day versus those who take it in two half days.

3. The relationship between the sequence of how the GED subtests were taken and test performance, as indicated by mean total test scores of first-time GED examinees, is not affected by the testing administration method experienced.

4. The relationship between pass/fail rates and test performance, as indicated by mean total test scores of first-time GED examinees, is not affected by the testing administration method experienced.

5. The relationship between age and test performance, as indicated by mean total test scores of first-time GED examinees, is not affected by the testing administration method experienced.

6. The relationship between gender and test performance, as indicated by mean total test scores of first-time GED examinees, is not affected by the testing administration method experienced.

7. The relationship between race and test performance, as indicated by mean total test scores of first-time GED examinees, is not affected by the testing administration method experienced.

8. The relationship between the highest grade completed in school and test performance, as indicated by mean total test scores of first-time GED examinees, is not affected by the testing administration method experienced.

9. The relationship between geographical location and test performance, as indicated by mean total test scores of first-time GED examinees, is not affected by the testing administration method experienced.

10. The relationship between preparation for the GED and test performance, as indicated by mean total test scores of first-time GED examinees, is not affected by the testing administration method experienced.

11. The relationship between content of classes or self-study taken in preparation for the GED and test performance, as indicated by mean total test scores of first-time GED examinees, is not affected by the testing administration method experienced.

12. The relationship between number of hours of preparation for the GED tests and test performance, as indicated by mean total test scores of first-time GED examinees, is not affected by the testing administration method experienced.

13. The relationship between motivation for taking the GED and test performance, as indicated by mean total test scores of first-time GED examinees, is not affected by the testing administration method experienced.

Hypothesis #1 was tested by the parametric t-test to determine if a statistically significant difference existed between the test scores for the two methods of testing administration utilized in this study.

A t-test makes three assumptions: (a) scores form an interval or ratio scale of measurement; (b) scores in the populations being studied are normally distributed; and (c) score variances for the populations studied are equal.

The first assumption was satisfied as scores received on the GED tests are interval scales. The second assumption was recommended to be tested by a nonparametric counterpart to the t-test, the Wilcoxon signed-rank test, even though parametric statistics have been found to provide accurate estimates of statistical significance even under violations of the assumptions made. This test showed if the distribution of scores in the two testing groups differed significantly from each other when the scores of the samples were correlated. The scores were also plotted in the form of histograms to depict the distribution of scores in each testing administration method. The third assumption was tested by use of a test for homogeneity of independent variables to determine if the variances for the populations were equal. Dependent upon whether the number (N) in each group was equal and whether the variances were equal

determined which t-test analysis formula to employ; in this case, a pooled variance formula was employed.

Hypothesis #2 utilized a multivariate analysis of variance (MANOVA) Wilk's lambda test to determine if scores deviated from the first and second half of testing. Then, a 2x2 analysis of variance factorial design was conducted on each test sequence to determine how each sequence contributed to the MANOVA. Results of these tests were displayed in table form.

Hypothesis #3 through #13 employed the use of analysis of variance factorial design, as it allowed to test for relationships between the dependent variable (GED test performance) and two or more independent variables simultaneously (testing administration method experienced with another selected characteristic of the GED examinee). Three mean square ratios were derived. One F reflected if a significant difference occurred according to the method of testing administration (columns); the second described any significant difference found with the variable possessed by the GED examinees (rows); and more importantly, the third indicated if any interaction occurred with the method and variable being studied, the main focus of this study. When a significant difference was found on any independent variable, a Newman-Keuls post hoc test was employed to determine which groups differed significantly from the other and how each contributed to the significant mean square ratio.

An additional statistical analysis was required for Hypothesis #7, concerning race, due to the original findings and possible explanation

offered for those findings. An analysis of covariance was utilized, on both treatment groups, examining scores on the Writing Skills, Social Studies, Science and Math covaried with scores received on the Reading Test in order to remove any group differences in reading ability.

Finally, a stepwise regression analysis was conducted in an attempt to determine which of the independent variables would be useful in predicting GED success for GED examinees as a group. By incorporating all of the eight independent variables into one equation, a fuller explanation was offered about the dependent variable (GED test performance) and why differences might have occurred.

This regression analysis showed what percentage of the variance in scores could be attributed to each independent variable introduced. Age and highest grade completed in school are interval variables and can be utilized in the equation with an exact number. The non-interval variables include gender, race, geographical location, preparation and reasons for taking the GED tests. Gender and race are considered dichotomies; geographical location, preparation and reasons for taking the GED are nominal variables and cannot be ordered. These were entered into the regression framework through the employment of dummy variables. In the regression analysis, the R^2 figure indicated how much each independent variable contributed to the variance in the GED scores, thus indicating how strong a predictor that independent variable was in the prediction of GED success. A table was developed to be used as an advisory tool by adult counselors and teachers of prospective GED

candidates. If the R^2 was statistically significant for a particular characteristic of the GED examinee, the characteristic was incorporated into this table.

Summary

Chapter Three has described the methods used in this study. Employing the Virginia GED testing program, GED examinees who tested for the first time in November and December, 1987, at the 43 Official GED Testing Centers, constituted the sample. Information garnered from the Candidate Data Sheets and official GED score transcripts were the data analyzed. This data analysis determined if (a) any difference existed between overall test performance of one day versus two half days of testing; (b) sequencing of tests affected the deviation of scores between the first and second half of testing; (c) scores received according to test sequencing was affected by method of testing administration; (d) pass/fail rate was affected by the method of testing administration; (e) what relationships existed between age, gender, race, highest grade completed, geographical location, preparation for the GED and motivations for taking the GED and test scores as affected by the testing administration method experienced; and (f) any of the variables studied were useful predictors of GED success in order to incorporate these into an advisory table to be used by counselors and teachers of prospective GED candidates.

CHAPTER FOUR

FINDINGS OF THE STUDY

This chapter presents the findings of this study in three parts: (a) description of the sample; (b) presentation of data analysis as related to the testing of the hypotheses set forth at the initiation of the study; and (c) delineation of those variables which are useful in prediction of successful GED completion to be used in the formulation of an advisory table.

Description of the Sample

This study's sample included all first-time GED examinees who completed the GED tests in November and December, 1987, in the Commonwealth of Virginia. The subjects will be described, according to the testing administration method experienced, by: (a) official GED testing centers participating in this study; (b) independent variables addressed in this study of age, gender, race, highest grade completed, geographical location, preparation for the GED, motivation to take the GED and test sequencing; and (c) pass/fail groups according to the independent variables addressed in this study.

Participation of GED Testing Centers

The official GED testing centers in Virginia totaled 47. All but four of the testing centers (Bath County, Greensville County, Northampton County, and Williamsburg City) tested in November and December, 1987; thus, 43 centers' first-time GED examinees' scores (100%) were utilized

in the overall comparison of test performance according to method of testing administration and in data analysis according to gender. As shown in Table 2, the total number of persons tested during this period was 2,864. This figure fell between the 2,500 to 3,000 estimated at the initiation of this study. Of this total number, 2,087 were first-time examinees (72.87%) and 777 were retakes (27.13%).

When analyzing data for age, race, highest grade completed, geographical location, preparation for the GED and motivation to take the GED, the total number of examinees' scores utilized totalled 1,606, the number of first-time examinees who completed a Candidate Data Sheet. This reflected a 84.13% response rate in the completion of Candidate Data Sheets by 39 of the GED testing centers who participated in this study. Though 43 centers tested during this time, four centers chose not to participate in the study by not completing any Candidate Data Sheets (Buchanan County, Louisa County, Portsmouth City, and Prince William County); this accounted for the absence of 178 data sheets. Three other centers tested in both November and December (Lynchburg City, Roanoke City and Washington County), but collected data sheets only in November, accounting for 102 missing data sheets. Of the remaining 36 centers who fully participated in this study, 201 data sheets were not available for data analysis. Frequency counts of participation by centers can be found in Table 2. A pictorial presentation of centers participating can be found in Appendix E.

Table 2. Participation of GED Testing Centers in Virginia

Center Code and Name	1 Day 1st-Takes	2-1/2 Days 1st-Takes	Retakes	TOTAL TESTED	MISSING DATA SHEETS
001 Accomack County		13	1	14	1
099 Alleghany Highlands	17		2	19	4
007 Arlington county		62	21	83	0
008 Augusta County	33		5	38	0
009 Bath County		----- NO TESTING DATES DURING THIS PERIOD -----			
013 Brunswick County		17	13	30	1
*014 Buchanan County		18	5	23	18
103 Buena Vista City		12	5	17	0
104 Charlottesville City		48	15	63	7
136 Chesapeake City	56		19	75	1
024 Culpeper County	22		3	25	0
108 Danville City		39	11	50	0
028 Essex County		12	21	33	1
029 Fairfax County	74	34	23	131	13
034 Frederick County	14		3	17	0

Table 2. (continued)

Center Code and Name	1 Day		2-1/2 Days		Retakes	TOTAL TESTED	MISSING DATA SHEETS
	1st-Takes		1st-Takes				
110 Fredericksburg City	56			25	81	0	
111 Galax City			20	6	26	0	
040 Greenville County							
041 Halifax County	17			11	28	1	
112 Hampton City	34		69	21	124	32	77
043 Henrico County	6		54	16	76	0	
044 Henry County	26		15	19	60	0	
052 Lee County	32		3	10	45	0	
053 Loudoun County	20			8	28	0	
*054 Louisa County			9	2	11	9	
X115 Lynchburg City	60		36	25	121	45	
058 Mecklenburg County	7			7	14	0	
060 Montgomery County			41	7	48	2	
117 Newport News City	81			42	123	5	
118 Norfolk City	75			24	99	1	
065 Northampton County							

----- NO TESTING DATES DURING THIS PERIOD -----

----- NO TESTING DATES DURING THIS PERIOD -----

Table 2. (continued)

Center Code and Name	1 Day		2-1/2 Days		Retakes	TOTAL TESTED	MISSING DATA SHEETS
	1st-Takes		1st-Takes				
120 Petersburg City			58		48	106	0
*121 Portsmouth City	55				33	88	55
073 Prince Edward County	68				46	114	34
*075 Prince William County	96				28	124	96
123 Richmond City	105		15		62	182	10
X124 Roanoke City			94		20	114	29
082 Rockingham County			23		9	32	0
083 Russell County	1		30		17	48	0
087 Southampton County	37				32	69	0
092 Tazewell County			43		17	60	6
128 Va. Beach City	133				18	151	37
093 Warren County	30				11	41	0
X094 Washington County	45				15	60	28
131 Williamsburg City							
096 Wise County	91				37	128	43

----- NO TESTING DATES DURING THIS PERIOD -----

Table 2. (continued)

Center Code and Name	1 Day 1st-Takes	2-1/2 Days 1st-Takes	Retakes	TOTAL TESTED	MISSING DATA SHEETS
097 Wythe County		31	14	45	2
TOTALS: 47 Centers	1,291	796	777	2,864	481

- * Centers testing during this period; did not participate in study
- X Centers testing during this period; participated only in November

Of the 43 centers included in this study, 20 centers offered the GED tests on one day only, 15 centers offered them on two half days only, and 8 centers offered them either on one day or two half days scheduling. One day examinees totalled 1,291, accounting for 62% of the sample; the two half days examinees totalled 796, accounting for 38% of the sample. All first-time examinees completing the GED tests during this study took the English version of the tests.

Selected Characteristics of GED Examinees

The two testing groups used for comparison can be described according to age, gender, race, highest grade completed, geographical location, preparation for the GED tests, motivations for taking the GED tests and test sequences experienced, the independent variables examined in this study. A chi-square test was employed with each variable to determine if there was a difference between the category proportions of the independent variable in the two groups being studied. Each independent variable is addressed separately, with 1,606 valid cases reported for all variables except gender. The variable gender included all of the 2,087 first-time GED examinees in this study.

Age. Table 3 depicts the frequency distribution according to the age groupings utilized in this study. These are the same age groupings employed by Cervero (1983) in a nationwide survey data analysis. A delineation of each chronological age can be found in Appendix G from which Table 3 was tabulated.

Table 3. Frequency Distribution of First-Time GED Examinees According to Selected Characteristics in One Day and Two Half Days Testing

Variable	One Day		Two Half Days		Total		X ²
	N	%	N	%	N	%	
Age							4.370
15-18	237	25.62	150	22.03	387	24.10	
19-22	212	22.92	164	24.08	376	23.41	
23-29	166	17.95	125	18.35	291	18.21	
30-39	179	19.35	127	18.65	306	19.05	
over 39	131	14.16	115	16.89	246	15.32	
Gender							.724
Males	545	42.22	321	40.33	866	41.49	
Females	746	57.78	475	59.67	1,221	58.51	
Race							.158
Whites	709	76.65	527	77.39	1,236	76.96	
Blacks	185	20.00	133	19.53	318	19.80	
Others (Asian, Indian, Hispanic)	31	3.35	21	3.08	52	3.24	
Highest Grade Completed							3.652
7th or less	50	5.40	37	5.42	87	5.42	
8th	103	11.14	93	13.66	196	12.20	
9th	183	19.78	136	19.97	319	19.86	
10th	283	30.59	194	28.49	477	29.70	
11th	283	30.59	206	30.25	489	30.45	
12th	23	2.49	15	2.20	38	2.37	
Geographical Location							14.458*
Urban	248	26.81	138	20.26	386	24.03	
Suburban	307	33.19	211	30.98	518	32.25	
Rural	370	40.00	332	48.75	702	43.71	

* $p < .05$

Table 3 (continued)

Variable	One Day		Two Half Days		Total		x ²
	N	%	N	%	N	%	
Hours of Preparation							9.149
None	153	16.54	103	15.12	256	15.94	
1-10	172	18.59	106	15.57	278	17.31	
11-20	82	8.86	72	10.57	154	9.59	
21-30	159	17.19	104	15.27	263	16.38	
31-50	94	10.16	63	9.25	157	9.78	
51-75	131	14.16	110	16.15	241	15.01	
76-100	52	5.62	48	7.05	100	6.23	
over 100	82	8.86	75	11.01	157	9.78	
Motivations to Take GED							4.154
Present Job							
Require-							
ment	39	4.22	28	4.11	67	4.17	
Future Job							
Require-							
ment	280	30.27	210	30.84	490	30.51	
Educational							
Admission	182	19.68	116	17.03	298	18.56	
Personal							
Satisfac-							
tion	326	35.24	263	38.62	589	36.67	
Military	44	4.76	24	3.52	68	4.23	
Combination							
of Motives	54	5.84	40	5.87	94	5.85	

p > .05

The ages of the GED examinees ranged from age 16 to 66. A 2x5 chi-square analysis was performed to detect any significant differences between the category proportions of the age groupings in both testing groups. The obtained $X^2 = 4.370$, $df = 4$, was not significant at the .05 level. The mean age for one day testing was 26.85; the mean age for two half days testing was 27.59.

The data also illustrate that of those testing in one day, 35.14% were 19 or younger and 14.6% were 40 or older; of those testing in two half days, 31.42% were 19 or younger and 16.89% were 40 or older. Those testing in two half days tend to be slightly older than those testing in one day, but not significantly so.

Gender. Table 3 shows the frequency distribution for gender for all first-time GED examinees. A 2x2 chi-square analysis found no statistically significant difference between the proportion of males and females in both testing groups ($X^2 = .724$, $df = 1$, $p > .05$). A larger percentage of examinees were females in both testing groups, with 57.78% females in one day testing and 59.67% females in two half days testing.

Race. The frequency distribution according to race of GED examinees is shown in Table 3. A 2x3 chi-square analysis found no statistically significant difference between the proportion of race categories in the two testing groups ($X^2 = .158$, $df = 2$, $p > .05$). Both testing groups consisted of 77% white, 20% black and 3% other minorities (Asian, Indian, Hispanic).

Highest Grade Completed. Table 3 presents the frequency distribution of the highest grade completed by the first-time GED examinees. A 2x6 chi-square analysis found no statistically significant difference between the proportion of those with similar highest grade completed in both testing groups ($\chi^2 = 3.652$, $df = 5$, $p > .05$). In both testing grouping, the percentage of those completing each grade level increased with each year presented, with the exception of the 12th grade; the highest percentage of completion was seen in the 10th and 11th grade. The mean highest grade completed in one day testing was 9.76; the mean highest grade completed in two half days was 9.69.

Geographical Location. The frequency distribution of geographical location of first-time GED examinees can be found in Table 3. A 2x3 chi-square analysis revealed a statistically significant difference between the category proportions of persons from different geographical locations in the two testing groups ($\chi^2 = 14.458$, $df = 2$, $p < .05$). From these data, the highest percentage category in each testing group was rural, but there were 8.75% more rural examinees in the two half days testing. A larger percentage of urban examinees took the test in one day than in two half days, 26.81% and 20.26%, respectively. The percentage of suburban examinees was very similar in each testing group, with 2.21% more in one day than two half days testing.

Preparation for the GED. The frequency distribution of how the first-time examinees prepared for the GED tests is shown in Table 4. Examinees were asked to report on the Candidate Data Sheet those

Table 4. Frequency Distribution of Preparation Choices by GED Examinees
While Preparing for the GED Tests

Choice	Test Admin.	N	%	Specific Content Covered							Total Sample N	Total Sample %	X ²
				Choice A		Choice B			Choice C				
				Only Subject Matter	Only Skills Test	GED Book	Prac. Test	Tu- tor		TV				Nothing
A	1 Dy. 2 1/2 Dys.	357 304	39 45	189 143	0 3	168 158	- -	- -	- -	- -	661	41.16	15.089*
B	1 Dy. 2-1/2 Dys.	350 205	38 30	- -	- -	- -	288 166	148 92	20 18	7 2	555	34.55	
C	1 Dy. 2-1/2 Dys.	153 103	16 15	- -	- -	- -	- -	- -	- -	- -	256	15.94	
D	1 Dy. 2-1/2 Dys.	65 69	7 10	40 37	1 1	25 31	55 57	30 39	4 5	0 0	134	8.35	
Totals:				299 180	1 4	193 189	343 223	178 131	24 23	7 2	1,606	100.00	

* p < .05

* p < .05

activities in which they participated to prepare for the GED tests. Three choices were listed, which included attending review classes (Choice A), studying on their own (Choice B), and doing nothing to prepare (Choice C). A fourth choice was added upon compilation of data as some examinees reported having attended both review classes and studying on their own (Choice D). Specific activities were listed under Choice A and Choice B from which the examinees reported the type of preparation utilized. These data show that 84.06% of the examinees prepared in some way before taking the GED tests, with 83.46% in one day testing and 84.88% preparing in two half days testing.

Review classes (Choice A) was the most utilized method for preparation as 41.16% of the total sample reported this choice. For specific content studied, 50.23% studied subject matter only, 49.32% studied both subject matter and test taking skills, and .45% took a class in test taking skills only.

Self-study (Choice B) was the second highest choice reported, with 34.55% of the total sample electing to prepare in this manner. For specific content studied, 81.80% utilized GED manuals and/or other textbooks, 43.24% took the practice GED tests, and 6.5% were helped by a tutor. The least used method was TV instruction (1.62%).

No preparation (Choice C) accounted for 15.94% of the total sample who reported this method of preparation.

Review classes and self-study (Choice D) was reported by 8.35% of the total sample.

A 2x4 chi-square analysis found a statistically significant difference between the proportions of those selecting varying choices in preparing for the GED in both testing groups ($\chi^2 = 15.089$, $df = 3$, $p < .05$). When the data were examined according to one day versus two half days testing, the one day examinees had 8% more examinees reporting self-study (Choice B) and a slightly higher percentage of 1% in doing nothing to prepare (Choice C) than the two half days examinees. The two half days examinees had 6% more examinees who took review classes (Choice A) and 4% more who opted both review classes and self-study (Choice D) than the one day examinees.

Hours of Preparation. Table 3 presents the frequency distribution of the hours spent in preparing for the GED by the first-time GED examinees. The mode of 1 to 10 hours is the only measure of central tendency that can be determined for both testing groups.

A 2x8 chi-square analysis revealed no statistically significant difference between the proportion of the hours of preparation between both testing groups ($\chi^2 = 9.149$, $df = 7$, $p > .05$). When ranking the percentage of the hours spent in preparation for both testing groups, the decreasing percentages fall in the same order for both groups: 1-10 hours, 21-30 hours, 0 hours, 51-75 hours, 31-50 hours, over 100 hours, 11-20 hours and 76-100 hours. A little over one-fourth of the examinees in both groups spent 1 to 20 hours in preparation and less than one-third in each group spent 51 to over 100 hours in preparation.

Motivations for Taking the GED Tests. The frequency distribution delineating the motivations for taking the GED tests are presented in Table 3. Because some individuals responded with two choices instead of the one requested, a sixth category was added when compiling data, a combination of reasons. These two answers included, in all cases, either one of the other four choices given (present job requirement, future job requirement, educational admission or military) plus personal satisfaction or military requirements paired with educational admission requirement.

Of the choices selected by the first-time GED examinees, the two motivations chosen most often were for personal satisfaction (36.67%) and future job requirement (30.51%). These two choices accounted for over two-thirds of all of the respondents. A 2x6 chi-square analysis found no statistically significant difference in the proportions chosen in both testing groups ($\chi^2 = 4.154$, $df = 5$, $p > .05$). Both one day and two half days examinees were very similar in their choices of motivation to take the GED tests. This is evident when considering the small differences which separate the choices: Combination (.03% more in two half days); present job requirement (.11% more in one day); future job requirement (.57% more in two half days); military (1.24% more in one day); educational admission (2.65% more in one day); and personal satisfaction (3.38% more in two half days).

Test Sequencing. Of the 120 possible sequence combinations in which the five subject area tests of the GED test battery could be taken, 117

different sequences were utilized by the 39 official GED testing centers who fully participated in this study. A frequency distribution of these sequences can be found in Appendix H. The order in which the tests were given, each having been given a sequence number, can be found in Appendix I.

A chi-square analysis was not performed on this variable as 65% of the cells had expected counts less than five; therefore, the chi-square may not be a valid test to detect significant differences between the two testing groups according to category proportions of test sequencing. Sequence #001 (Writing, Social Studies, Science, Reading, Math) was experienced more often by the one day testing group (13.95%) than the other possible sequences; Sequence #118 (Writing, Social Studies, Reading, Science, Math) was experienced more often by the two half days testing group (13.66%) than the other possible sequences.

Pass/Fail Groups

Table 5 depicts the percentages of those first-time GED examinees who passed or failed the GED tests. Overall, it can be concluded that approximately 68% passed and 32% failed in both testing groups.

Each of the pass/fail groups for both testing treatments will be described according to each independent variable in this study, as one of the objectives of this study was to determine if a relationship between certain characteristics of GED examinees and test performance (pass/fail rate) was affected by the method of testing administration experienced by first-time GED examinees. Percentages in each variable category are

Table 5. Summary Table of Pass/Fail Groups According to GED Examinees' Selected Characteristics and Testing Administration Method

Variable	% of Those Tested in One Day		% of Those Tested in Two Half Days	
	Pass	Fail	Pass	Fail
Pass/Fail	67.39	32.61	67.71	32.29
Age:				
15-18	67.51	32.49	74.67	25.33
19-22	65.57	34.43	68.29	31.71
23-29	69.28	30.72	70.40	29.60
30-39	70.95	29.05	66.93	33.07
over 39	66.41	33.59	59.13	40.87
Mean Age	(27.05)	(26.43)	(26.87)	(29.13)
Gender:				
Male	68.26	31.74	65.42	34.58
Female	66.76	33.24	69.26	30.74
Race:				
White	76.16	23.84	73.43	26.57
Black	36.22	63.78	51.13	48.87
Others	67.74	32.26	47.62	52.38
Highest Grade Completed:				
7th or less	54.00	46.00	43.24	57.76
8th	60.19	39.81	56.99	43.01
9th	62.30	37.70	63.97	36.03
10th	73.85	26.15	73.71	26.29
11th	71.73	28.27	77.67	22.33
12th	56.52	43.48	40.00	60.00
Mean	(9.85)	(9.57)	(9.84)	(9.37)
Geographical Location:				
Urban	63.31	36.69	68.84	31.16
Suburban	75.24	24.76	68.72	31.28
Rural	64.86	35.14	67.77	32.23

Table 5 (continued)

Variable	% of Those Tested in One Day		% of Those Tested in Two Half Days	
	Pass	Fail	Pass	Fail
Preparation Choice:				
A (Review Class)	63.20	36.80	65.13	34.87
B (Self-study)	75.14	24.86	77.07	22.93
C (Nothing)	73.20	26.80	70.87	29.13
D (Review Class & Self-study)	42.42	57.58	52.17	47.83
Hours of Preparation:				
0	72.55	27.45	70.87	29.13
1-10	72.67	27.33	73.58	26.42
11-20	68.29	31.71	72.22	27.78
21-30	66.04	33.96	71.15	28.85
31-50	65.96	43.04	74.60	25.40
51-75	63.36	36.64	64.55	35.45
76-100	65.38	34.62	68.75	31.25
over 100	63.41	36.59	49.33	50.67
Motivation:				
Present Job	43.59	56.41	67.86	32.14
Future Job	61.43	38.57	63.81	36.19
Educational				
Admission	76.37	23.63	74.14	25.86
Personal				
Satisfaction	73.01	26.99	69.58	30.42
Military	59.09	40.91	62.50	37.50
Combination of Motives	66.67	33.33	70.00	30.00

presented in Table 5. Analysis of variance factorial design was employed utilizing pass/fail status (pass = 1; fail = 0) as the dependent measure to determine if any interaction occurred between method of testing administration and selected characteristics of GED examinees.

Age. Table 6 shows the results of a 2x5 analysis of variance factorial design which found no statistically significant differences in method, age, or interaction effect of age and method according to the pass/fail status of the GED examinees. Table 5 shows that the mean age for the one day pass group was 27.05 years and 26.87 years for the fail group; the mean age for the two half days pass group was 26.43 and 29.13 for the fail group. The pass group's mean age for one day was .18 years older than the mean age of the two half days pass group, while the two half days fail group was 2.7 years older than the one day fail group. A higher percentage of those aged 30 years and over 39 years tended to pass in the one day testing, while a higher percentage of those aged 15 to 29 tended to pass in the two half days testing. Those passing in one day testing were .62 years older than those who failed. Those passing in two half days testing were 2.23 years younger than those who failed.

Gender. A 2x2 analysis of variance factorial design found no statistically significant differences in the pass/fail groups either by method, gender, or an interaction effect of method and gender. These results are shown in Table 6. Table 5 shows a slightly higher percentage (1.5%) of the males in one day testing were in the pass group than were

Table 6. Analysis of Variance of GED Performance by Selected Characteristics of GED Examinees According to Pass/Fail Groups

Variable	Method		Variable	Method x Variable	Within (Error)
Age					
	MS	.006	.253	.247	.217
	F	.03	1.16	1.13	
	p	.869	.325	.339	
Gender					
	MS	.005	.014	.340	.220
	F	.02	.06	1.55	
	p	.878	.801	.214	
Race					
	MS	.006	13.588	1.223	.200
	F	.03	68.05	6.13	
	p	.863	.0001*	.002*	
Highest Grade Completed					
	MS	.006	1.533	.271	.212
	F	.03	7.24	1.28	
	p	.867	.0001*	.257	
Geographical Location					
	MS	.006	.796	.473	.217
	F	.03	3.67	2.18	
	p	.868	.026*	.113	
Preparation for GED					
	MS	.006	3.541	.152	.212
	F	.03	16.74	.72	
	p	.867	.0001*	.540	
Hours of Preparation					
	MS	.006	.516	.191	.216
	F	.03	2.38	.88	
	p	.868	.0200*	.520	
Motivation for Taking GED					
	MS	.006	1.133	.254	.215
	F	.03	5.28	1.18	
	p	.868	.0001*	.314	

* $p < .05$

the females, while 4% more females were in the pass group in two half days testing.

Race. Table 6 shows the results of a 2x3 analysis of variance factorial design for pass/fail groups according to race. No statistically significant difference was found with method, but a statistically significant difference was found with race (depicted in Figure 2) and with the interaction effect of race and method (depicted in Figure 3). Table 5 shows that approximately three-fourths of all whites tested passed in both testing groups. Just a little over one-third of the blacks tested passed in one day testing while a little over one-half of the blacks tested passed in two half days testing. A little over two-thirds of the other minorities tested passed in one day testing and less than one-half of the other minorities tested passed in two half days testing. Therefore, a higher percentage of whites and other minorities tested passed in one day testing, while a higher percentage of blacks tested passed in two half days testing.

Highest Grade Completed. Table 6 shows the results of a 2x8 analysis of variance factorial design. No statistically significant differences were found with method or an interaction effect of method and highest grade completed. A statistically significant difference was found with highest grade completed, as depicted in Figure 4. Those examinees who completed the 7th or less grades and 12th grades had a higher number of failures than did those completing grades 8, 9, 10 and 11. Table 5 shows that in both testing groups, a higher percentage

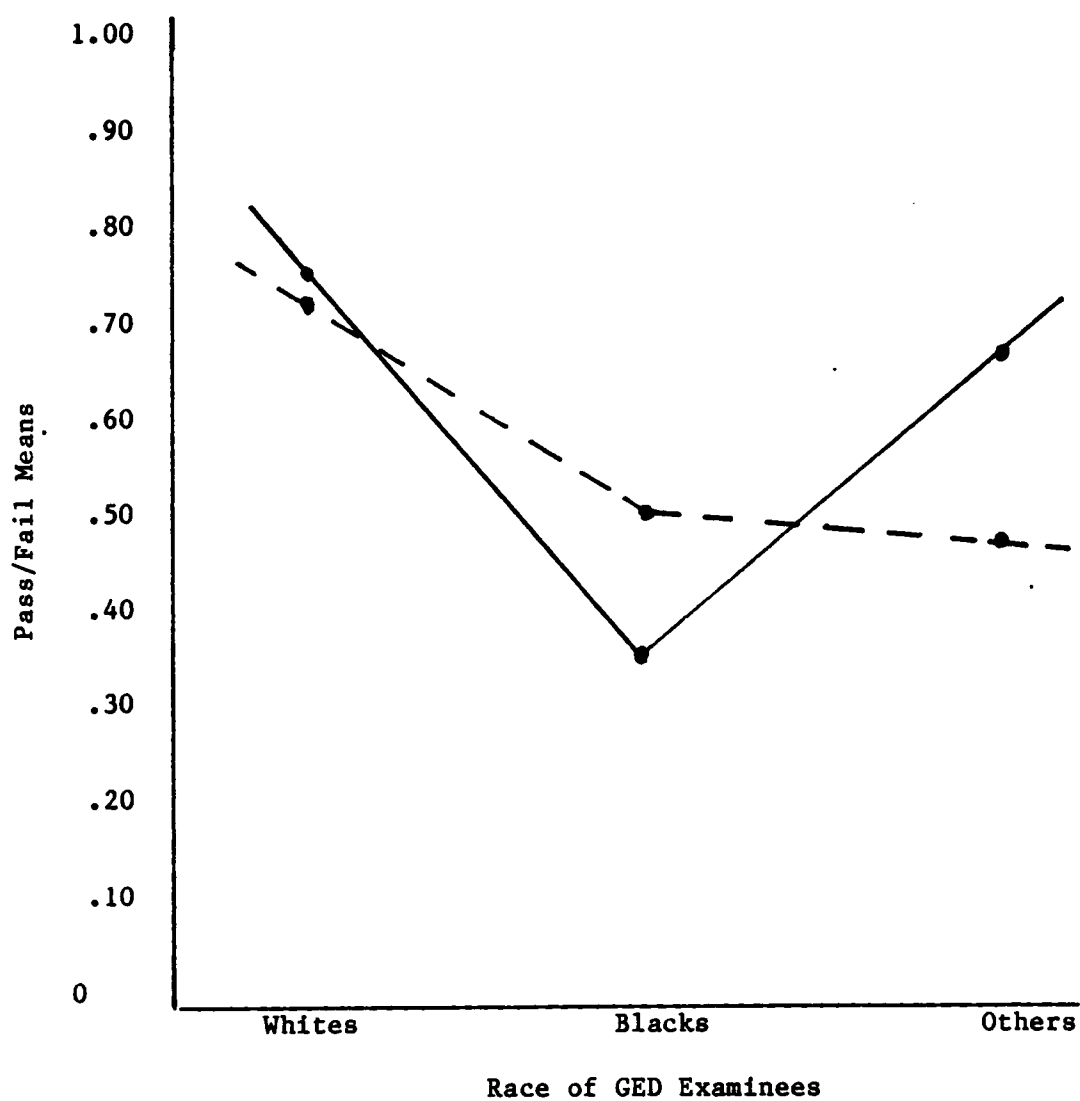


Figure 2
Main Effects of Race According to Pass/Fail Groups

—— One Day Testing
----- Two Half Days Testing

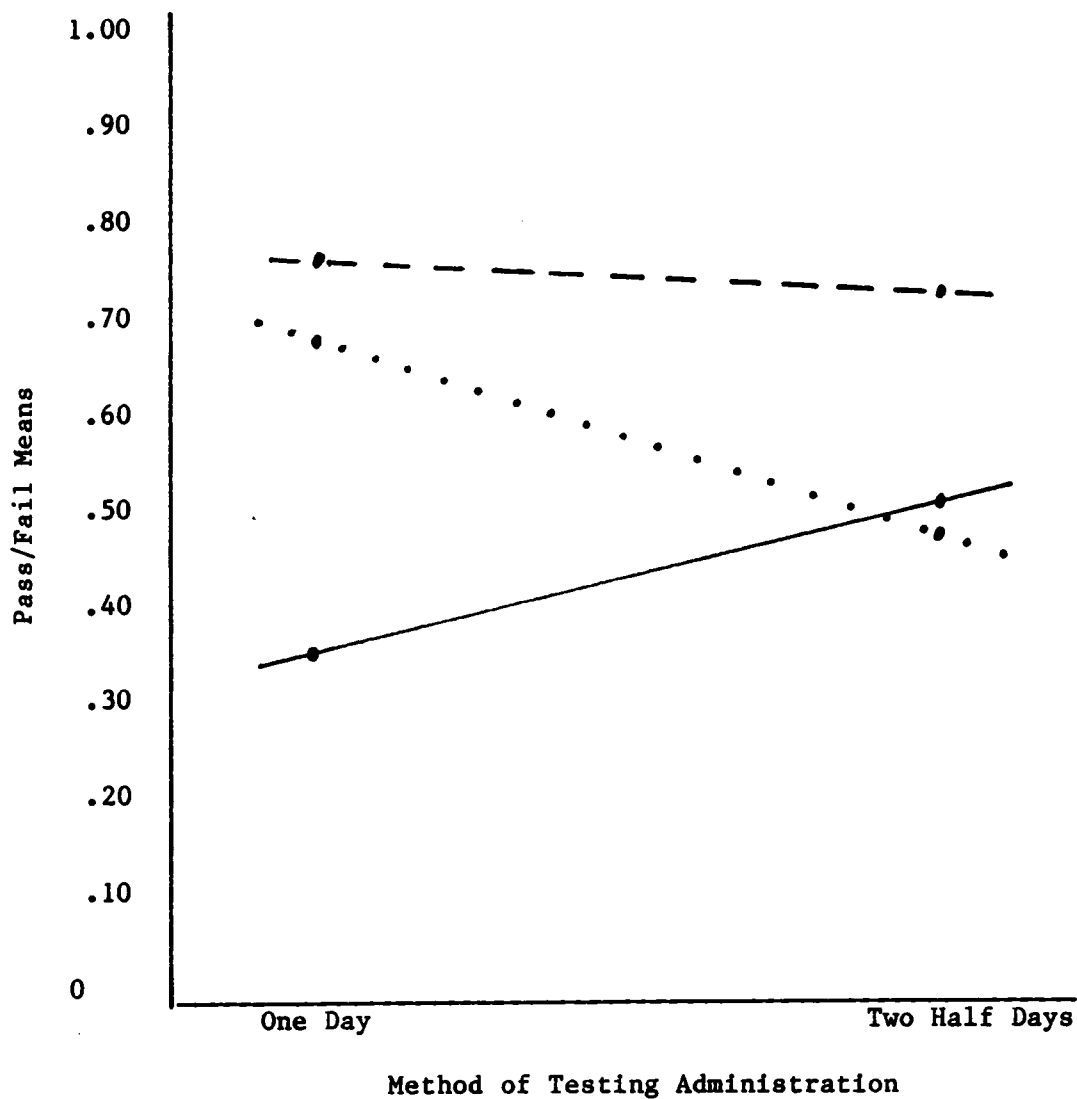


Figure 3
Interaction Effects of Method of Testing Administration
and Race According to Pass/Fail Status

----- Whites
 _____ Blacks
 Other Minorities

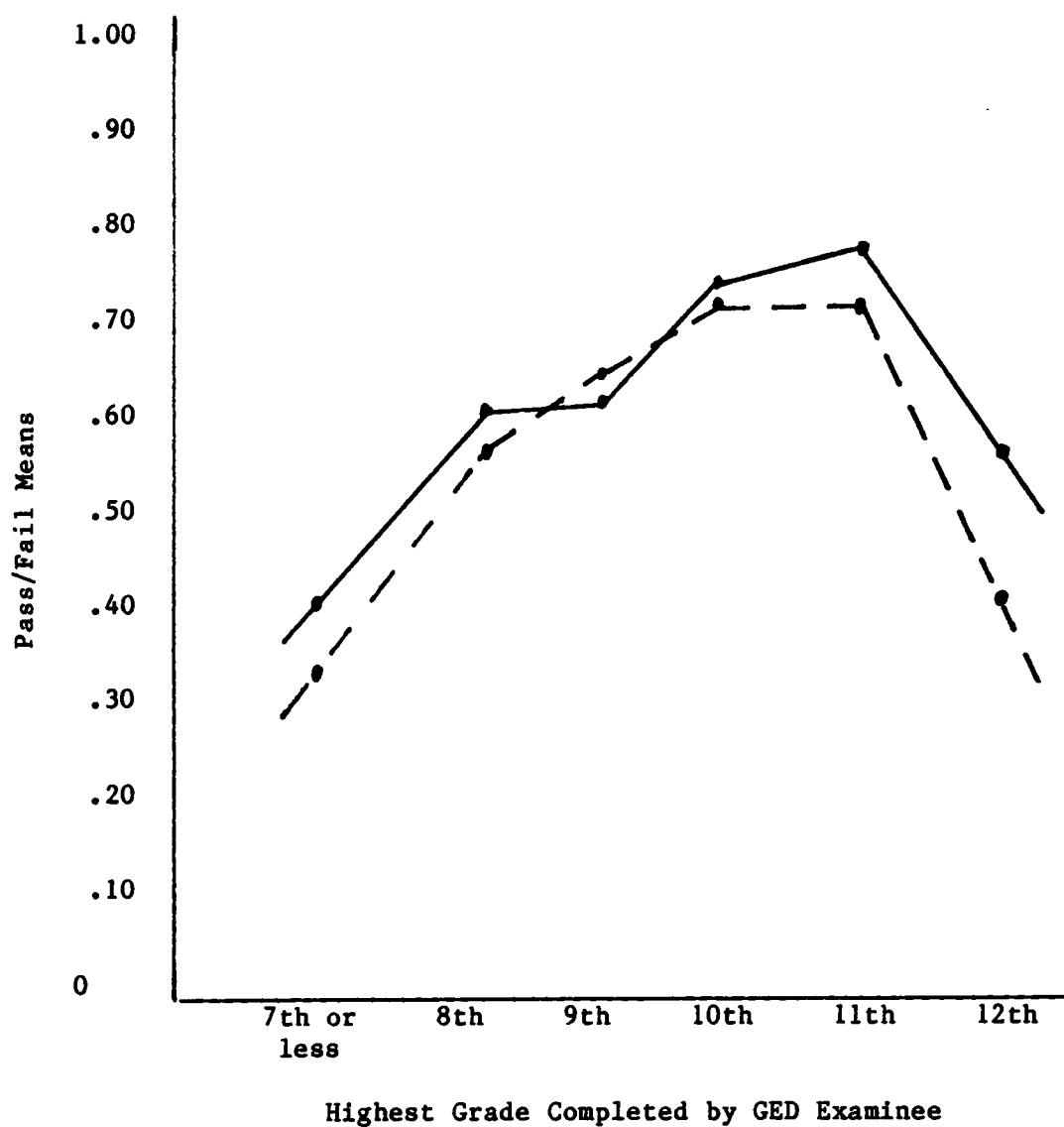


Figure 4
Main Effects of Highest Grade Completed According to
Pass/Fail Status

— One Day Testing
- - - Two Half Days Testing

passed with each grade level completed, with the exception of the 11th and 12th grades in one day testing and 12th grade in two half days testing. A higher proportion of those who had completed the 7th grade or less (+10.67%), 8th grade (+3.2%) and 12th grade (+16.52%) and a slightly higher percentage of those completing the 10th grade (+.14%) were in the one day testing pass group than in two half days testing pass group. A higher percentage of those who had completed the 11th grade (+5.94%) and a slightly higher percentage of those who had completed the 9th grade (+1.67%) were in the two half days testing pass group than in the one day testing pass group.

The mean highest grade completed in one day pass group was 9.85 and 9.57 for the fail group. The mean highest grade completed for two half days pass group was 9.84 and 9.37 for the fail group.

Geographical Location. A 2x3 analysis of variance factorial design found no statistically significant differences with method or in the interaction effect of geographical location and method. A statistically significant difference was found with geographical location, depicted in Figure 5. Table 5 shows that a larger percentage of the suburban examinees tested in one day passed than those of the urban or rural examinees in both testing groups, with 75% passing compared to less than two-thirds of urban and rural examinees passing in one day and a little over two-thirds of urban, suburban, and rural examinees passing in two half days.

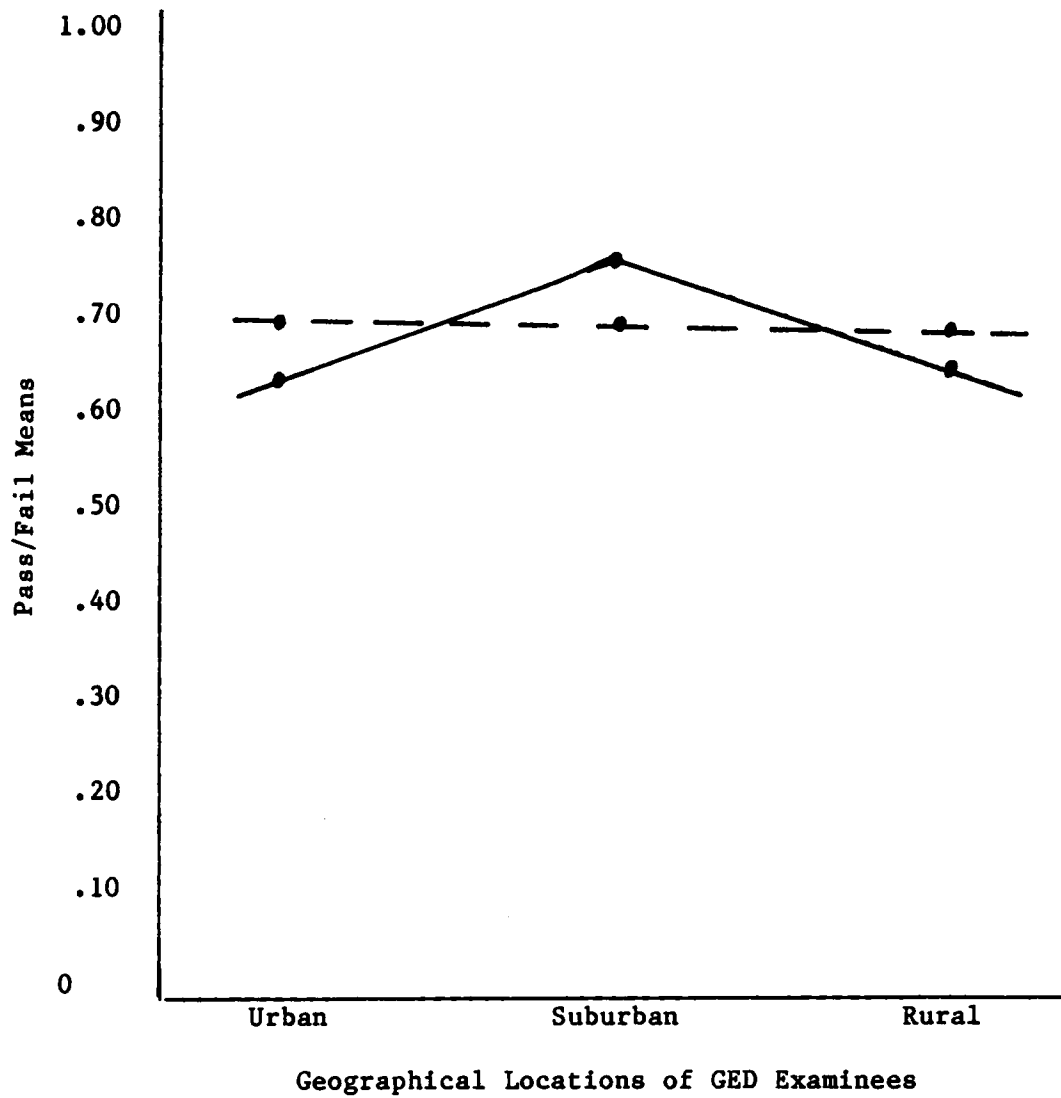


Figure 5
Main Effects of Geographical Locations According to
Pass/Fail Groups

— One Day Testing
- - - Two Half Days Testing

Preparation for the GED. Table 6 shows the results of a 2x4 analysis of variance factorial design which found no statistically significant differences in method or in the interaction effect of method and preparation choice. A statistically significant difference was found with preparation choice, as depicted in Figure 6. Those examinees who chose self-study (Choice B) or doing nothing to prepare (Choice C) had higher pass rates than did either those attending review classes (Choice A) or those who attended review classes and who were involved in self-study (Choice D), with Choice D's participants having the lowest pass rate. Table 5 shows that approximately three-fourths of all the examinees choosing self-study (Choice B) and doing nothing to prepare (Choice C) passed in both testing groups. A larger percentage (+9.75%) of those who chose review classes and self-study (Choice D) and a slightly higher percentage (+1.93%) who chose review classes (Choice A) passed in two half days of testing than in one day testing.

Hours of Preparation. Table 6 shows the results of a 2x8 analysis of variance factorial design which found no statistically significant differences with method or with the interaction effect of method and hours of preparation. A statistically significant difference was found with hours of preparation, depicted in Figure 7. The highest pass rate was experienced by those who had studied no hours or 1 to 10 hours. The persons who studied over 100 hours had the lowest pass rate. Table 5 shows that the highest percentage of those who passed in one day were those who had studied 1 to 10 hours (72.67%) and the lowest pass rate for

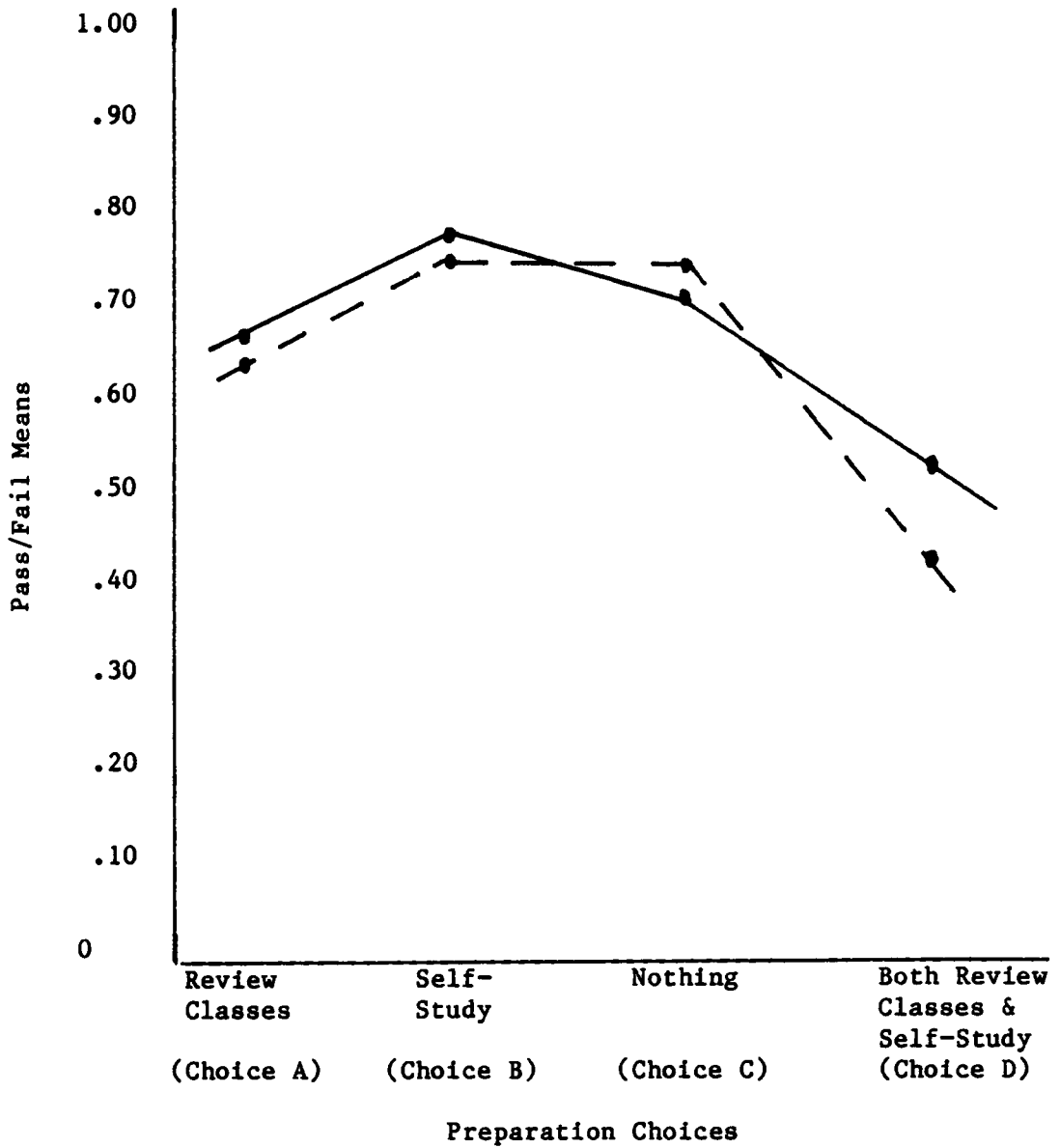


Figure 6
Main Effects of Preparation for the GED According to
Pass/Fail Status

— One Day Testing
- - - Two Half Days Testing

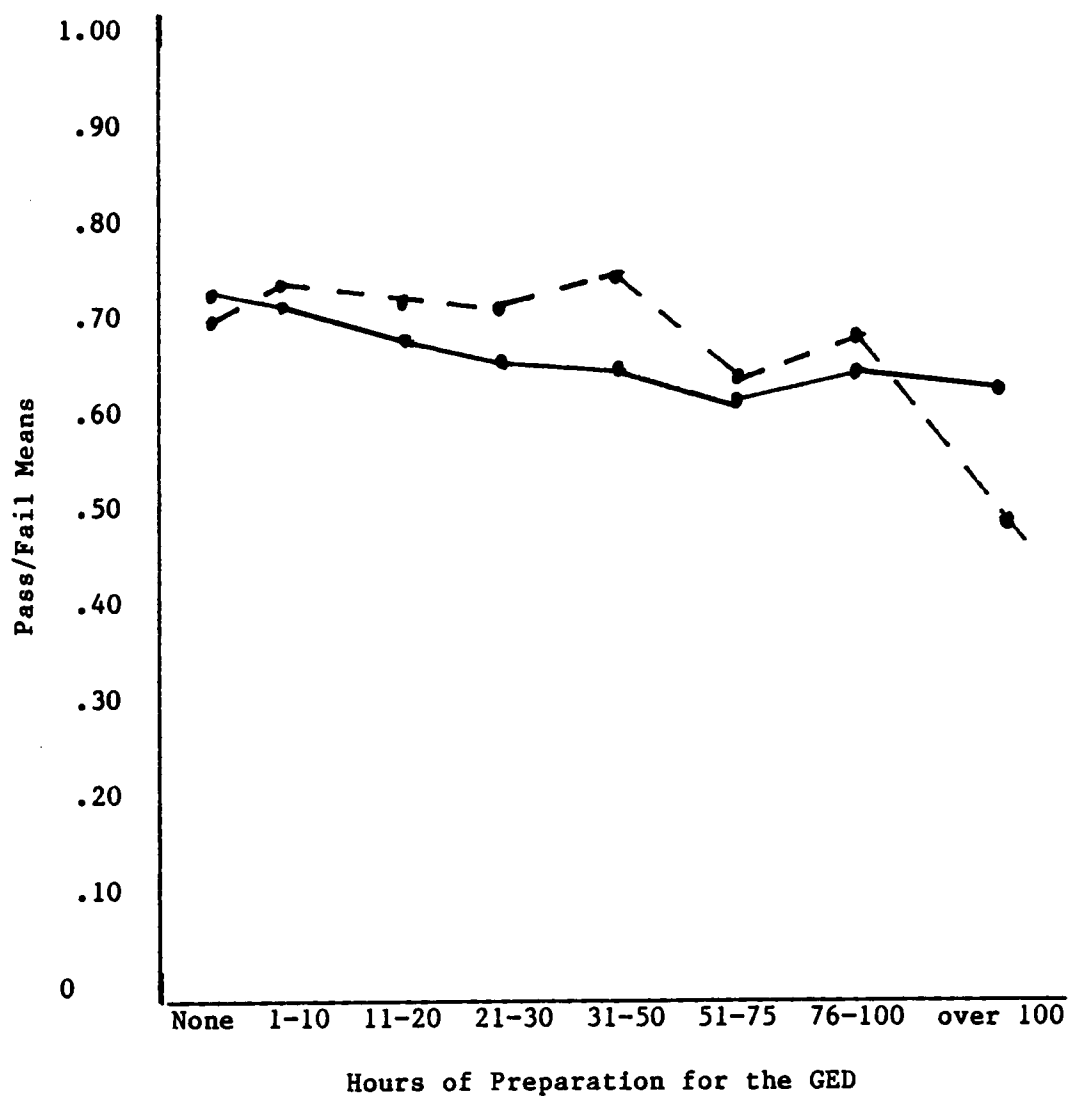


Figure 7
Main Effects of Hours of Preparation According to Pass/Fail Status

—— One Day Testing
----- Two Half Days Testing

those who had studied 51 to 75 hours (63.36%). The highest percentage passed in two half days were those who studied 31 to 50 hours (74.60%) and the lowest percentage passed were those who had studied over 100 hours (49.33%).

Motivation for Taking the GED Tests. Table 6 shows the results of a 2x6 analysis of variance factorial design which found no statistically significant differences with method or with the interaction effect of method and motivation. A statistically significant difference was found with motivations to take the GED, depicted in Figure 8. Those reporting motives for educational admission and personal satisfaction passed at a higher rate than did those who reported motives for the military, future job requirement or combinations of reasons. The lowest pass rate was experienced by those who reported present job requirement as the motive to take the GED, particularly in one day testing. Table 5 shows that the highest percentage for passing in both testing groups included those examinees who were motivated to take the GED for educational admission, 76.37% in one day and 74.14% in two half days. The lowest percentage for passing in one day included those examinees who were motivated for present job requirement (43.59%) and military (62.50%) in two half days testing.

In summary, approximately 68% passed and 32% failed in both testing groups. When comparing pass/fail rates, no differences were found with regard to age or gender. Those experiencing the highest pass rates included whites, those having completed the 8th, 9th, 10th or 11th

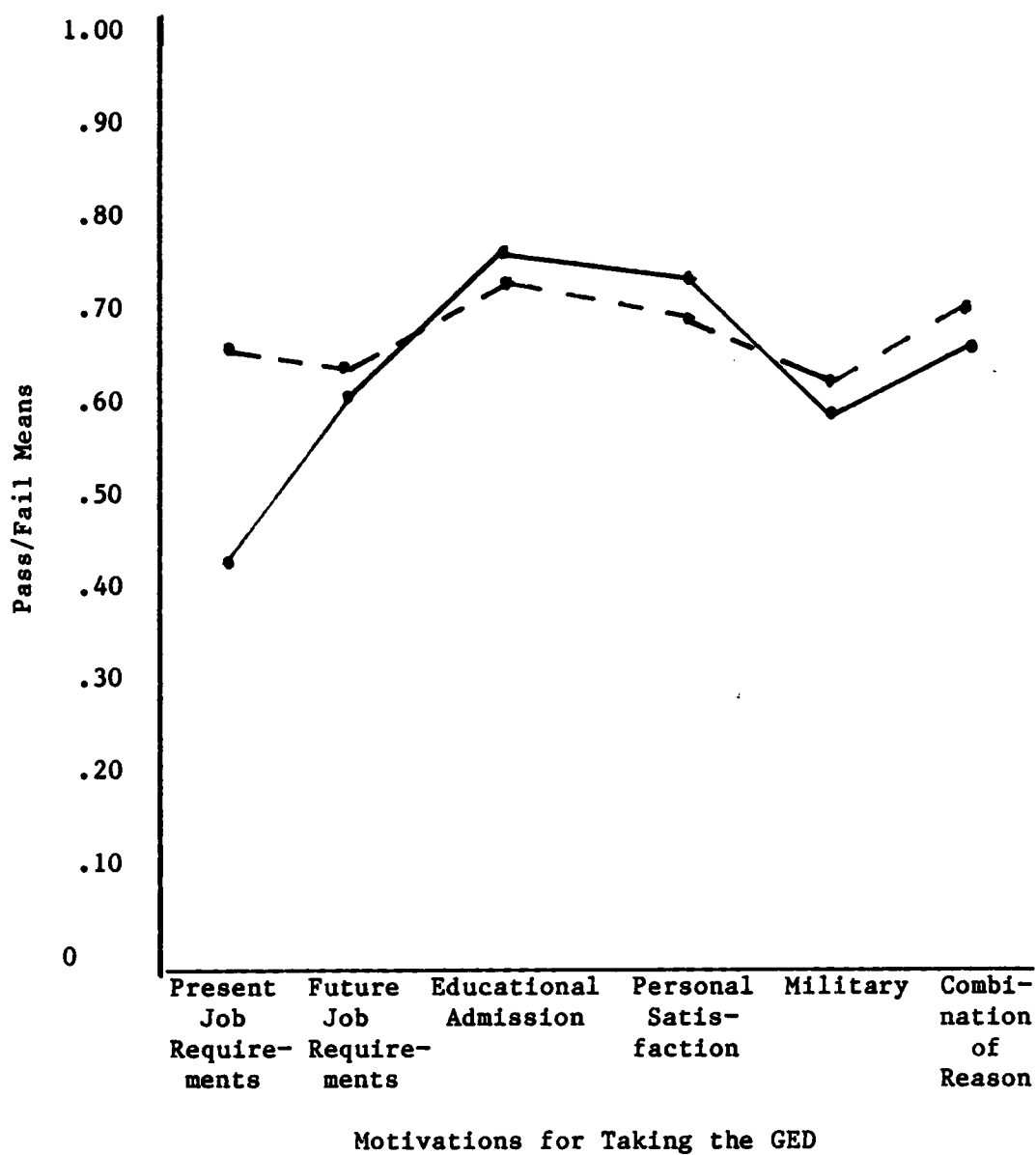


Figure 8
Main Effects of Motivations for Taking the GED Tests
According to Pass/Fail Rate

— One Day Testing
- - - Two Half Days Testing

grades, suburban examinees, those who prepared by self-study or doing nothing, those who studied 0 to 10 hours and those who were motivated to take the GED for educational admission.

Testing of Hypotheses

This section presents the findings of this study by first stating each hypothesis being tested, followed by an explanation of the data analysis through narrative and tabular presentations.

GED Performance and Method of Testing Administration

Hypothesis #1 stated: There is no difference in overall GED performance, as indicated by mean total test scores, between those first-time GED examinees who tested in one day versus those who tested in two half days.

The parametric statistical test employed for this analysis was the t-test. Data needed to conduct this test, mean total GED test scores, are presented in Table 7. A complete frequency distribution of GED total test scores is found in Appendix J. The three assumptions made for use of a t-test were satisfied. First, GED scores formed an interval scale of measurement. Secondly, the distribution of scores was found to be normally distributed by use of the Wilcoxon signed-rank test ($z = -.0690$, $p = .9450$, $p > .05$). The range of total test scores, when depicted in Figures 9 and 10, reveals that the scores in both testing methods were normally distributed, having much shared variance, with just a few outliers at either extreme. Thirdly, score variances for the populations

Table 7. t-test Results for One Day versus Two Half Days Testing Administration

Method	N	Mean Score	Standard Deviation	Range High Low	Skewedness	Standard Error of Measurement	t	p
1 Day	1291	242.273	35.519	123 383	.158	.989	.2782	.7809
2-1/2 Days	796	241.833	34.338	137 349	.048	1.217		
TOTAL:	2087	242.105	35.066	123 383	.119			

p > .05

* May represent up to 4 counts

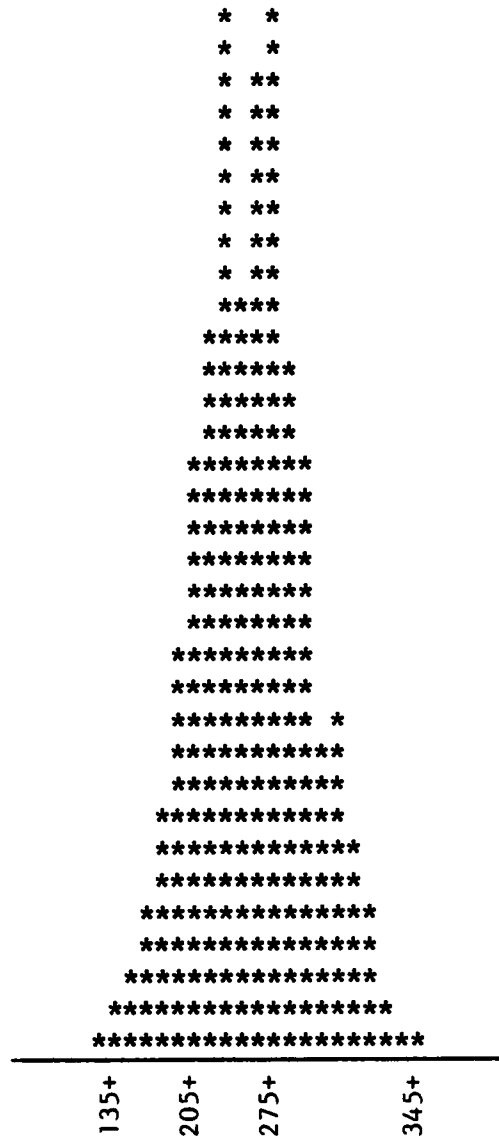


Figure 10
Histogram of GED Mean Total Test Scores for Two Half Days

* May represent up to 3 counts

studied were found to be equal through use of a test for homogeneity of independent variances ($F = 1.07$, $df = 1290 \text{ \& } 795$; $p = .2928$; $p > .05$).

A t-test's pooled variance formula was then used to ascertain if a difference in overall GED performance was present. Table 7 shows that no statistically significant difference was found, even with the large number of individuals in this study. Though not significantly different, the one day GED examinees' mean total score was .44 total points higher than those for the two half days.

The results of the statistical test failed to reject Hypothesis #1. There is no difference in overall GED performance according to method of testing administration experienced by first-time GED examinees.

GED Performance in First and Second Half of Testing

Hypothesis #2 stated: There is no difference in GED performance, as indicated by subtest scores, between scores received in the first half and second half of testing of those first-time GED examinees who take the tests in one day versus those who take them in two half days.

This hypothesis employed a multivariate analysis of variance (MANOVA) by use of the Wilks Lambda test. Results are shown in Table 8. Then a 2x2 analysis of variance factorial design was computed on each of the sequences indicated to see how each contributed to the MANOVA F. Results of the first half of testing are found in Table 9; results of the second half of testing are found in Table 10. As the MANOVA F was not statistically significant, the second part of the analysis may not have been needed. Thus, no statistically significant differences were found

Table 8. Wilk's Lambda Test of Overall Method Effect on First and Second Half of Testing by Sequences

Sequence	Wilk's Criterion	df	Comparable F Value	p
001	.9892	2,163	.89	.4140
015	.9512	2,76	1.95	.1499
020	.9591	2,23	.49	.6189
022	.9214	2,30	1.28	.2927
042	.9999	2,147	.01	.9930

001 - Writing, Social Studies, Science, Reading, Math

015 - Math, Science, Social Studies, Writing, Reading

020 - Writing, Reading, Social Studies, Science, Math

022 - Writing, Reading, Math, Social Studies, Science

042 - Social Studies, Science, Math, Writing, Reading

p > .05

Table 9. Analysis of Variance for Comparing First Half of Testing Sequence
According to Testing Administration Method

Sequence	Mean 1 Day	Mean 2-1/2 Days		df	Sum of Squares	Mean Square	F	p
001 (Writing S.S.)	95.33	91.62	Method Within (Error)	1	396.125	396.125	1.78	.1835
				164	36411.369	222.020		
015 (Math, Science)	101.34	98.40	Method Within (Error)	1	171.256	171.256	1.10	.2971
				77	11966.298	155.406		
020 (Writing, Reading)	101.46	97.40	Method Within (Error)	1	104.327	104.327	.44	.5131
				24	5680.327	236.680		
022 (Writing, Reading)	100.69	101.29	Method Within (Error)	1	3.033	3.033	.01	.9197
				31	9102.967	293.644		
042 (S.S., Science)	102.97	102.66	Method Within (Error)	1	2.417	2.417	.01	.9154
				148	31619.083	213.642		

111

p > .05

Table 10. Analysis of Variance for Comparing Second Half of Testing Sequence
According to Testing Administration Method

Sequence	Mean 1 Day	Mean 2-1/2 Days		df	Sum of Squares	Mean Square	F	p
001 (Science, Reading, Math)	144.71	139.95	Method Within (Error)	1	653.455	653.455	1.42	.2355
				164	75598.279	460.965		
015 (S.S., Writing, Reading)	152.10	152.97	Method Within (Error)	1	15.138	15.138	.04	.8514
				77	32988.583	428.423		
020 (S.S., Science, Math)	142.27	140.80	Method Within (Error)	1	13.764	13.764	.05	.8332
				24	7288.582	303.690		
022 (Math, S.S., Science)	142.50	149.24	Method Within (Error)	1	373.911	373.911	.96	.3347
				31	12071.059	389.389		
042 (Math, Writing, Reading)	149.34	148.81	Method Within (Error)	1	6.977	6.977	.01	.9053
				148	72691.316	491.158		

p > .05

when comparing first half of testing with one day and two half days of testing; second half of testing with one day and two half days testing; or in overall method effect between first half and second half of testing according to method of testing administration.

The five test sequences utilized in this analysis included sequence numbers 1, 15, 20, 22, and 42. These were the only sequences entered into analysis as they were the only ones which were experienced by a sufficient number of examinees in both testing groups to allow for the feasibility of statistical analysis. The order in which the GED subtests were taken in each sequence was: (a) Sequence 1: Writing, Social Studies, Science, Reading, Math; (b) Sequence 15: Math, Science, Social Studies, Writing, Reading; (c) Sequence 20: Writing, Reading, Social Studies, Science, Math; (d) Sequence 22: Writing, Reading, Math, Social Studies, Science; and (e) Sequence 42: Social Studies, Science, Math, Writing, Reading.

Whatever the sequence used for analysis, in whatever order the GED tests were given, the variances of scores were controlled more by the examinees than by the treatment of testing administration method experienced by the GED examinees.

The statistical test failed to reject Hypothesis #2. There is no difference in GED performance between scores received in the first half and second half of testing according to the method of testing administration.

GED Performance and Test Sequencing

Hypothesis #3 stated: The relationship between the sequence of how the GED subtests were taken and test performance, as indicated by mean total test scores of first-time GED examinees, is not affected by the testing administration method experienced.

The same five sequences were entered into statistical analysis in testing this hypothesis as were utilized in testing Hypothesis #2. The mean total test scores for each sequence are presented in Table 11. GED examinees in one day testing experiencing these five test sequences earned higher mean total scores on all sequences, but one, than did those GED examinees experiencing the same test sequences in two half days testing. The one day examinees scored 8.29 total points higher on Sequence 1, 5.436 total points higher on Sequence 20, 1.540 total points higher on Sequence 15, and 1.168 total points higher on Sequence 42 than did those examinees in two half days testing. The two half days testing group scored 7.283 total points higher on Sequence 22 than did the one day examinees. For both testing groups, it is interesting to note that the highest scores earned were by those experiencing Sequence 15, in which the Math test is administered first and ended with the Reading Skills tests, beginning with the more difficult subtest and ending with the less difficult test in terms of specific content covered. The lowest test scores in both testing groups were received by those experiencing Sequence 1 which administered the most difficult test last, Math. The

Table 11. Mean Total GED test Scores by Test Sequence Number According to Testing Administration Method

Sequence	One Day			Two Half Days		
	N	%	Mean Score	N	%	Mean Score
1	129	13.95	240.047	37	5.43	231.757
15	41	4.43	253.439	38	5.58	251.895
20	11	1.19	243.636	15	2.20	238.200
22	16	1.73	243.188	17	2.50	250.471
42	118	12.76	246.686	32	4.70	251.188
Total	315	34.06	246.686	139	20.41	244.719

total mean score for each testing group was 246.686 for one day examinees and 244.719 for two half days examinees.

A 2x5 analysis of variance factorial design was employed to test this hypothesis. Results are shown in Table 12. No statistically significant difference was found either with method of testing administration or with an interaction effect of sequence of testing and method of testing administration. A statistically significant difference was found with sequence. The Newman-Keuls post hoc test was used to determine how each of the variable categories contributed to the significant difference. This test was applied hereafter to any analysis of variance statistical analysis when a significant difference was found with a variable. The post hoc test showed, even though there was a statistically significant difference with sequence, that the means of the test scores in each sequence were not significantly different from each other. This was possibly due to the adjustment made in calculation for the smaller cell frequencies with some of the sequences included. This is depicted in Figure 11.

The statistical test failed to reject Hypothesis #3. The relationship between sequence of how the GED subtests were taken and test performance is not affected by the method of testing administration experienced by the first-time GED examinees.

GED Performance and Pass/Fail Rates

Hypothesis #4 stated: The relationship between pass/fail rates and test performance, as indicated by mean total scores of first-time GED

Table 12. Analysis of Variance of Test Sequence and Test Performance
According to Testing Administration Method

Source of Variation	df	Sum of Squares	Mean Square	F	p
Between:					
Method	1	372.876	372.876	.31	.5773
Sequence	4	20050.999	5012.750	4.18	.0025*
Method X Sequence	4	23209.192	5802.298	.48	.7492
Within (Error)	444	532163.752	1198.576		

* $p < .05$

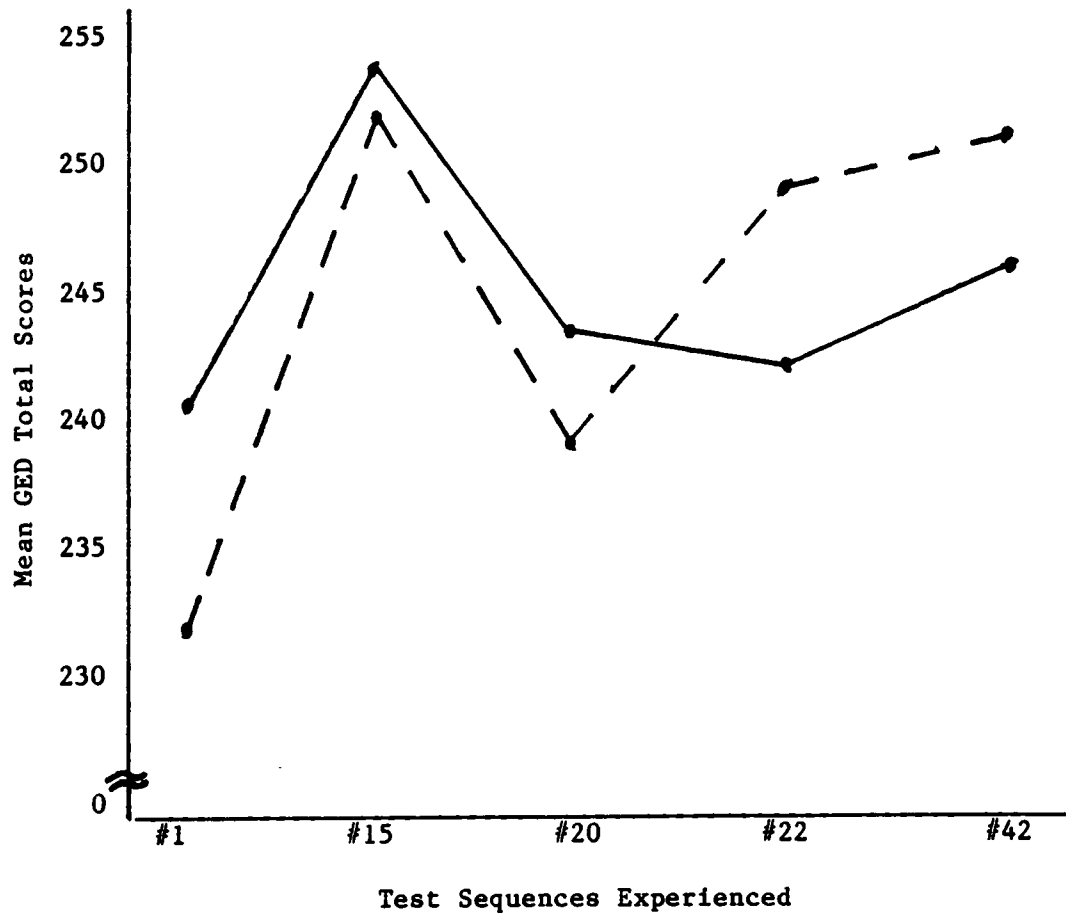


Figure 11
Main Effects of Test Sequences and GED Test Performance

— One Day Testing
- - - Two Half Days Testing

examinees, is not affected by the testing administration method experienced.

The mean total test scores for the pass/fail groups are shown in Table 13. To qualify for a high school equivalency certificate based upon GED test scores, Virginia requires a minimum score of 35 on each test, an average score of 45 on all five tests, and a minimum total score of 225. The mean total test score for the one day pass group was 1.12 total points higher than for the two half days pass group. In overall comparison of GED mean total test scores, the difference was only .44 total points higher in one day over two half days testing. The two half days fail group's mean total test score was only .406 total points higher than the one day fail group's mean total score. The mean scores in the fail groups in both testing administration methods had only one total test score above the cut-off score of 224 for unsuccessful completion of the GED tests: in one day testing, a score of 242 was unsuccessful and in two half days testing, a score of 226 was unsuccessful.

A 2x2 analysis of variance factorial design was utilized to test this hypothesis. Table 14 shows that no statistically significant difference was found by method of testing administration, as the same mean total test scores of 242.273 for one day and 241.833 for two half days was used for comparison in a previous analysis of the 2,087 first-time GED examinees participating in this study. A statistically significant difference was found between pass/fail groups, as could be expected due to the scores needed to pass or fail the GED tests. This is

Table 13. Mean Total Scores for Pass/Fail Groups According to Testing Administration Method

Method	PASS GROUP						FAIL GROUP					
	N	Mean	Median	Mode	SD	Range High Low	N	Mean	Median	Mode	SD	Range High Low
1 Day	870 (67.39%)	260.980	255	238,246	25.62	383 225	421 (32.61%)	203.613	209	217	17.12	242 123
2-1/2 Days	539 (67.71%)	259.863	255	255	24.26	349 225	257 (32.29%)	204.019	208	222	17.46	226 135
Total	1409 (67.51%)	242.273					678 (32.49%)	241.833				

Table 14. Analysis of Variance of Pass/Fail Rate and Test Performance
According to Testing Administration Method

Source of Variation	df	Sum of Squares	Mean Square	F	p
Between:					
Method	1	95.217	95.217	.18	.6695
Pass/Fail	1	1476044.528	1476044.528	2824.77	.0001*
Method X Pass/Fail	1	346.972	346.972	.66	.4152
Within (Error)	2083	1088443.302	522.536		

* $p < .05$

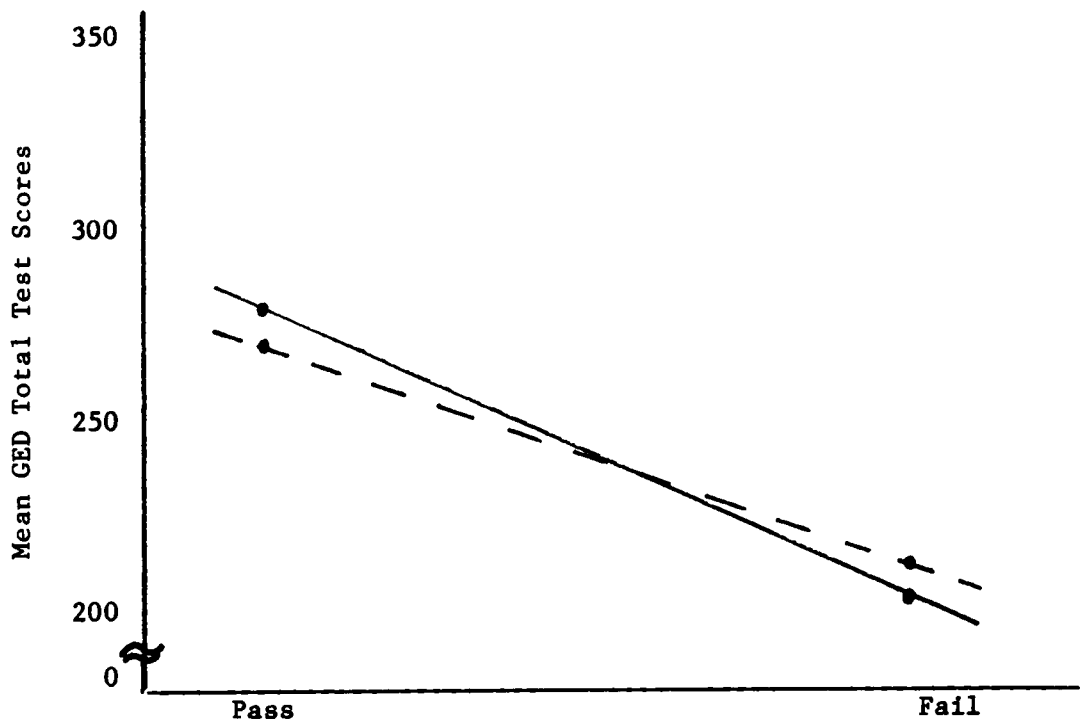


Figure 12
Main Effects of Pass/Fail Groups and Test Performance

— One Day Testing
- - - Two Half Days Testing

depicted in Figure 12. However, no statistically significant difference was found with the interaction effect of pass/fail groups and method of testing administration.

Results of the statistical test failed to reject Hypothesis #4. The relationship between pass/fail rates and test performance is not affected by the testing administration method experienced by the first-time GED examinees.

GED Performance and Age

Hypothesis #5 stated: The relationship between age and test performance, as indicated by mean total test scores of first-time GED examinees, is not affected by the testing administration method experienced.

Table 15 depicts the mean total test scores for each of the five age groupings in this study. In one day testing, 7.186 total points separate the highest scoring group (30-39 years) with the lowest scoring group (19-22 years). In two half days testing, 6.905 total points separate the highest scoring group (30-39 years) with the lowest scoring group (over 39 years). In comparing the one day testing and two half days testing, the age groups of 30 to 39 years (+4.539 total points) and over 39 years (+9.281 total points) earned higher scores in one day testing; the age groups of 15 to 18 years (+2.096 total points), 19 to 22 years (+4.218 total points), and 23 to 29 years (+4.505 total points) earned higher scores in two half days testing. As this analysis included only the 1,606 who had completed the Candidate Data Sheets, the mean total test

Table 15. Mean Total Test Scores Received on GED Tests According to Selected Characteristics of GED Examinees and Testing Administration Method

Variable	One Day Testing			Two Half Days Testing		
	N	%	Mean	N	%	Mean
Age						
15-18	237	25.62	242.831	150	22.03	243.643
19-22	212	22.92	239.306	164	24.08	243.524
23-29	166	17.95	242.295	125	18.35	246.800
30-39	179	19.35	246.492	127	18.65	241.953
Over 39	131	14.16	242.046	115	16.89	232.765
Gender						
Males	545	42.22	242.404	321	40.33	242.262
Writing			46.06			45.76
Soc. St.			49.41			49.04
Science			50.74			50.43
Reading			48.86			48.77
Math			47.54			48.24
Females	746	57.78	242.177	475	59.67	241.543
Writing			48.32			48.16
Soc. St.			48.32			48.09
Science			49.09			49.46
Reading			50.62			50.32
Math			45.84			45.53
Race						
White	709	76.65	249.038	527	77.39	247.309
Black	185	20.00	217.297	133	19.53	224.654
Others	31	3.35	244.097	21	3.08	229.143
Highest Grade Completed						
7th or less	50	5.4	225.440	37	5.42	226.324
8th	103	11.14	232.136	93	13.66	230.699
9th	183	19.78	235.869	136	19.97	237.559
10th	283	30.59	247.364	194	28.49	248.268
11th	283	30.59	249.357	206	30.25	248.859
12th	23	2.49	235.522	15	2.20	230.467
Geographical Location						
Urban	248	26.81	239.722	138	20.26	241.906
Suburban	307	33.19	249.518	211	30.98	244.256
Rural	370	40.00	238.600	332	48.75	241.271

Table 15 (Continued)

Variable	One Day Testing			Two Half Days Testing		
	N	%	Mean	N	%	Mean
Preparation Choice						
(A) Review Class	357	38.59	235.129	304	44.64	238.135
(B) Self-Study	350	37.84	248.774	205	30.10	250.644
(C) Nothing	153	16.54	254.360	103	15.13	247.524
(D) Both Review Class & Self-Study	65	7.03	221.833	69	10.30	228.304
Content of Review Class						
Subject Matter Only	229	54.14	231.171	180	48.26	236.133
Test-Taking Skills Only	1	.24	202.000	4	1.07	225.250
Both Subject Matter & Test-Taking Skills	193	45.62	235.689	189	50.67	236.725
Content of Self-Study						
GED Books	343	82.65	238.098	223	81.39	243.365
Practice Tests	178	42.89	252.965	131	47.81	248.806
Tutor	24	5.78	249.542	23	8.39	237.636
TV	7	1.69	220.288	2	.73	195.500
Hours of Preparation						
None	153	16.54	254.072	103	15.12	247.524
1-10	172	18.59	248.279	106	15.57	247.472
11-20	82	8.86	238.171	72	10.57	243.986
21-30	159	17.19	238.484	104	15.27	243.788
31-50	94	10.16	240.713	63	9.25	245.794
51-75	131	14.16	235.053	110	16.15	240.055
76-100	52	5.62	243.654	48	7.05	239.500
over 100	82	8.86	234.390	76	11.01	226.507
Motivation to Take GED						
Present Job Requiremt.	39	4.22	223.667	28	4.11	238.143
Future Job Requiremt.	280	30.27	234.725	210	30.84	236.638
Educational Admission	182	19.68	252.385	116	17.03	247.707
Personal Satisfaction	326	35.24	246.844	263	38.62	245.646
Military Enlistment	44	4.76	233.886	24	3.52	234.625
Comb. of Reasons	54	5.84	244.315	40	5.87	242.275

score for one day testing was 242.524 and the mean total test score for two half days testing was 242.524, only a .199 total points difference.

A 2x5 analysis of variance factorial design was used to test this hypothesis. As shown in Table 16, no statistically significant difference was found for the method of testing administration, age groupings, or the interaction effect of age grouping and testing administration method. Though not statistically significantly different, the probability levels for the main effects of age and the interaction effect of method and age are very close to the confidence level set at .05. Although, generally speaking, it is not appropriate to plot insignificant findings, when the pattern of performance is clear, as in this instance, plotting the results can be quite informative. The main effects of age are depicted in Figure 13; the interaction effect of method and age is depicted in Figure 14.

Results of the statistical test failed to reject Hypothesis #5. The relationship between age and test performance is marginally affected by the testing administration method experienced by the first-time GED examinees.

GED Performance and Gender

Hypothesis #6 stated: The relationship between gender and test performance, as indicated by mean subtest scores and mean total test scores of first-time GED examinees, is not affected by the testing administration method experienced.

Table 16. Analysis of Variance of Age and Test Performance According to Testing Administration Method

Source of Variation	df	Sum of Squares	Mean Square	F	p
Between:					
Method	1	15.658	15.658	.01	.9112
Age	4	9070.454	2267.614	1.80	.1262
Method X Age	4	10284.738	2571.185	2.04	.0863
Within (Error)	1596	2010466.792	1259.691		

$p > .05$

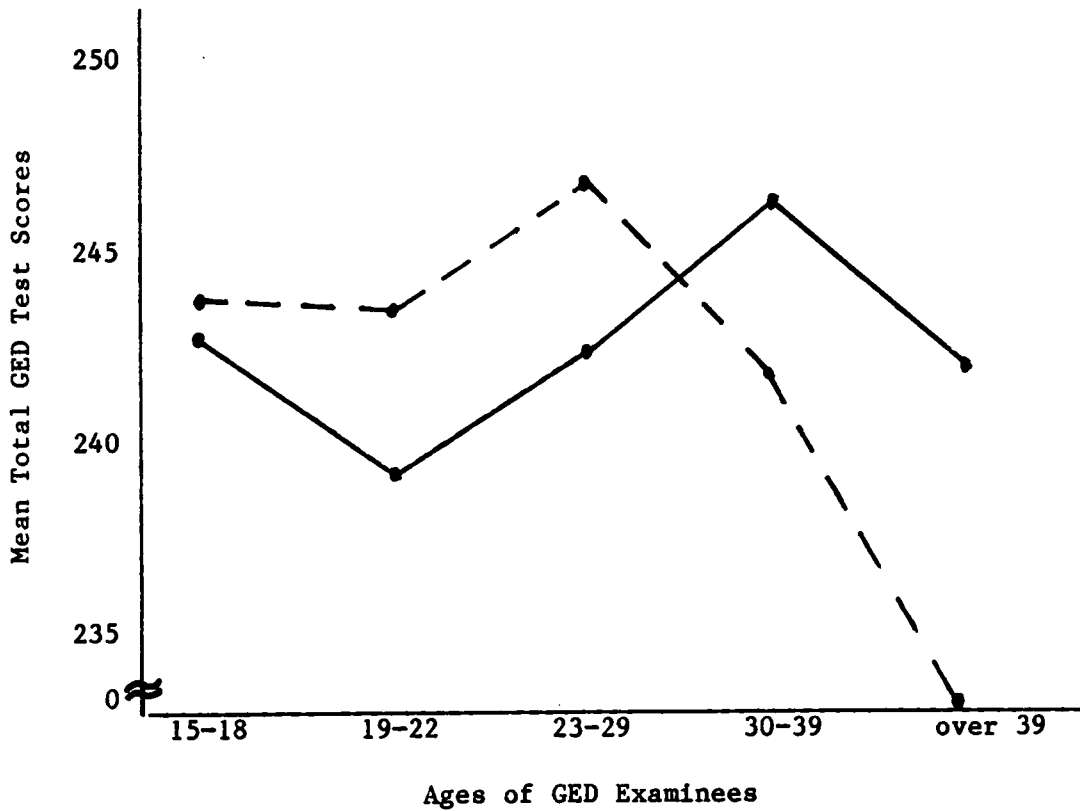


Figure 13
Main Effects of Age and Test Performance

— One Day Testing
- - - Two Half Days Testing

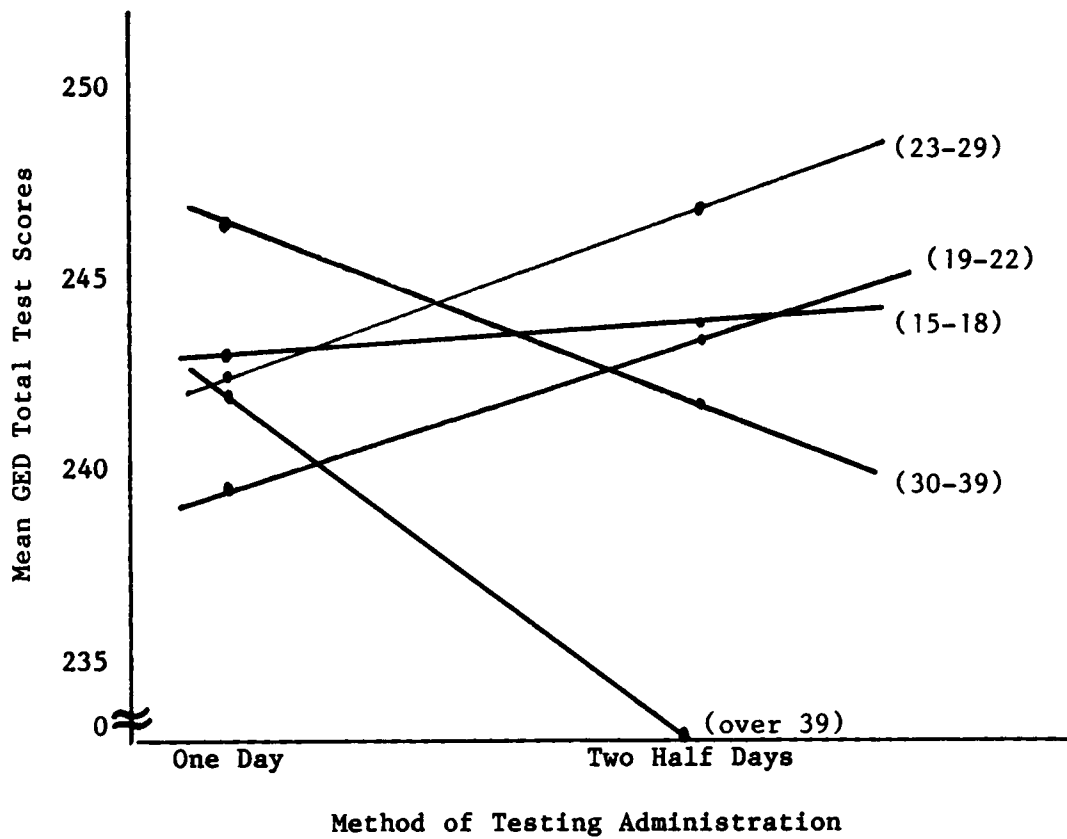


Figure 14
Interaction Effect of Method of Testing Administration and Age

Table 15 shows the mean test scores earned by all males and females in this study on each of the five subtests and total score. A 2x2 analysis of variance factorial design was used for each subtest scores to determine if any differences occurred according to gender. As shown in Table 17, no statistically significant difference was found by method of testing administration or interaction effect of gender and method of testing administration. However, a statistically significant difference was found on each subtest according to gender. Males earned slightly higher scores than females in both testing groups on Social Studies, Science and Math, while females earned slightly higher scores than males in both testing groups on Writing and Reading. The main effects are plotted in Figures 15 and 16.

When analyzing the total test scores, males scored less than one total point higher than females in both testing administration methods. A 2x2 analysis of variance factorial design revealed no statistically significant difference in either method of testing administration, gender, or interaction effect of gender and method of testing administration. Results are found in Table 17.

The statistical test failed to reject Hypothesis #6. The relationship between gender and test performance is not affected by the method of testing administration experienced by the first-time GED examinees.

Table 17. Analysis of Variance of GED Performance by Gender and Testing Administration Method

Subtests	Method	Gender	Gender X Method	Within (Error)
Writing				
MS	14.393	2691.599	10.763	68.793
F	.21	39.13	.16	
p	.6474	.0001*	.6925	
Social Studies				
MS	46.549	552.436	0.00	63.378
F	.73	8.72	0.00	
p	.3915	.0032*	1.00	
Science				
MS	1.879	980.258	56.964	63.708
F	.03	15.39	.89	
p	.8637	.0001*	.3445	
Reading				
MS	15.865	1418.319	11.601	73.658
F	.22	19.26	.16	
p	.6426	.0001*	.6915	
Math				
MS	2.176	2197.154	122.461	49.098
F	.04	44.75	2.49	
p	.8333	.0001*	.1144	
Total				
MS	95.217	89.652	25.430	1231.262
F	.08	.07	.02	
p	.7810	.7873	.8857	

* $p < .05$

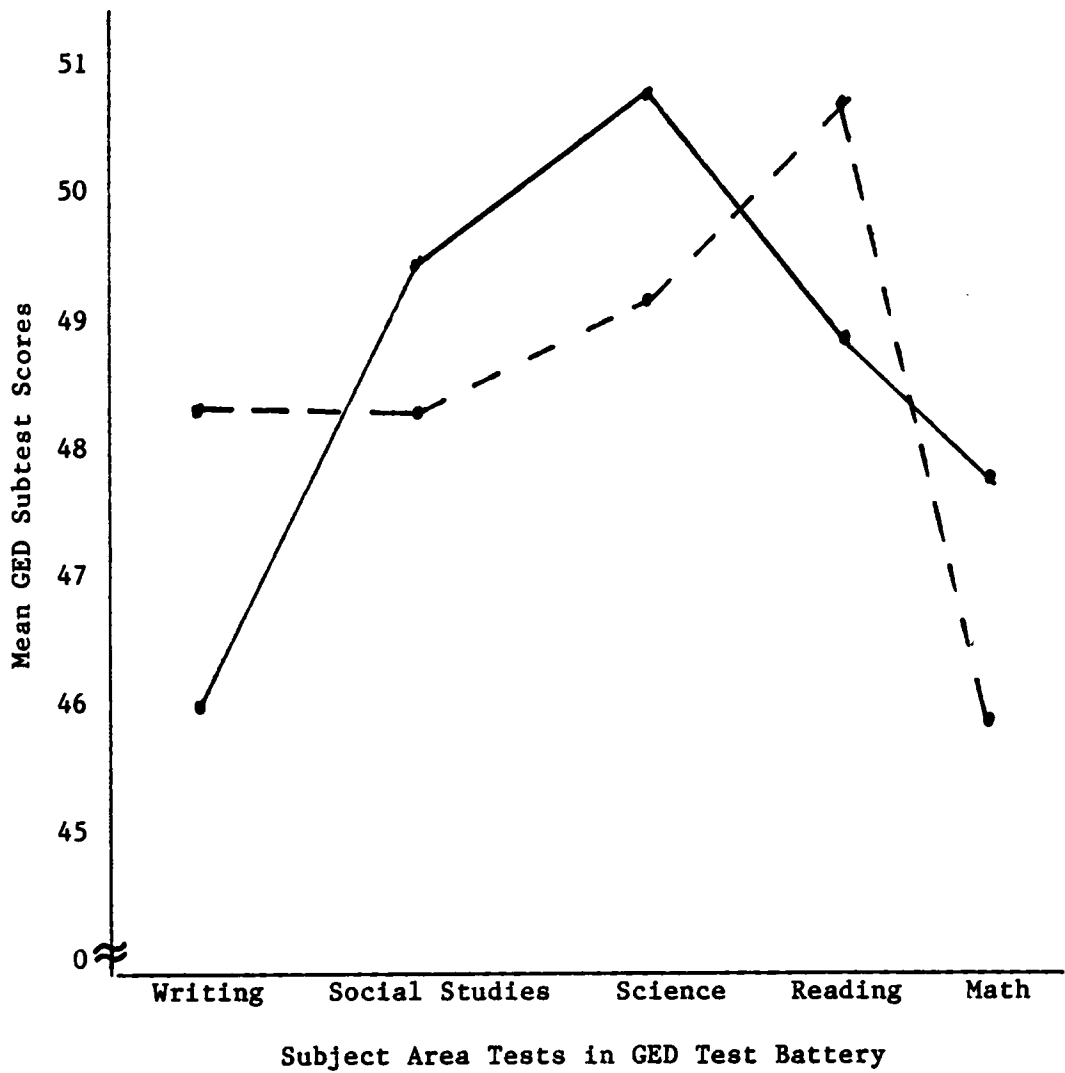


Figure 15
Main Effects of Gender and Test Performance for One Day Testing

—— Males
----- Females

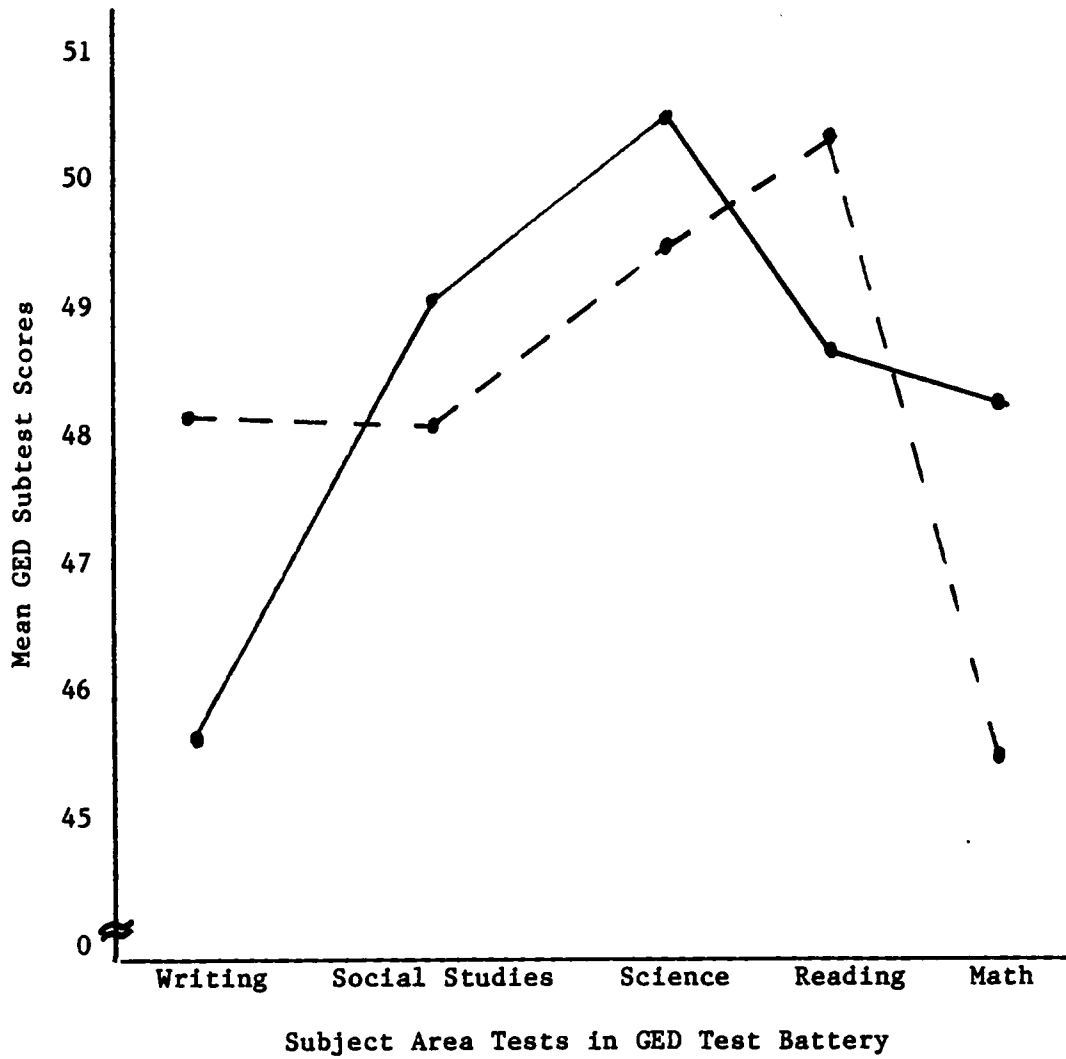


Figure 16
Main Effects of Gender and Test Performance for Two Half Days Testing

—— Males
---- Females

GED Performance and Race

Hypothesis #7 stated: The relationship between race and test performance, as indicated by mean total test score of first-time GED examinees, is not affected by the testing administration method experienced.

The mean total test scores by race are shown in Table 15. In one day testing, whites scored 32.741 total points higher than blacks and 4.941 total points higher than the other minority GED examinees. In two half days testing, whites outperformed blacks by 22.755 total points and other minority examinees by 18.166 total points.

A 2x3 analysis of variance factorial design revealed no statistically significant difference in method of testing administration. However, a statistically significant difference was found in comparing race and in the interaction effect of race and method of testing administration. These results are found in Table 18. The main effects of race are depicted in Figure 17 and the interaction effect of race and method is depicted in Figure 18. Whites and other minorities performed at a higher level of proficiency in one day testing and blacks performed better in two half days testing. The post hoc test found that each racial group was statistically significant one from the other, with whites having the highest mean scores, other minorities having the next highest mean scores and blacks having the lowest mean scores.

To test the conjecture that the differences found in test performance according to race was due to differential reading abilities,

**Table 18. Analysis of Variance of Race and GED Test Performance
According to Testing Administration Method**

<u>Source of Variation</u>	<u>df</u>	<u>Sum of Squares</u>	<u>Mean Square</u>	<u>F</u>	<u>p</u>
Between:					
Method	1	15.658	15.658	.01	.9067
Race	2	198290.307	99145.15	86.99	.0001*
Method X Race	2	7875.099	3937.549	3.45	.0318*
Within (Error)	1600	1823656.576	1139.785		

* $p < .05$

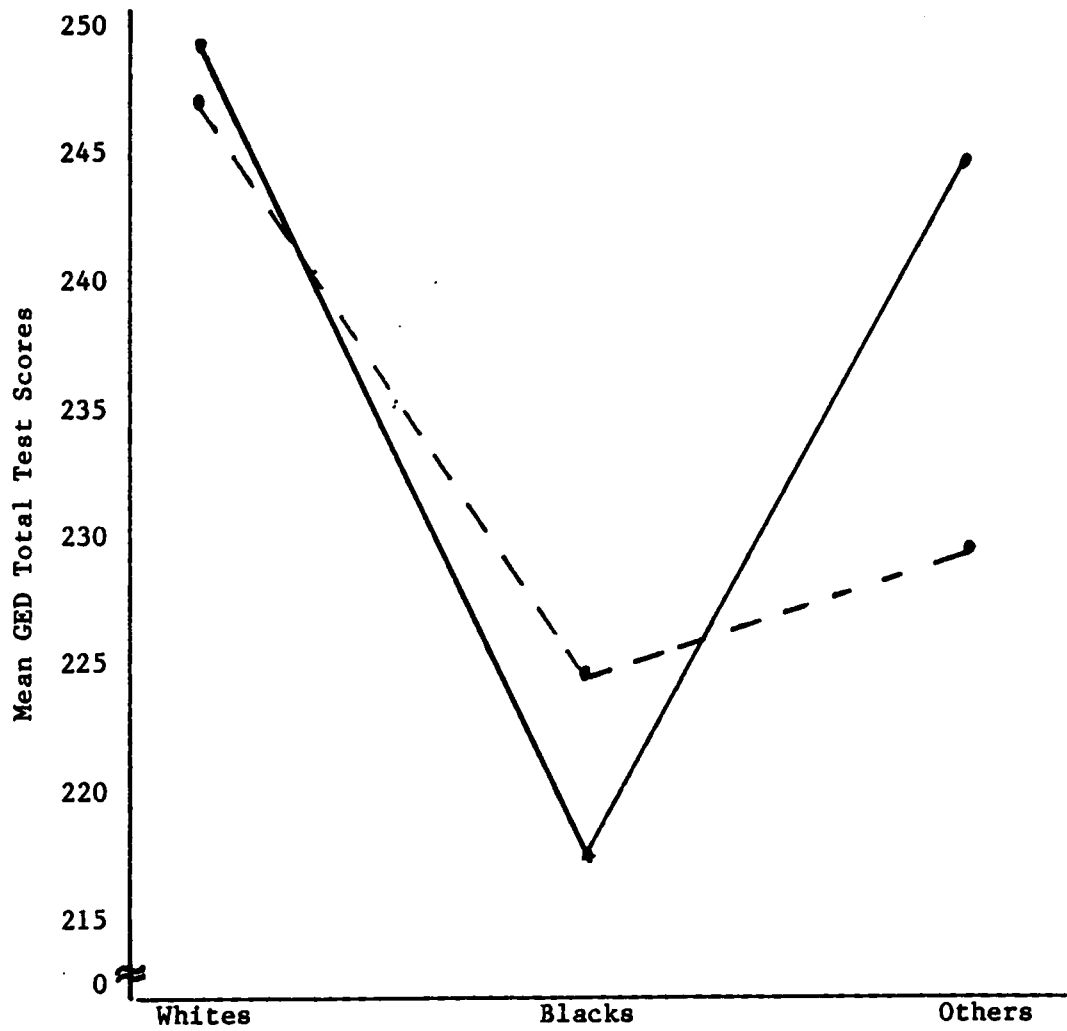


Figure 17
Main Effects of Race and Test Performance

— One Day Testing
- - - Two Half Days Testing

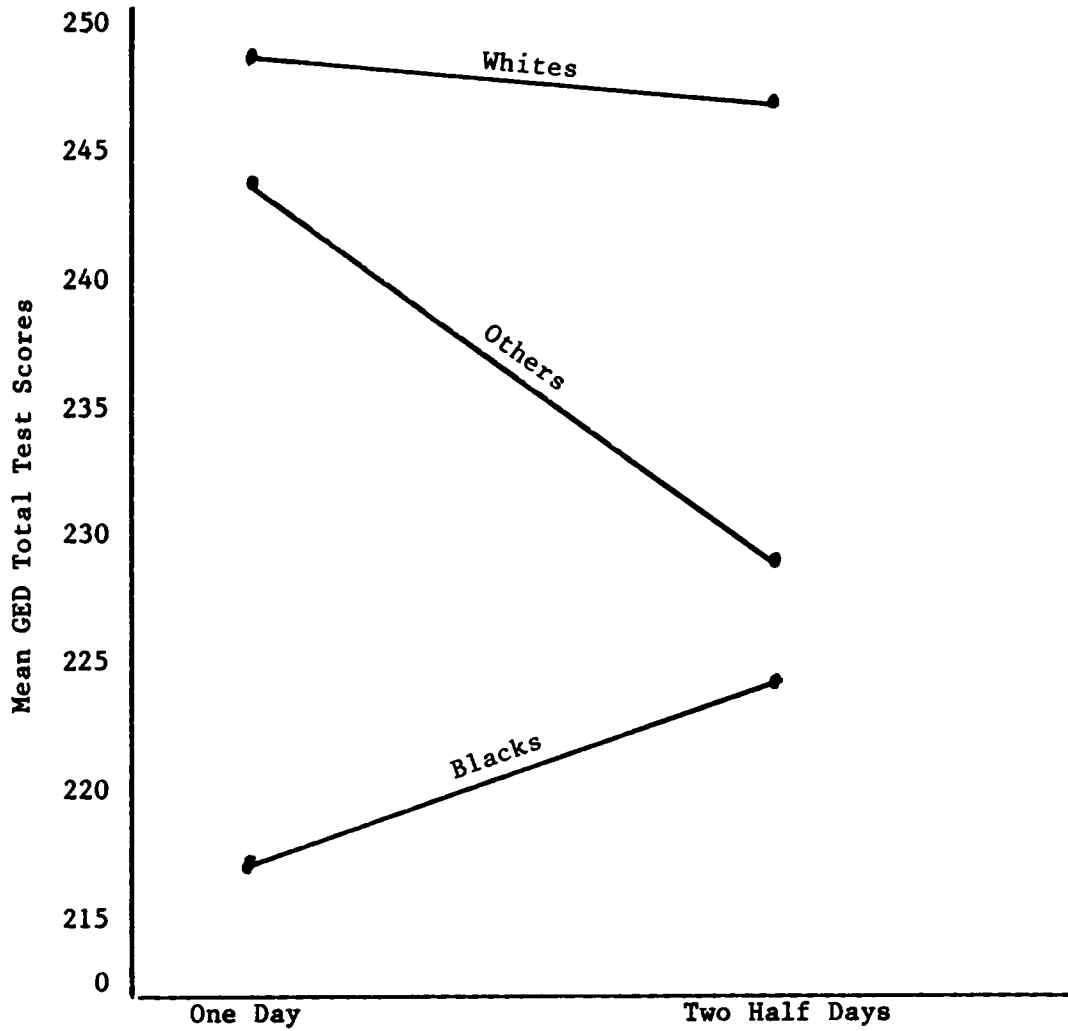


Figure 18
Interaction Effect of Race and Testing Administration Method

an analysis of covariance was employed. Mean reading scores were utilized as the covariate to the mean scores earned by GED examinees on Writing, Social Studies, Science and Math in order to remove any group differences in reading ability. Results of the analyses are presented in Table 19. In all four of the analysis of covariance a statistically significant difference in the scores after adjusting for reading ability was found for the main effects of race and an interaction effect with method of testing administration and race (with the exception of Math where method of testing administration marginally affected test performance); no statistically significant difference was found with method of testing administration.

When comparing main effects after covarying to remove differences in reading scores from the original analysis, the same location, direction and slope were noted. Even after adjusting for differences in reading ability, whites consistently earned higher mean scores in one day testing and blacks consistently earned higher mean scores in two half days testing. A difference occurred with the "others" category. In the original analysis, the "others" scored higher mean scores in one day testing than in two half days testing. In all four subject area tests covaried by Reading scores, the "others" category scored higher mean scores in two half days testing than in one day testing. The main effects of the covariance are not presented graphically. Only interaction effect of method of testing administration and race will be presented graphically for the purposes of this study in order to compare

Table 19. Mean Total Test Scores of Writing, Social Studies, Science and Math Tests Covaried with Reading Scores According to Race and Method of Testing Administration

Source of Variation	df	Sum of Squares	Mean Squares	F	p
<u>Writing Test</u>					
Between:					
Reading	1	62577.385	62577.385	1952.25	.0001*
Method	1	34.616	34.616	1.08	.2989
Race	2	301.538	150.769	4.70	.0092*
Method X Race	2	277.570	138.785	4.33	.0133*
Within (Error)	1599	51254.288	32.054		
<u>Social Studies Test</u>					
Between:					
Reading	1	64762.632	64762.632	2654.37	.0001*
Method	1	22.341	22.341	.92	.3388
Race	2	1213.317	606.659	24.86	.0001*
Method X Race	2	139.133	69.567	2.85	.0500*
Within (Error)	1599	39013.170	24.398		
<u>Science Test</u>					
Between:					
Reading	1	58218.855	58218.855	2055.76	.0001*
Method	1	.432	.432	.02	.9018
Race	2	1026.456	513.228	18.12	.0001*
Method X Race	2	195.138	97.569	3.45	.0321*
Within (Error)	1599	45283.537	28.320		
<u>Math Test</u>					
Between:					
Reading	1	31216.599	31216.599	993.96	.0001*
Method	1	11.369	11.369	.36	.5475
Race	2	1724.820	862.41	27.46	.0001*
Method X Race	2	121.060	60.530	1.93	.1459
Within (Error)	1599	50218.445	31.406		

* $p < .05$

the original interaction with the covariance in order to note any differences in location, direction and slope of the plotted mean scores. The interaction effect of method of testing administration and race are presented in Figure 19 (Writing scores), Figure 20 (Social Studies scores), Figure 21 (Science scores) and Figure 22 (Math scores).

In the original interaction, in both methods of testing administration, whites earned the highest mean scores, with higher scores earned in one day testing; blacks earned the lowest mean scores, with higher scores earned in two half days testing; other minorities earned middle-range mean scores, with higher scores earned in one day testing. The location, direction and slope of the plotted adjusted scores, after removing effects of reading ability, for blacks and whites were consistent in all four subject area tests when compared to the original interaction, with the exception of Writing scores in two half days testing. In this test, whites and blacks earned the same mean scores in two half days testing, changing the slope of the lines somewhat, but not the direction. The biggest difference was noted with the "others" category. The location of scores remained the same as the original interaction with the exception on Math scores. Though this was not significantly different, test performance was marginally affected by method of testing administration for this test, with "others" earning higher mean scores in both methods of testing administration. The most significant difference was with the direction and slope of the plotted adjusted scores when comparing them to the original interaction. In all

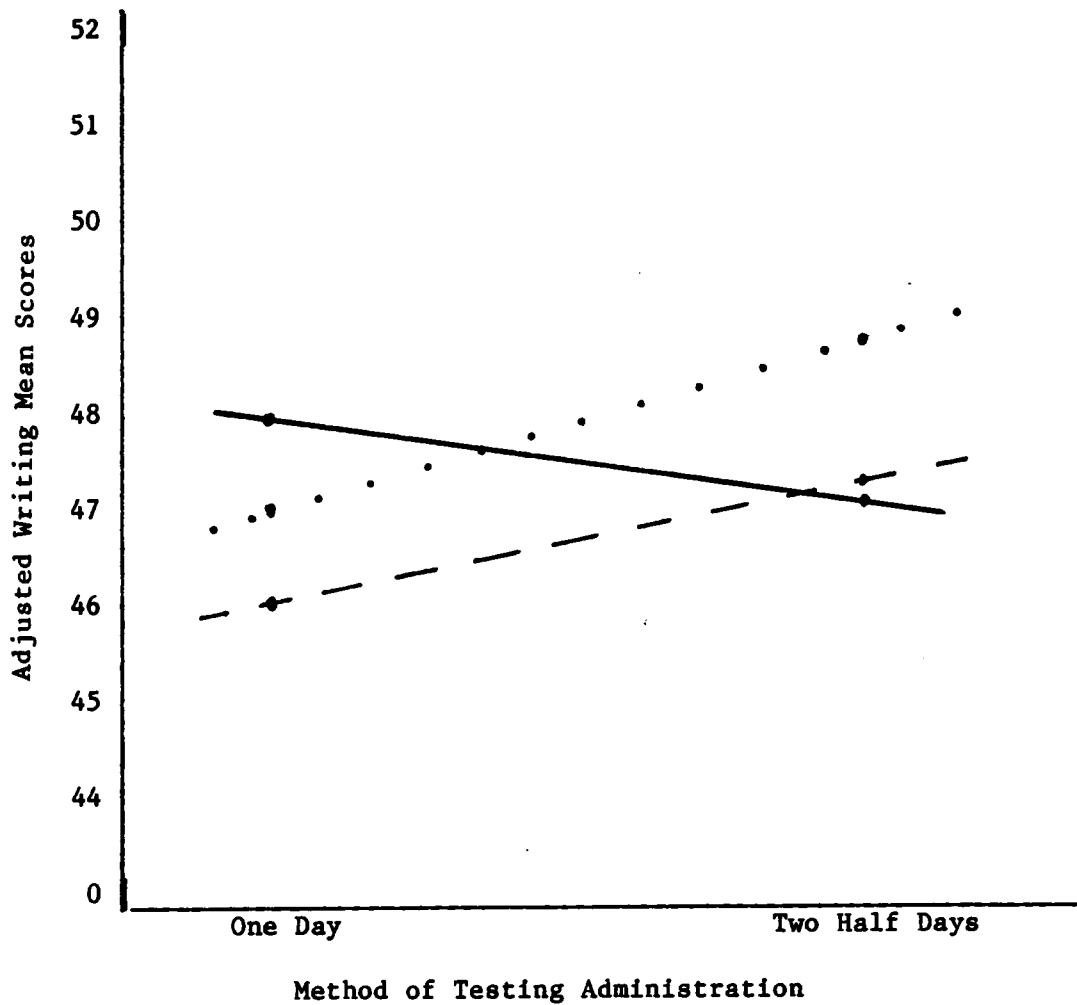


Figure 19
Interaction Effect of Method of Testing Administration and Race
According to Writing Test Scores Covaried with Reading Scores

—— Whites
 ---- Blacks
 "Others"

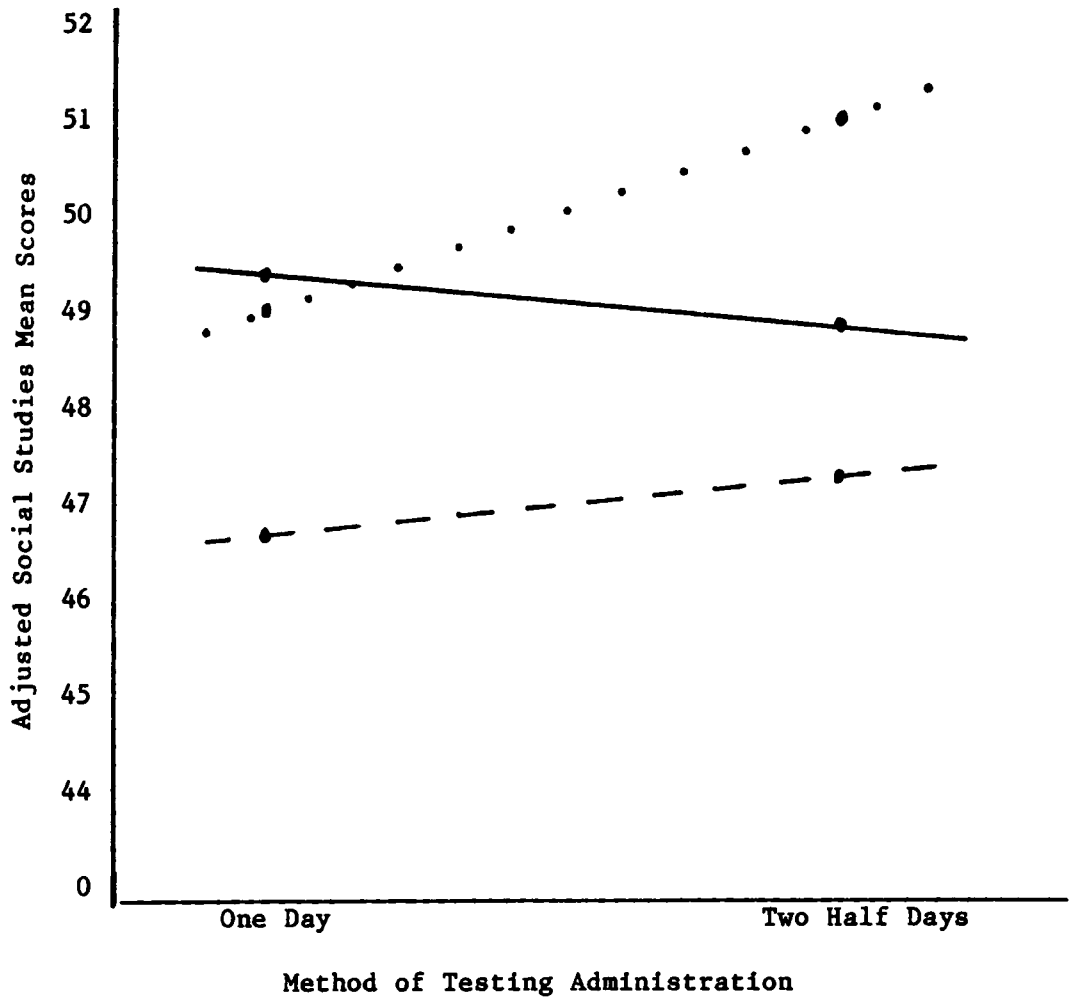


Figure 20
Interaction Effect of Method of Testing Administration and Race
According to Social Studies Test Scores Covaried with Reading Scores

—— Whites
 ---- Blacks
 "Others"

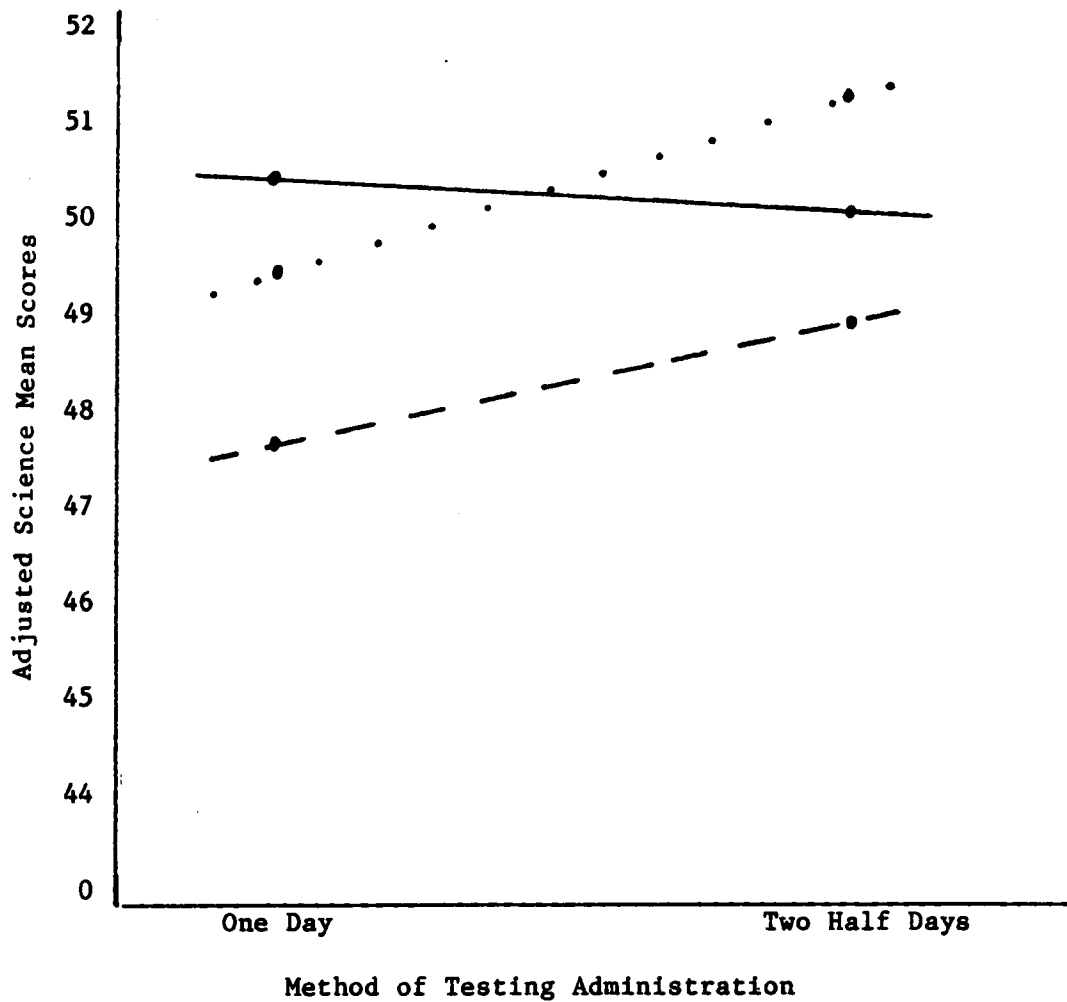


Figure 21
Interaction Effect of Method of Testing Administration and Race
According to Science Test Scores Covaried with Reading Scores

—— Whites
----- Blacks
..... "Others"

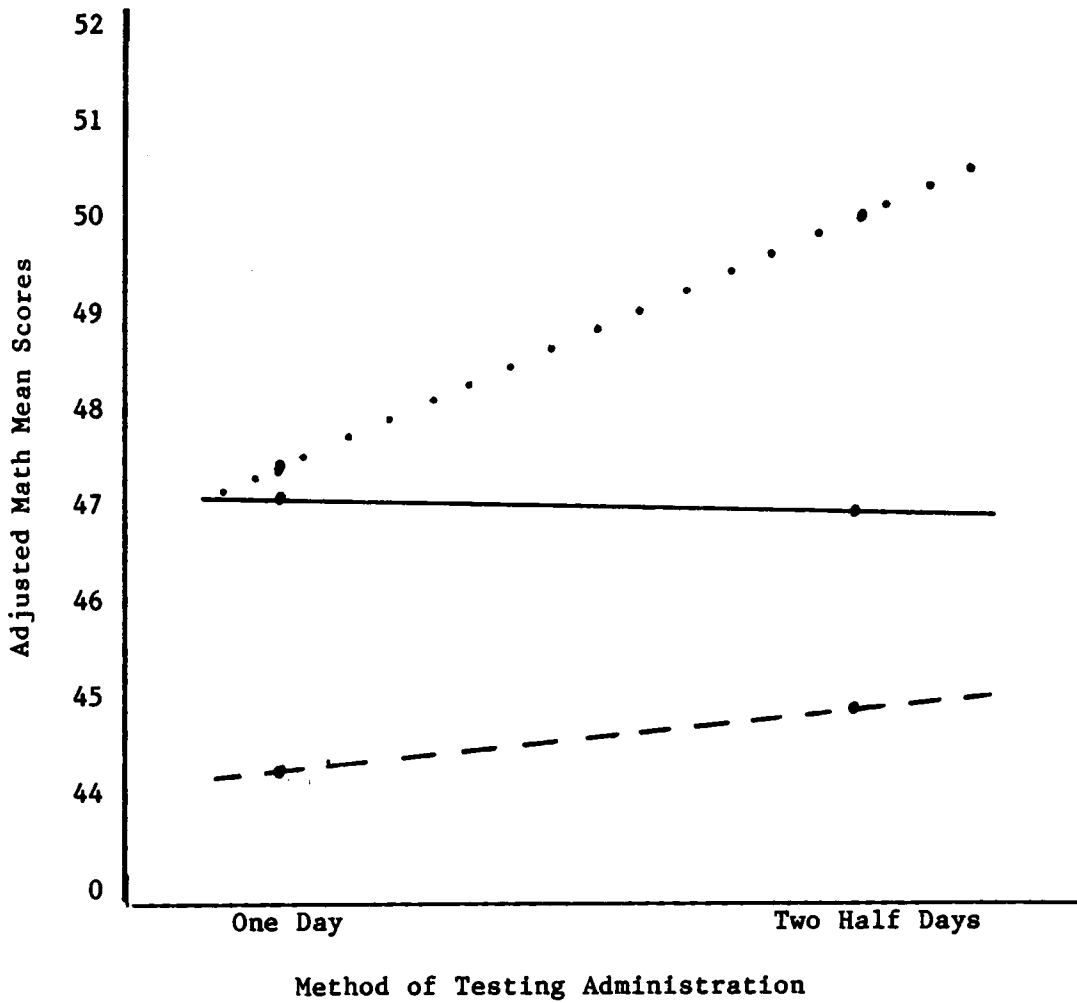


Figure 22
Interaction Effect of Method of Testing Administration and Race
According to Math Test Scores Covaried with Reading Scores

—— Whites
 ---- Blacks
 "Others"

four subject area tests, the "others" scored higher mean scores in two half days testing than in one day testing.

As no difference was found in the direction and slope of the plotted adjusted scores from the original interaction with blacks and whites (with one exception stated), this means that the effects of differences in reading ability between blacks and whites are similar for both testing administration methods. But, since the "others" scores showed a change in direction and slope when mean scores were plotted, this signifies that the GED examinees' reading ability in this category must have something to do with the lower performance in two half days testing in the original interaction. In other words, if the "others" read as well as the whites, this group would probably have outperformed the whites in overall testing performance. Thus, when offering an explanation for the variances in test scores, Cervero's conjecture of differential reading abilities would be rejected for the blacks and whites. However, the "others" category supported his conjecture since the covariance signified that if the "others" had had equal reading ability to the whites, their scores would have been similar.

Results of the statistical test rejected Hypothesis #7. The testing administration method does affect GED performance according to race of the first-time GED examinees. Differential reading abilities does not appear to be an explanation of the differences found for blacks and whites, but it does for other minorities. Other reasons which are

uncertain at this time contribute to this difference. Further research is required to seek additional explanations for the differences found.

GED Performance and Highest Grade Completed

Hypothesis #8 stated: The relationship between the highest grade completed in school and test performance, as indicated by mean total test scores of first-time GED examinees, is not affected by the testing administration method experienced.

Table 15 presents the mean total test scores received by those examinees reporting the highest grade completed in formal schooling. The mean total score increases with each additional grade level completed, with exception of the 12th grade. In one day testing, a 23.917 total point difference can be seen from the highest scores earned by those completing the 11th grade and lowest scores earned by those completing 7th grade or less; a 22.535 total point difference is found in two half days testing with the same two groups.

A 2x6 analysis of variance factorial design was utilized to test this hypothesis. Results are presented in Table 20. No statistically significant difference was found with method of testing administration or interaction effect of testing administration method and highest grade completed. A statistically significant difference was found with the highest grade completed. The post hoc test found that the highest mean scores were earned by those examinees having completed the 10th and 11th grades in formal schooling. The next highest mean scores were earned by

Table 20. Analysis of Variance of Highest Grade Completed and Test Performance According to Testing Administration Method

Source of Variation	df	Sum of Squares	Mean Square	F	p
Between:					
Method	1	15.658	15.658	.01	.9095
Hi Grade	5	96992.269	19398.453	16.00	.0001*
Method X Hi Grade	5	680.319	136.064	.11	.9897
Within (Error)	1594	1932149.395	1212.139		

* $p < .05$

those who had completed the 7th grade or less, 8th grade, 9th grade and 12th grade. This difference is depicted in Figure 23.

The statistical test failed to reject Hypothesis #8. The relationship between the highest grade completed in school and test performance is not affected by the testing administration method experienced by the first-time GED examinees.

GED Performance and Geographical Location

Hypothesis #9 stated: The relationship between geographical location and test performance, as indicated by mean total test scores of first-time GED examinees, is not affected by the testing administration method experienced.

Mean total test scores by geographical location are shown in Table 15. The persons living in suburban areas scored the highest in both treatment groups, scoring 5.262 total points higher in one day testing than in two half days testing. Rural examinees scored 2.671 total points higher in two half days testing than in one day testing. Urban examinees scored 2.184 total points higher in two half days testing than in one day testing.

Results of the 2x3 analysis of variance factorial design utilized to test this hypothesis are found in Table 21. No statistically significant differences were found with method of testing administration or interaction effect of geographical location and method of testing administration. A statistically significant difference was found in GED performance based upon geographical location. The post hoc test revealed

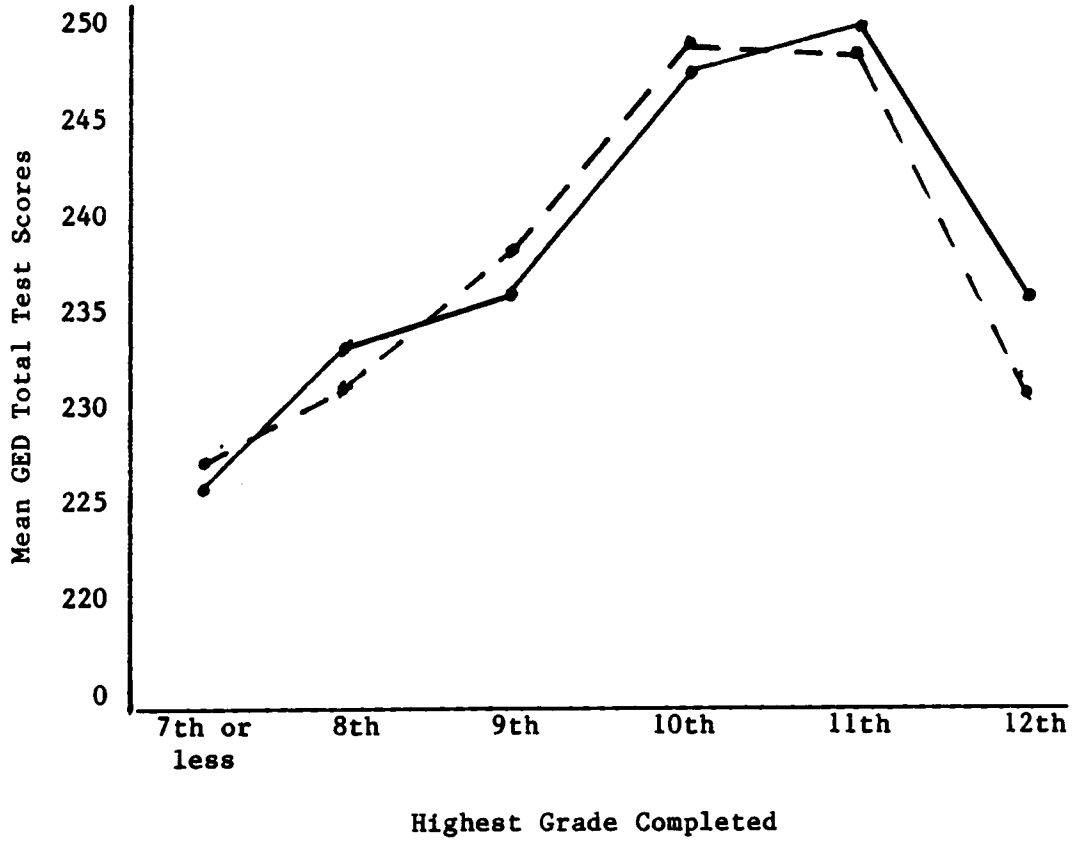


Figure 23
Main Effects of Highest Grade Completed and Test Performance

— One Day Testing
- - - Two Half Days Testing

Table 21. Analysis of Variance of Geographical Location and Test Performance According to Testing Administration Method

Source of Variation	df	Sum of Squares	Mean Square	F	p
Between:					
Method	1	15.658	15.658	.01	.9110
Location	2	18722.928	9361.464	7.47	.0006*
Method X Location	2	5118.243	2559.121	2.04	.1302
Within (Error)	1600	2005980.812	1253.738		

* $p < .05$

that the suburban examinees' average scores were significantly higher than those of urban and rural examinees' average scores. The main effects of geographical location are depicted in Figure 24. Again, though not generally practiced, the plotting of insignificant differences that are close to the confidence levels set at .05 can be most informative and show more clearly an emerging pattern of test performance. If this study had had a more powerful design, this interaction may have been significant. Thus, the interaction effect of method and geographical location is depicted in Figure 25.

The statistical test failed to reject Hypothesis #9. The relationship between geographical location and test performance is marginally affected by the testing administration method experienced by the first-time GED examinees.

GED Performance and Preparation for the GED

Hypothesis #10 stated: The relationship between preparation for the GED and test performance, as indicated by mean total test scores of first-time GED examinees, is not affected by the testing administration method experienced.

Table 15 presents the mean total test scores by preparation choice according to testing administration method. Choice A were those examinees who attended review classes, Choice B were those examinees who participated in self-study, Choice C were those examinees who did nothing to prepare, and Choice D were those examinees who chose both review classes and self-study. In one day testing, the highest mean score was

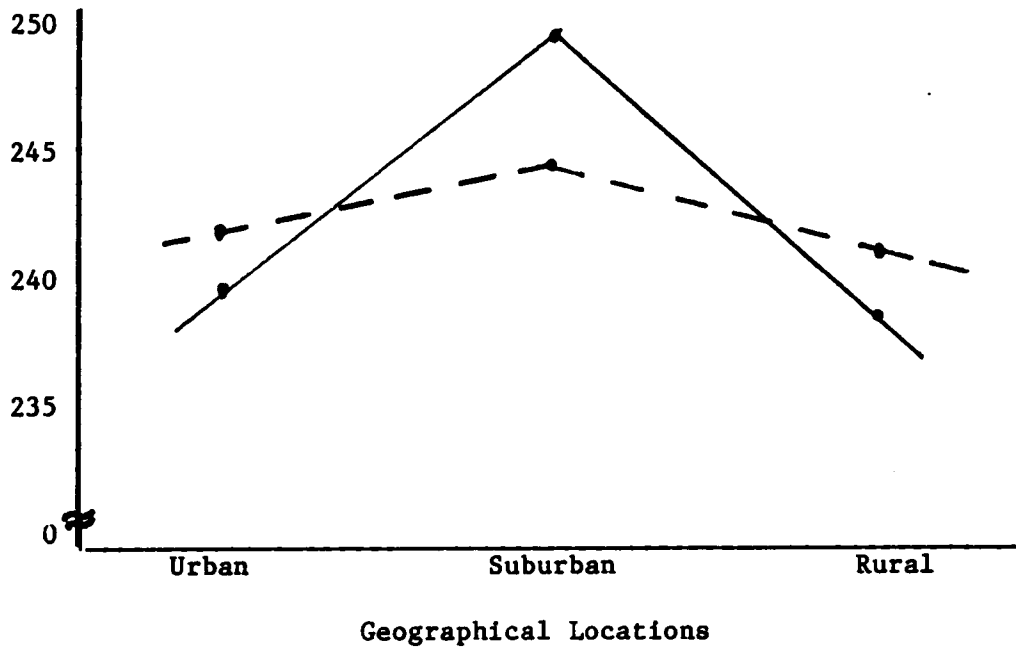


Figure 24
Main Effects of Geographical Location and Test Performance

— One Day Testing
- - - Two Half Days Testing

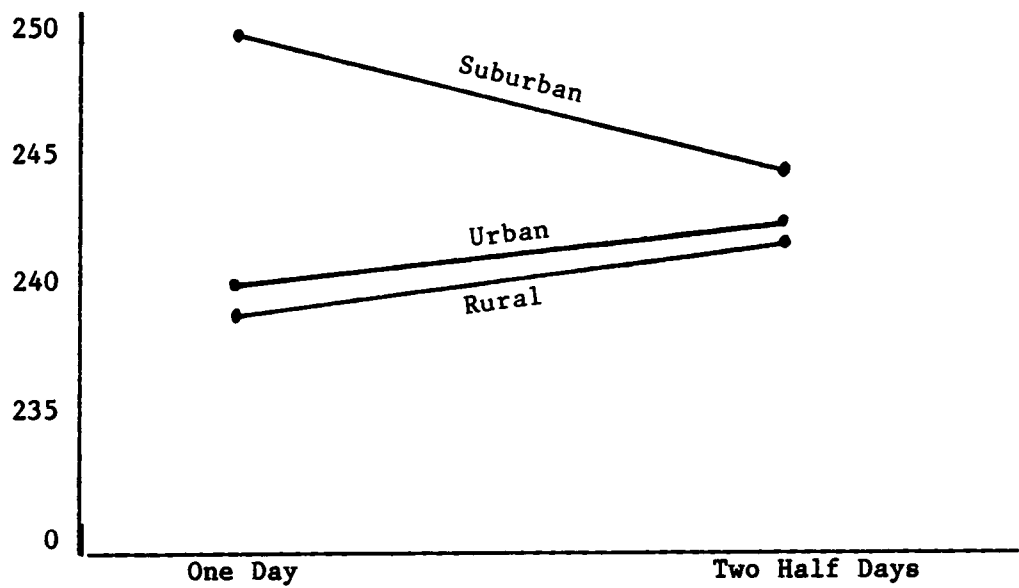


Figure 25
Interaction Effect of Geographical Location and
Testing Administration Method

earned by those who reported that they had done nothing (Choice C) to prepare for the GED tests. This mean score was 32.527 total points higher than the lowest mean score earned by examinees who reported having attended both review classes and participated in self-study (Choice D).

In the two half days testing, the highest mean score was earned by those who reported self-study (Choice B) as a means to prepare for the GED tests. This mean score was 22.340 total points higher than the lowest mean score earned by examinees who chose to both attend both review classes and participate in self-study (Choice D). Though Choice D was the lowest score in both treatment groups, those who reported this choice of preparation earned 6.471 total points higher in two half days testing than in one day testing. Those who chose Choice C in one day testing earned 6.836 total points higher than those reporting the same choice in two half days testing. Those who chose Choice B in two half days testing earned only 1.87 total points higher than those reporting the same in one day testing.

Results of a 2x4 analysis of variance factorial design used to test this hypothesis are found in Table 22. No statistically significant difference was found in either method of testing administration or in an interaction effect of preparation choice and method of testing administration. A statistically significant difference was found in preparation choice. The post hoc test revealed that average scores of those who reported self-study (Choice B) and do nothing to prepare (Choice C) were significantly higher than those who reported attending

Table 22. Analysis of Variance of Preparation Choice and Test Performance According to Testing Administration Method

Source of Variation	df	Sum of Squares	Mean Square	F	p
Between:					
Method	1	15.658	15.658	.01	.9089
Choice	3	112493.436	37497.81	31.35	.0001*
Method X Choice	3	6206.154	2068.718	1.73	.1589
Within (Error)	1598	1911122.393	1195.946		

* $p < .05$

review classes (Choice A). Mean scores of those who reported attending review classes and participating in self-study (Choice D) were significantly lower than the other three preparation choices. Figure 26 depicts the differences found. A marginal difference was found with the interaction effect, though not statistically significant. The emerging patterns can be seen in Figure 27. Again, with a more powerful research design, this interaction may have been significant.

The statistical test failed to reject Hypothesis #10. The relationship between preparation for the GED and test performance is marginally affected by the testing administration method experienced by the first-time GED examinees.

GED Performance and Contents of Preparation Choices

Hypothesis #11 stated: The relationship between content of classes or self-study taken in preparation for the GED and test performance, as indicated by mean total test scores of first-time GED examinees, is not affected by testing administration method experienced.

The mean total test scores for specific content covered in preparing for the GED tests according to testing administration method experienced are presented in Table 15. Of those who attended review classes, the highest mean scores received were by those who studied both subject matter and test-taking skills. The lowest mean scores were received by those who took a class only in test-taking skills. Of those GED examinees who reported to use self-study to prepare for the GED tests, the highest mean scores were obtained by those who took the GED practice

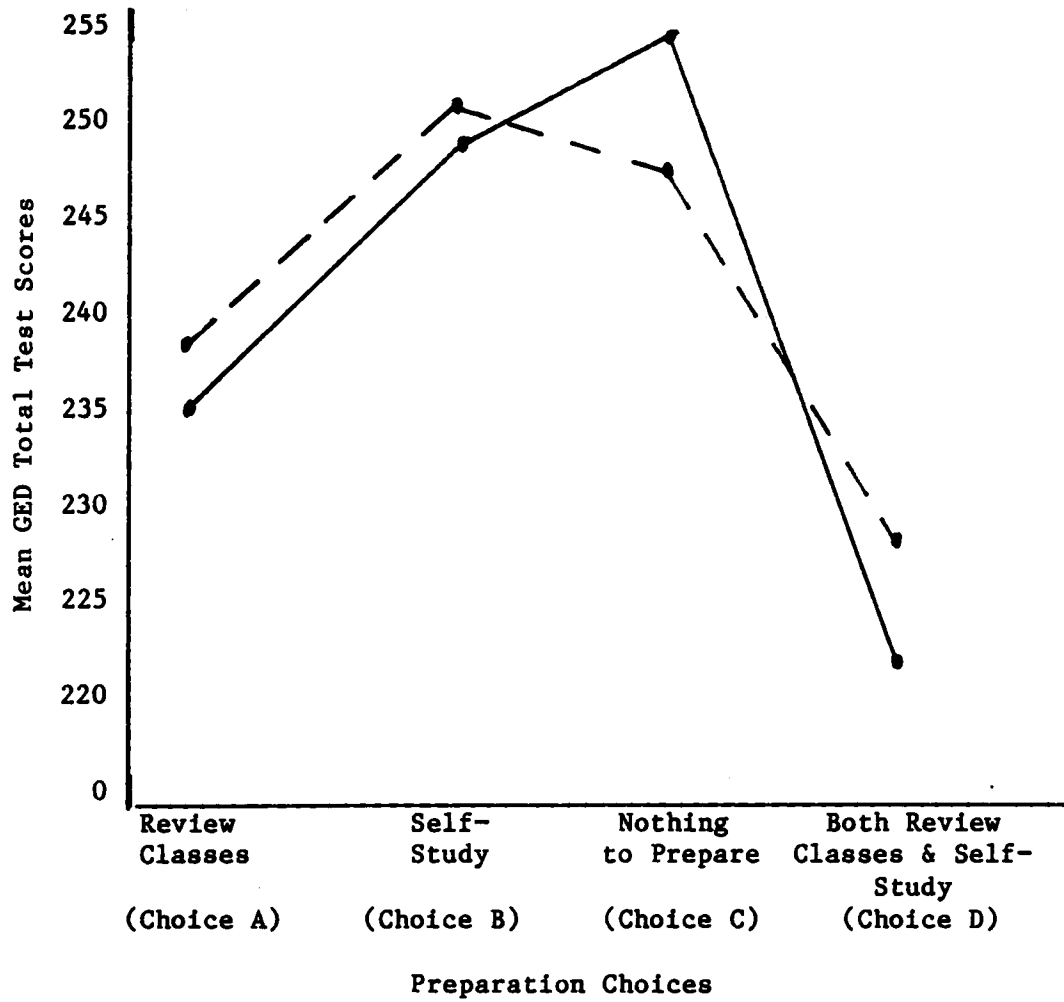


Figure 26
Main Effects of Preparation Choices and Test Performance

— One Day Testing
- - - Two Half Days Testing

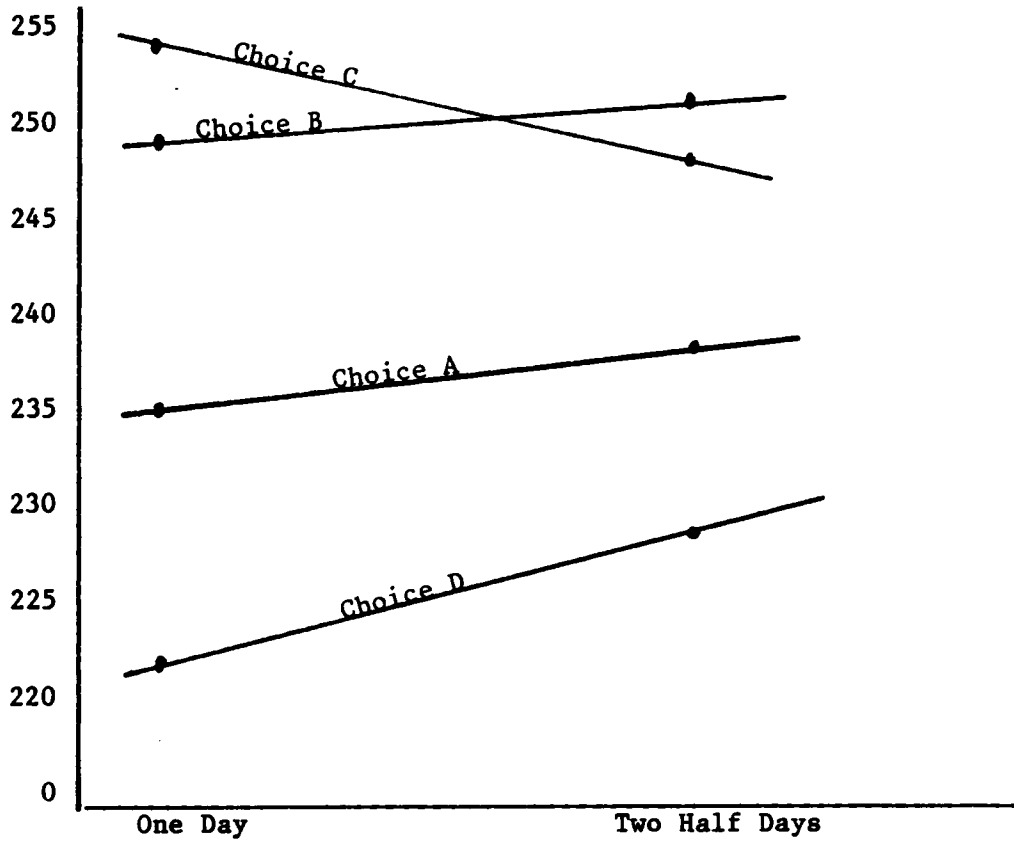


Figure 27
Interaction Effect of Preparation Choice and
Testing Administration Method

tests before taking the GED tests. The lowest mean scores were received by those who chose TV instruction.

A 2x3 analysis of variance factorial design was employed to determine if there was a significant difference in the scores based upon specific content covered in review classes. No statistically significant difference was found either by method of testing administration, content of review class or an interaction effect of content of review classes and method of testing administration. These results are presented in Table 23.

A 2x4 analysis of variance factorial design was utilized to determine if there was any significant difference in specific content covered in self-study. No statistically significant difference was found with method of testing administration or an interaction effect of content of self-study and method of testing administration. A statistically significant difference was found with the content covered in self-study. The post hoc test found that mean scores of those who chose TV instruction were significantly lower than those utilizing books, practice tests or tutor. These results are presented in Table 24 and Figure 28.

The statistical test failed to reject Hypothesis #11. The relationship between content of classes or self-study taken in preparation for the GED and test performance is not affected by testing administration method experienced by the first-time GED examinees.

Table 23. Analysis of Variance of Review Class Content and GED Test Performance According to Testing Administration Method

Source of Variation	df	Sum of Squares	Mean Square	F	p
Between:					
Method	1	1962.245	1962.245	1.75	.1858
Review Class	2	2585.254	1297.627	1.16	.3155
Method X Class	2	1049.552	524.776	.47	.6258
Within (Error)	789	882862.919	1118.964		

p > .05

Table 24. Analysis of Variance of Self-Study and GED Test Performance According to Testing Administration Method

Source of Variation	df	Sum of Squares	Mean Square	F	p
Between:					
Method	1	36.278	36.278	.03	.8626
Self-Study	3	27905.359	9301.786	7.68	.0001*
Method X Self-Study	3	5986.021	1995.340	1.65	.1771
Within (Error)	681	824616.266	1210.890		

* $p < .05$

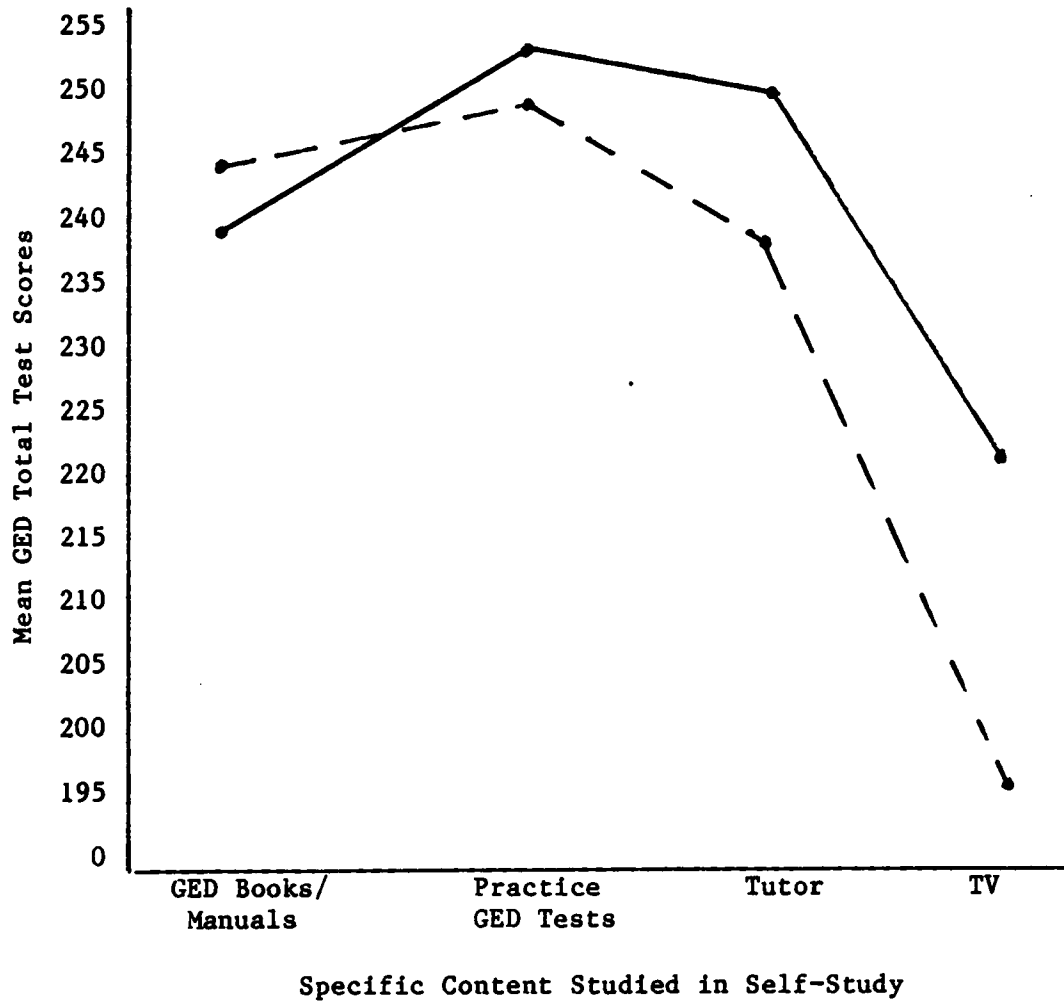


Figure 28
Main Effects of Specific Content Covered While Preparing for the GED
in Self-Study and Test Performance

— One Day Testing
----- Two Half Days Testing

GED Performance and Hours of Preparation

Hypothesis #12 stated: The relationship between number of hours of preparation for the GED tests and test performance, as indicated by mean total test scores of first-time GED examinees, is not affected by the testing administration method experienced.

Table 15 displays the mean total test scores by hours of preparation according to testing administration method. The highest mean score was earned by examinees in both treatment groups who reported they had spent 0 hours in preparation for the GED tests, with the one day testing group's mean score 6.548 total points higher than in the two half days testing group. The next highest mean score was earned in both testing groups was by those examinees who reported having studied 1 to 10 hours in preparation. In one day testing, this score was 5.793 total points lower than the highest score earned, while in two half days testing only .052 total points lower than the highest score earned. The lowest scores earned by examinees in both treatment groups were earned by those who studied over 100 hours. The one day group's score in this category was 7.935 total points higher than the same category in the two half days group.

Results of a 2x8 analysis of variance factorial design used to test this hypothesis are presented in Table 25. No statistically significant difference was found in either method of testing administration or an interaction effect of hours of preparation and method of testing administration. A statistically significant difference was found with

Table 25. Analysis of Variance of Hours of Preparation and GED Test Performance According to Testing Administration Method

Source of Variation	df	Sum of Squares	Mean Square	F	p
Between:					
Method	1	15.658	15.658	.01	.9103
Hours	7	58781.40	8397.3428	6.81	.0001*
Method X Hrs.	7	11066.124	1580.8748	1.28	.2551
Within (Error)	1590	1959974.460	1232.688		

* $p < .05$

the hours of preparation. Much overlapping occurred in significant differences in preparation hours. The post hoc test revealed that mean test scores received by examinees according to hours of preparation were grouped into four categories, where scores for (a) > (b) > (c) > (d). The categories were: (a) 0 hours, 1-10 hours, and 31-50 hours; (b) 11-20 hours, 21-30 hours and 76-100 hours; (c) 51-75 hours; and (d) over 100 hours. These are depicted in Figure 29.

The statistical test failed to reject Hypothesis #12. The relationship between number of hours of preparation for the GED tests and test performance is not affected by the testing administration method experienced by the first-time GED examinees.

GED Performance and Motivations to Take the GED

Hypothesis #13 stated: The relationship between motivations for taking the GED tests and test performance, as indicated by mean total test scores of first-time GED examinees, is not affected by the testing administration method experienced.

Table 15 presents the mean total scores by motivations for taking the GED tests according to testing administration method. For both one day and two half days testing, the highest and next highest scores were earned by those who were motivated to take the GED test for educational admission and personal satisfaction, respectively. In one day testing, those who were motivated to take the tests for educational admission earned 4.678 total points higher than those in two half days testing; those motivated for personal satisfaction earned only 1.198 total points

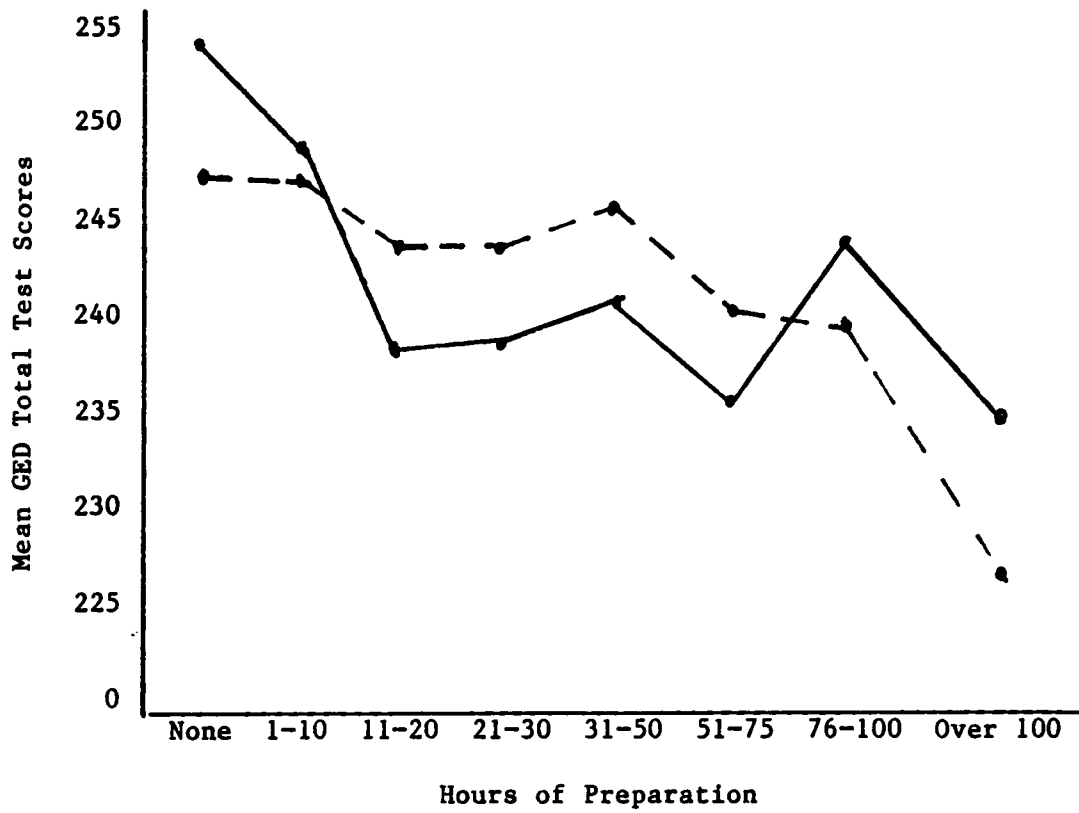


Figure 29
Main Effects of Hours of Preparation and Test Performance

—— One Day Testing
----- Two Half Days Testing

higher in one day testing as in two half days. GED examinees earned the lowest mean scores in one day testing if motivated to take the test for present job requirement. This score was 14.476 total points lower than the same category in two half days testing. The lowest score earned for two half days testing was earned by those motivated for military entrance, but this score was still .739 total points higher than the same category in one day testing.

Results of a 2x6 analysis of variance factorial design utilized to test this hypothesis are presented in Table 26. No statistically significant difference was found either in method of testing administration or an interaction effect of motivations for taking the GED and method of testing administration. A statistically significant difference was found between motivations for taking the GED tests. The post hoc test revealed that scores of those motivated for specific reasons were categorized into three discrete groups. They were: (a) Group 1: educational admission, personal satisfaction and a combination of reasons; (b) Group 2: future job requirement and military entrance; and (c) Group 3: present job requirement. These results are depicted in Figure 30, where mean scores earned by Group 1 > Group 2 > Group 3.

The statistical test failed to reject Hypothesis #13. The relationship between motivations for taking the GED tests and test performance is not affected by the testing administration method experienced by the first-time GED examinees.

Table 26. Analysis of Variance of Motivations for Taking the GED Tests and GED Performance According to Testing Administration Method

Source of Variation	df	Sum of Squares	Mean Square	F	p
Between:					
Method	1	15.658	15.658	.01	.9101
Motivation	5	67397.703	13479.54	10.98	.0001*
Method X Mot.	5	5701.938	1140.388	.93	.4610
Within (Error)	1594	1956722.342	1227.555		

* $p < .05$

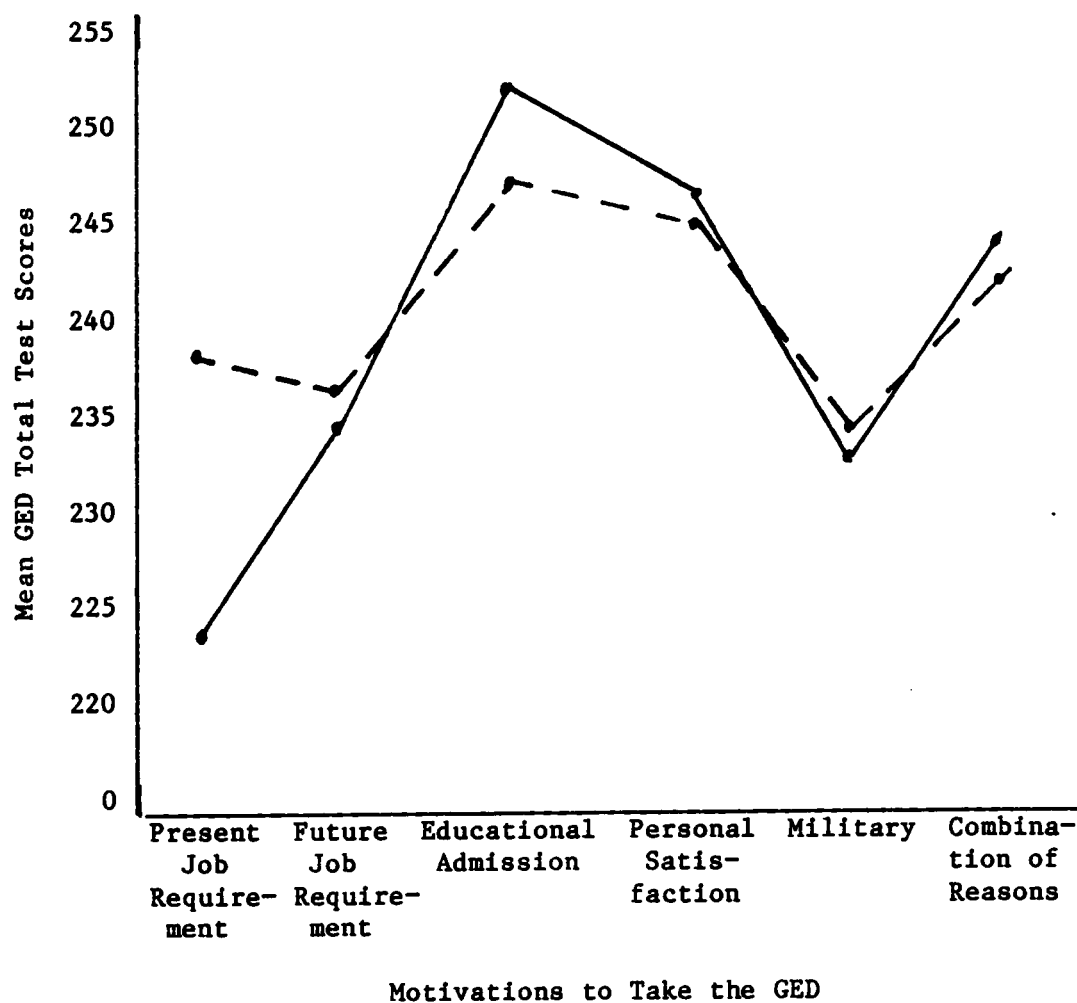


Figure 30
Main Effects of Motivations to Take the GED and Test Performance

— One Day Testing
- - - Two Half Days Testing

Summary

Based on the statistical tests employed in this section, all of the hypotheses posed in this study failed to be rejected, with only one exception. The following can be concluded:

1. There is no significant difference in either overall GED performance or in scores received in the first and second half of testing between those first-time GED examinees who are tested in one day versus those who are tested in two half days.

2. Though a significant difference was found between the relationship of test performance and the independent variables of test sequencing, pass/fail rates, gender according to subtests mean scores, highest grade completed, geographical location, preparation for the GED, specific content covered in self-study, hours of preparation, and motivations for taking the GED tests, no interaction effect was found with each of these independent variables and the method of testing administration experienced. Therefore, the testing administration method experienced by first-time GED examinees does not affect the relationship between test performance and these independent variables, with the exceptions of geographical location and preparation for the GED which were found to be marginally affected.

3. No significant difference was found between the relationship of test performance with gender according to mean total test scores or with specific content covered in review classes, nor any interaction effect between these independent variables and testing administration method.

Therefore, the testing administration method experienced by first-time GED examinees does not affect the relationship between test performance and these two independent variables. A marginal difference was found between the relationship of test performance and age, as well as a marginal difference in the interaction effect of the same. Therefore, testing administration method experienced by first-time GED examinees marginally affects the relationship of test performance and age.

4. The only hypothesis rejected was concerned with the independent variable of race. Not only was there a significant difference found between the relationship of test performance and race, but also with the interaction effect of race and testing administration method experienced. Therefore, the testing administration method does affect GED test performance of first-time GED examinees according to race. However, differential reading abilities cannot be offered as an explanation for the variance in mean test scores according to race.

Prediction of GED Success

This section addresses one of the concerns of this study in asking which of the study's eight independent variables of age, gender, race, highest grade completed, geographical location, preparation for the GED, motivations for taking the GED and test sequencing would be useful in helping predict successful completion of the GED tests?

To answer this question, a stepwise regression analysis was utilized. Results of this analysis are found in Table 27. Five variables (age, gender, geographical location, motivation for taking the

Table 27. Weighted Regression Analysis Showing Percent of Variance Accounted for in Total GED Scores by Selected Examinee Characteristics According to Testing Administration Method

Variable	F	b value	Stepwise Multiple Correlation (R)	Stepwise R ²	R ² Increment
One Day Testing:					
Race	110.38*	29.178	.3268	.1068	.1068
High Grade	52.79*	5.821	.3939	.1552	.0484
Preparation	8.31*	-6.715	.4034	.1627	.0076
Two Half Days Testing:					
Race	51.34*	24.047	.2651	.0703	.0703
High Grade	37.17*	6.194	.3444	.1186	.0483

* p = .0001

GED and test sequencing) were not listed on this table as they did not meet the .2500 significance level for entry into the regression model. Predictor variables were added until they no longer contributed significantly to the prediction of total GED test scores, as determined by calculating an F value. As in one day testing, sex was entered and then removed, as the model was not working with its addition. The F value decreased so that $p > .05$. Preparation for taking the GED tests was entered and then removed from two half days testing, as the F value decreased so that $p > .05$.

The R value signifies the magnitude of relationship between GED total test scores and the variables listed. The larger the R, the better the prediction. This fact is evident also by the R^2 value. The R^2 value, which tells which amount of variance in the GED total test scores can be explained by adding this predictor variable to the equation, signifies how well the model is working.

In one day testing, the three variables of race, highest grade completed, and preparation accounted for 16.28% of the variance in GED total test scores for this testing administration method. Race accounted for 10.68%; the addition of highest grade completed explained 4.84% more of the variance and preparation accounted for .76% more of the variance in GED scores.

In two half days testing, the two variables of race and highest grade completed accounted for 11.86% of the variance in GED scores. Race accounted for 7.03% of the variance, with highest grade completed

explaining 4.8% more of the variance in GED test scores when added to the equation.

Therefore, the variables of race, highest grade completed, and preparation for the GED, as they relate to the testing administration method, will be utilized in the formulation of advisory tables as useful predictors of successful GED completion.

CHAPTER FIVE

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Chapter Five presents a summary of this study, conclusions, and recommendations for further study.

Summary

The purpose of this study was to determine if the method of testing administration (one day vs. two half days) affected test performance, both in overall test performance (total test scores and pass/fail status) and specifically as it related to certain characteristics of the first-time GED examinees, i.e., age, gender, race, highest grade completed, geographical location, preparation for the GED, motivation to take the GED and test sequences experienced. The study also attempted to determine if any of these certain characteristics of the first-time GED examinees would be useful predictors of successful GED completion, the findings which would be utilized in counseling prospective GED candidates.

A review of related literature surveyed three major areas of interest to this study. First, a history of the GED testing program was presented which included an explanation of its usage, the GED test battery and the typical GED examinee. The second section advanced general research conducted concerning adults and test performance on aptitude tests as related to age and intellectual capacity, gender, race, educational level, geographical location, and noncognitive factors of

motivation, relevancy of materials covered on tests, anxiety, speed, cautiousness, and experience in test-taking. The third section addressed research studies conducted with the GED testing program as they pertained to the selected characteristics of GED examinees which were examined in this study. Only two previous studies had dealt with the issue of testing administration method, one day versus two half days. Neither of these studies, however, examined the effect of the method of testing administration on the relationship of test performance and the GED examinee characteristics.

This research study was a replication of Carbol's (1986) study, focusing on the major concepts of his study; however, the research design differed and the study was extended to include whether method of testing administration affected the relationship of test performance and selected characteristics of GED examinees. The research design utilized in this study involved both quasi-experimental and associational or comparative research designs. The independent variables were those selected characteristics of GED examinees and method of testing administration. The dependent variables were the total test scores received on the GED test battery and the pass/fail rate based upon the test scores earned. A description of the population sample was presented in frequency distributions and explanation of the instrumentation, data collection and data analysis were provided.

From the proposed objectives of this study, six research questions and 13 null hypotheses were formulated. These hypotheses were tested by

use of statistical analysis through application of a t-test, multivariate analysis of variance (MANOVA) and/or analysis of variance factorial designs, with post hoc tests utilized when warranted. The significance level was set at .05. Following are the findings revealed from the data analyses.

Population Sample

This sample included the 2,087 first-time GED examinees who attended one of the 43 official GED testing centers in Virginia in November and December, 1987. This number represented 17.7% of the total first-takes in Virginia from January through December, 1987. Of these 2,087, 1,291 tested in one day and 796 tested in two half days. These examinees' scores were utilized when determining overall test performance between the two treatment groups (one day vs. two half days) and when determining if the method of testing administration affected the relationship between test performance and gender.

In all other data analyses, only 1,606 of these first-time GED examinees' scores from 39 testing centers were used, as these were the examinees who had completed the Candidate Data Sheets. This number represented 13.7% of all first-time GED examinees in 1987. Of these 1,606, 925 were tested in one day and 681 were tested in two half days.

From the description of the population sample presented in the form of frequency distributions, based on the numbers given above, the following were findings about the two treatment groups:

1. No significant difference between the composition of the two groups was found with regard to age, gender, race, highest grade completed, hours of preparation before taking the GED, motivation for taking the GED and testing sequences experienced. In both testing groups the following can be stated:

a. Ages of GED examinees ranged from 16 to 66. Mean age for one day testing was 26.85 years with 58.8% being 21 years or over; mean age for two half days testing was 27.59 with 62.7% being 21 years or over; mean age for all 1987 first-time GED examinees was 27.3 years with 64.15% being 21 years or older. The one day examinees tended to be slightly younger and the two half days examinees tended to be slightly older than the total 1987 GED examinees.

b. Approximately 58% of the examinees were females.

c. Racial composition of the sample was 77% whites, 20% blacks, and 3% other minorities.

d. Approximately 60% completed the 10th grade or higher. The mean highest grade completed for one day testing was 9.76 years and for two half days testing was 9.73 years. The mean highest grade completed for all 1987 first-time GED examinees was 9.7, with 60.6% completing the 10th grade or higher. This sample approximated the years of educational level as all of the 1987 GED examinees.

e. The most frequent number of hours spent in preparation for the GED was 1 to 10 hours, with a little over one-fourth of

examinees having spent 1 to 20 hours in preparation and less than one-third of the examinees spending 51 to over 100 hours in preparation.

f. Over two-thirds of the examinees cited personal satisfaction and future job requirement as their motivation for taking the GED tests.

g. The testing sequences (order in which the subtests were taken) experienced by the examinees varied greatly. The sequences most frequently experienced accounted for 14% of the examinees in each group: one day testing experienced Sequence #001 and two half days testing experienced Sequence #118. Sufficient numbers were available in both testing groups for data analysis of only Sequences #001, 015, 020, 022 and 042.

2. A significant difference was found in the composition of the two testing groups according to geographical location and preparation choices for preparing for the GED tests.

a. Though a higher percentage of the rural examinees were found in both testing groups as compared to urban and suburban examinees, a higher percentage of urban examinees were in one day testing and a higher percentage of rural examinees were in two half days testing, with percentage of suburban examinees in both groups being very similar.

b. In preparation for the GED tests, of the 83.46% preparing in one day testing, a higher percentage chose self-study (Choice B),

utilizing GED manuals and/or other textbooks most frequently. Of the 84.88% preparing in two half days testing, a higher percentage chose review classes (Choice A) or a combination of both review classes and self-study (Choice D), mostly studying a combination of both subject matter and test-taking skills and using GED manuals and/or other textbooks. Those examinees opting to do nothing to prepare (Choice C) were about equal in both groups.

3. When comparing this study's sample to the typical GED examinee described in Malizio and Whitney's (1981) national survey, this sample approximated the description of a typical GED examinee according to gender, race, percent of those preparing in some way and in number of hours of preparation for the GED. However, this sample in which all examinees took the English version of the GED tests tended to be older with less educational backgrounds. More examinees in this study chose review classes and self study, while fewer examinees chose doing nothing to prepare for the GED as compared to those reported in the national survey. Also, a much lower percentage of this sample was motivated to take the GED for educational admission and a much higher percentage was motivated for personal satisfaction than those in the national sample.

Findings

Due to the quasi-experimental and ex post facto research design, the following findings are descriptive in nature concerning this sample of GED examinees. Though the two testing groups were quite similar on many of the variables being examined in this study, there may be other

variables on which they are not equivalent. Also, there is no way of knowing if these GED examinees were truly representative of all GED examinees in the State of Virginia or in the United States. No causation is implied with the findings to be presented or any generalizability to the larger GED population will be made. Comparisons, when possible, are made in the conclusions section of this chapter to reveal the consistencies of these findings with related research studies.

The following are the findings of this study:

1. No difference in overall GED test performance was found between those examinees testing in one day versus those testing in two half days.
2. The method of testing administration did not affect the relationship between test sequence experienced and test performance or when looking at the deviation in scores between the first half and second half of testing according to the method of testing administration. Only five test sequences which were most frequently experienced by both testing groups were utilized for analyses.
3. The method of testing administration did not affect the relationship between pass/fail rates and test performance. In both testing methods, 68% passed and 32% failed on their first attempt in taking the GED.
4. The method of testing administration did not affect the relationship of test performance and the following GED examinee characteristics: gender, highest grade completed, specific content covered in review classes and self-study while preparing for the GED,

hours of preparation and motivations for taking the GED. When considering pass/fail rates, these same findings held true, with the addition of two GED examinee characteristics, age and preparation choices.

5. The method of testing administration marginally affected the relationship of test performance and the following GED examinee characteristics: age, geographical location and preparation choices. When considering pass/fail rates, only one of these characteristics as related to test performance, geographical location, was found to be marginally affected by the testing administration method. With these variables, if a more powerful research design had been utilized, the relationship of test performance and these variables may have been found to be affected by the method of testing administration. The emerging patterns seen in each of these variables were as follows:

a. Those examinees aged 15 to 29 received higher mean test scores in the two half days testing, while those aged 30 and above received higher mean test scores in one day testing.

b. Suburban examinees earned higher mean scores and experienced a higher percentage pass rate in one day testing; urban and rural examinees earned higher mean scores and experienced a higher percentage pass rate in two half days testing.

c. The two highest mean test scores in both testing groups were earned by those examinees who chose to use self-study or to do nothing to prepare for the GED, with the examinees in the one day

testing earning higher mean scores than those in two half days when doing nothing to prepare and the examinees in the two half days testing earning higher mean scores than those in one day testing when using self-study. The lowest mean scores were earned by those examinees who both attended review classes and also participated in self-study, with the lower mean score for this choice appearing in the one day testing group.

6. The method of testing administration affected the relationship of test performance and race of the GED examinee. This was also found to be true when considering the pass/fail rates. Whites received the highest mean scores and highest percentage passed in both testing groups. Blacks received significantly higher mean scores and higher percentage passed in the two half days testing. Other minorities received significantly higher mean scores and higher percentage pass rate in one day testing.

7. Though not the major focus of this study, the relationship of test performance and each GED examinee characteristic should be noted. The findings include the following:

a. No significant relationship was found between test performance (total test scores and pass/fail status) and gender on total test scores and specific content covered in review classes while preparing for the GED.

b. A marginal relationship was found with test performance and age. The highest mean test scores were earned by those aged 23 to

39. The next highest mean scores were earned by those aged 15 to 18. The third highest mean scores were earned by those aged 19 to 22. The lowest mean scores were earned by those over 39. No significant relationship was found with test performance and age when considering pass/fail rates.

c. A significant positive relationship was found with test performance and the following GED examinee characteristics: gender on subtest scores, race, highest grade completed, geographical location, preparation for the GED, specific content covered in self-study while preparing for the GED, hours of preparation and motivations for taking the GED tests. These same relationships hold true when considering pass/fail rates. These relationships include the following:

In both testing groups, females outperformed males on the tests of Writing and Reading, while males outperformed females on the tests of Social Studies, Science and Math.

Whites outperformed and passed at a higher percentage rate than did both blacks and other minorities. Other minorities outperformed and passed at a higher percentage rate than did blacks.

An increase in mean total scores and percentage passed were found with each year of formal schooling that was completed, with the exception of the 12th grade. The lowest pass rate was experienced by those examinees who had completed the 7th grade or

less and 12th grade. Those completing the 12th grade performed similarly to those having completed the 8th or 9th grades.

Urban and rural examinees performed similarly, but suburban examinees outperformed and had higher percentage passing than both urban and rural examinees.

The highest mean scores were earned and the highest pass rate was experienced by those who participated in self-study (Choice B) or in doing nothing to prepare for the GED (Choice C). Those attending review classes (Choice A) received the next highest mean scores and percentage passing. Those who attended both review classes and participated in self-study (Choice D) received the lowest mean scores and lowest percentage passing.

The highest mean scores were received by those who took the practice GED tests when preparing in self-study for the GED. The next highest mean scores were received by those who used GED manuals and/or other textbooks or a tutor. The lowest mean scores were earned by those who used TV instruction.

Mean total scores decreased with the increase in number of hours of preparation. Those who prepared 0 to 10 hours passed at a significantly higher rate than those who prepared for 11 to 100 hours. The lowest pass rate was experienced by those who prepared for over 100 hours.

The highest mean scores were received and a higher pass rate experienced by those who were motivated to take the GED for

educational admission or for personal satisfaction. The next highest mean scores and percentage passed were received by those who were motivated for a combination of reasons, future job requirements or for military. The lowest mean scores were earned and the lowest pass rate was experienced by those who were motivated to take the GED for present job requirements.

8. An advisory table was created to aid GED staff in directing individuals to the appropriate testing administration method according to specific GED examinee characteristics. The advisory table shown in Table 28 depicts the GED examinee characteristics which were found to be useful predictors of successful GED completion based upon the variances accounted for by these characteristics in this study's sample. In one day testing, the variables of race, highest grade completed and preparation choice were found to be useful predictors, accounting for 16.28% of the variance in GED total test scores. In two half days testing, the variables of race and highest grade completed were found to be useful predictors, accounting for 11.68% of the variance in GED total test scores. It should be noted that the percentage of variance in test scores accounted for by these GED examinee characteristics is actually very small. When considering the variability in the ability levels of all GED examinees, this advisory table may not be highly accurate for usage in individual cases.

Table 28. Advisory Table for Prediction of GED Success According to Method of Testing Administration Based Upon Results of This Study's Sample

The following selected characteristics of GED examinees tended to earn similar or higher test scores and pass rate:

One Day Testing	Two Half Days Testing
Race: Whites Other Minorities	Race: Whites Blacks
Highest Grade Completed: 7th or less 8th 9th 10th 12th	Highest Grade Completed: 9th 10th 11th
Preparation Choice: Self-Study Nothing	

Recommendation: The GED practice test should be given as a means to assess readiness with regard to each of these variables.

Conclusions

Two major conclusions can be drawn from this study. The first deals with test performance as it relates to the method of testing administration. The overall comparison of test performance (total test scores and pass/fail status) is most informative for those policy-makers who set initial testing policy, both Virginia's GED Administrator with the Department of Education, Adult Services division, and the local GED testing center directors. As scores earned on one day and two half days testing were not notably different, neither method of testing administration is preferable over the other. However, though not significantly different, an interesting pattern emerged concerning the order in which the five subtests of the GED test battery were taken. If the testing center director determines the order in which the GED examinees will take the GED test battery, it should be noted that those examinees who took the Math test first earned higher scores than did those examinees who took the Math test last. The Math test is the most difficult test in terms of specific content covered. If GED examinees select the order in which the five subtests will be taken, the counselor might suggest to them to take the Math test first, based upon the findings of this study.

The second conclusion drawn from this study deals with the predictive usage of certain GED examinee characteristics according to the projected outcome of GED completion. This may also be useful for counselors of prospective GED candidates. In this study, though

accounting for only a small percentage of the variance in test scores, the characteristics of race, highest grade completed and preparation choices for one day examinees and race and highest grade completed for two half days examinees were found to be useful predictors of successful GED completion for this Virginia sample of GED examinees.

Following are specific conclusions that can be drawn from this study and possible explanations for these conclusions which will be useful to policy-makers and counselors of prospective GED examinees.

For Policy-Makers

Three studies have now been conducted on the issue of method of testing administration and how this affects test performance. Carbol's (British Columbia Ministry of Education, 1987) first two studies found a difference in mean test scores of 2.9 total points and .44 total points, respectively. This study found a difference in mean test scores of .44 total points. Though the differences are very small, in all three studies the differences noted favored the one day testing group in outperforming the two half days testing group. Therefore, those GED examinees taking the tests in two half days clearly do not have an advantage over those testing in one day, but in fact, these studies suggest that one day examinees perform slightly better on the average.

Variances in scores may have been the result of many factors not examined in this study. The factors of fatigue, adjusting to pre-exam jitters twice, and having to "settle-in" twice to the testing situation, as suggested by Carbol, may have contributed to the two half days

examinees scoring somewhat lower on the GED tests, even though the scores did not deviate significantly from the first and second half of testing in each testing method. But, whatever the reasons, based upon the findings of this study and in concurrence with Carbol's two previous studies, the issue of method of testing administration, at this time, does not warrant review by the Department of Education--Adult Services in Virginia or by the local GED testing centers. This was also demonstrated in the fact that in both testing groups 68% passed and 32% failed in their first attempts in taking the GED according to the minimum score requirements set by the State of Virginia.

One issue that does warrant further study, however, is that of the order in which the five subject area tests are given, particularly if this sequencing is decided by the testing center director or test administrator of the center based upon the availability of GED test booklets. This study's findings suggested that those examinees who took the more difficult test first, in terms of specific content covered, Math, and ended with the more general skills covered, Reading, earned higher mean test scores than did those who took the Math test last. This finding would suggest that examinees perform better on more difficult material when they are more alert and fresher than after several hours of testing have passed.

For Counselors

Through the use of the attribute-treatment interaction research, matches were attempted with method of testing administration and GED

examinee characteristics. As no other study has ever attempted this, no comparisons can be made at this time of this study's findings with related literature. But, the findings of this study do suggest that the method of testing administration does affect the relationship of test performance and certain GED examinee characteristics.

The most definitive interaction was with the race of the GED examinee and method of testing administration. As with Cervero's (1983) study, this study found that whites outperformed other minorities and blacks; other minorities outperformed blacks. Whites and other minorities performed better in one day testing, while blacks performed better in two half days testing. These findings, however, should be viewed with caution due to the research design utilized in this study. Factors associated with race, such as ability levels of the GED candidates, highest grade completed, preparation for the GED and motivation to take the GED, were not examined. Other possible reasons to explore might include socioeconomic status, attitudes towards education and testing based upon past experiences (positive or negative), employment status and type of job held or experiences encountered since leaving formal schooling (training programs, influences of family, community involvement, self-improvement activities, frequency of reading, keeping abreast of current events and of use/disuse theory).

The only explanation available for this difference advanced by Cervero (1983) in explaining the variance in test scores according to race was due to differential reading abilities. With this Virginia

sample of GED examinees, part of the original interaction was not accounted for due to differential reading abilities. Cervero's conjecture was rejected for blacks and whites as the reading ability differences were similar for these races, but was supported by the "others" category. The statistical test signified that if the "others" had had equal reading ability to the whites, their scores would have been similar. The definitive explanation for the variances in scores according to race is unclear at this time and additional research is required to address this issue more thoroughly.

The relationship of test performance and three other GED examinee characteristics was found to be marginally affected by the method of testing administration. These included age, geographical location and preparation choices when preparing for the GED.

With age, though no statistically significant difference was found, an interesting pattern emerged with this GED sample. It had been suggested that older adults may require more than one session when testing due to a fatigue factor, but in this study those aged 30 and above received higher mean test scores in the one day testing group, while those under 30 years old earned higher scores in two half days testing. The overall findings of this study are consistent with the longitudinal studies which concluded that middle-aged and older adults can perform as well as younger adults on aptitude tests due to their stability in intellectual capacity. As to why those over 30 performed better in one day and those under 30 performed better in two half days

can only be speculative at this time. For whatever reason, overall, it can be stated from this study's findings and in concurrence with many GED studies, that age is not a deterrent to GED test performance. All ages eligible for GED testing should be encouraged to take the GED tests, in whatever method of testing administration.

When considering the geographical location of the GED examinee, the suburban examinee scored higher in both testing groups than did their urban and rural counterparts, with suburban examinees earning higher scores in one day testing and urban and rural examinees scoring slightly higher in two half days testing. It was proposed at the beginning of this study that if a difference occurred, it could be related to the fact that each location provides varying resources and experiences for examinees which might affect their continued educational growth. An explanation of why suburban examinees should score higher in both testing groups is not clear at this time. Without available data or previous research findings to rely upon for possible explanations, more research is needed in this area. Possible reasons to explore might include the level of affluence of suburban individuals as compared to urban and rural individuals which would be linked to job opportunities, home and community environments and/or aspirations of these individuals.

The effect of the choice of preparation for the GED is also a difficult factor in which to offer an explanation for the marginal difference found. In this study, those who chose to participate in self-study or do nothing to prepare for the GED earned higher scores than did

those who attended review classes or who chose to both attend review classes and participate in self-study. This difference may be explained based upon what is known about adults in embarking upon learning activities. They are motivated according to their perceived needs and interests. It would seem logical to assume that only those individuals who felt a need for some type of review before attempting to take the GED would attend classes or initiate some type of self-study. The utility of preparation activities is difficult to ascertain as there are no pre-tests given when individuals begin preparation. Therefore, there is no way of knowing how much knowledge or skills are gained through any type of participation. Those who prepared in some way could very possibly have earned higher scores than what they would have obtained if not preparing in some way. Those individuals earning higher scores may have possibly possessed higher ability levels before embarking upon any type of preparation. The same could be said for those who chose not to prepare at all. Thus, it can only be speculated that preparation activities do conditionally help some GED candidates dependent upon their pre-preparation ability. Individuals already high in ability will not be helped to the same degree as those individuals with lower ability.

Though the method of testing administration did not affect the relationship of test performance and hours of preparation, it can generally be stated that those who earned the higher scores actually spent less time in preparation. Logically, the more capable or skilled individual would need fewer hours of preparation time in order to prepare

for the GED. Even individuals beginning at the same level, functioning at a pace comfortable and convenient for them, would differ in the amount of time needed to reach the same goal.

From this sample, the most useful learning activity experienced when attending review classes was in studying both subject matter and test-taking skills. In self-study, those who chose to take the practice GED tests earned higher scores in both testing groups, possibly due to acquainting themselves with the format utilized in the GED test battery. The lowest performance was seen by those utilizing TV instruction. However, this finding should be noted with caution as these results are based on a very small number of GED examinees choosing this type of preparation activity.

The method of testing administration did not affect the relationship of test performance and the remaining GED examinee characteristics examined, but a relationship was found with some of these characteristics and test performance. Possible explanations for these relationships should be stated so that counselors will be aware of their existence. These characteristics included gender, highest grade completed, content of preparation choices, hours of preparation and motivation for taking the GED. Content of preparation choices and hours of preparation have already been addressed. The following can be stated on the remaining relationships:

1. This study found, as did previous research, that males and females perform equally well on total test scores, but higher scores were

earned by females on the tests of Writing and Reading and higher scores were earned by males on the tests of Social Studies, Science and Math. Explanations that might be offered for these findings may be due to differential socialization of the sexes, different high school course selection by males and females, innate abilities possessed, or the confidence level of males and females with regards to certain subject matter.

2. This study found, as did previous research on adults and aptitude tests and some GED studies, that the more formal schooling completed by the GED examinee the higher mean test score received. The only exception with this study were those scores earned by those who had attended the 12th grade. The difference found with those having attended the 12th grade may have been due to several reasons: reporting error by the GED examinee, social promotion experienced by those examinees, generation in which those examinees attended school, attitudinal problems of these examinees concerning education which may have led these individuals to becoming a major disciplinary problem and possibly being dismissed from school before completing the 12th grade.

3. The highest mean scores were earned by those examinees who were motivated to take the tests for educational admission or for personal satisfaction. In previous studies, the highest mean scores were earned by those motivated for personal satisfaction. In this study, this motivator ranked second in highest mean scores earned. The next highest mean scores were earned by those motivated for a combination of reasons,

future job requirements or for the military. The lowest mean scores were earned by those motivated for present job requirements. A possible explanation offered for the higher mean scores earned by those motivated for educational admission may be due to those individuals being self-directed, having set a goal for higher educational opportunities, but could not do so until receiving a high school equivalency certificate; thus, these examinees were highly motivated to succeed. Higher scores earned by those motivated for personal satisfaction, rather than other motivators, might be presumed due to these individuals experiencing less anxiety and pressure to perform when the outcome was not job-related. The low mean scores earned by those motivated for present job requirements possibly was due to anxiety. Those examinees in this category possibly felt a deeper feeling of desperation than did other examinees motivated for other reasons. The threat of the loss of a paycheck certainly could bring about this type of debilitating anxiety. Other explanations can be offered for these differences, but they are not apparent at this time.

4. The advisory table presented in Table 28 was based upon the findings of this study. Those GED examinee characteristics useful as predictors of successful GED completion in one day testing included race, highest grade completed and preparation choice and for two half days testing included race and highest grade completed. The inclusion of race was the only characteristic which concurred with previous research studies as a valid predictor. Other research studies have cautioned

about the use of highest grade completed and preparation choices. Though these were included in this study's advisory table, it should be noted that the percentage of the test score variance accounted for by these GED examinee characteristics was actually very small. When considering the variability in the ability levels of all GED examinees, this advisory table may not be highly accurate for usage in individual cases. As this advisory table may not be generalizable to the entire GED population in the State of Virginia, its formulation does suggest to counselors that such tables might be effectively developed and utilized in individual testing centers as a useful counseling tool when advising prospective GED candidates.

From the above discussion, it is apparent that counselors do indeed have a vast array of characteristics to consider when counseling prospective GED candidates. A need for more effective counseling services can be reflected when viewing some of the very low scores received on the GED tests in this sample and when comparing the percentage failed to the 1987 failure rate for the GED testing program. This sample experienced a 32% failure rate as compared to the overall 1987 failure rate of 26%. Counselors should be encouraged to evaluate their current screening procedures and if these procedures do not currently take into account the characteristics examined in this study, then these should be incorporated. GED examinees should also be encouraged to take the practice GED tests as an indicator of their readiness to take the GED.

Recommendations for Further Study

1. This study utilized a quasi-experimental research design. This study should be replicated utilizing an experimental design in the State of Virginia and in other parts of the United States for validation of its findings.

2. The new version of the GED test battery to be introduced in 1988 will have 45 minutes added to the current six and three-quarter hours of testing administration time due to the addition of a writing sample. Additional studies should be conducted to determine either if (a) this longer testing administration time would depress the test performance of one day examinees, or if (b) this additional time would have no effect on test performance since sufficient time limits have been set for the completion of the writing sample.

3. Other methods of testing administration, other than one day and two half days, are utilized in giving the GED tests, i.e., taking one subject area test at a time or taking no more than two subject area tests at a time. Additional studies should be conducted to include all methods of testing administration to determine if these methods affect overall test performance.

4. Further research is required to investigate explanations for the diverse variances in total test scores according to the GED examinees' race. Previous research had offered differential reading abilities as the contributing factor, but this was found to be only partially true with this Virginia sample of GED examinees.

5. Additional research focused specifically on preparation for the GED tests and hours of preparation is needed to clarify the benefits of GED preparatory programs and self-study aids. Readiness to take the GED tests is an important factor when considering the variance in GED test scores.

6. Counselors might consider conducting research on the GED examinees attending their local testing centers in order to obtain insights about the audience that they are currently serving. This would aid them in evaluating present screening procedures and/or in developing advisory tables which would be more suited to their clientele.

7. Other characteristics of GED examinees not addressed in this study could be useful predictors of successful GED completion. Additional studies might include such characteristics as reading ability levels, aptitude, personality or attitudes of GED candidates, anxiety level of examinees, or number of years since leaving formal schooling. These could further assist counselors and teachers in advising GED candidates as to their readiness to take the GED.

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APPENDIXES

Appendix A

Introductory Letter to Testing Center Directors



COMMONWEALTH of VIRGINIA

DEPARTMENT OF EDUCATION
P.O. BOX 80
RICHMOND 23216-2060

September 23, 1987

MEMORANDUM

TO: GED Chief Examiners

FROM: Lennox L. McLendon, Associate Director of Adult Education
C/L Claiborne R. Leonard, Virginia GED State Administrator

Subject: GED Research Study

The State of Virginia has been chosen as a research site for an interesting study in regards to our GED Testing Program. The study is focusing on policy-making decisions as to the testing administration method utilized in administering the GED tests. Many questions have been asked, such as; Is it best to administer the tests in one sitting or more? Does age make a difference in examinee performance if given in more than one sitting? Does the order in which an examinee takes the tests make a difference in performance? This study should provide information to help in making decisions concerning test administration.

Your participation and cooperation is crucial in obtaining the necessary data for this study. You are requested to have each examinee who is taking the tests for the first time to complete a data sheet (sample enclosed). Data will be collected during your scheduled testing dates in November and December, 1987. These data sheets will be provided for you about mid-October for use in November and December. Your assistance in aiding the examinees in completing this form and their collection is of utmost importance to the study.

Sue Jones, former Program Director of the Planters Employee Training Program, Suffolk, Virginia will be conducting this study. Its findings will be invaluable to us as Chief Examiners as well as to the GED Testing Service.

Additional information will be coming about mid-October. We look forward to participating in this research study. Knowing your interest in adult education, we know that we can count on your full cooperation.

Appendix B

Implementation of Study Letter and Instructions to
Testing Center Directors

COMMONWEALTH of VIRGINIA

DEPARTMENT OF EDUCATION

P.O. BOX 50

RICHMOND 23216-2060

October 19, 1987

TO: GED Chief Examiners

FROM: Lennox L. McLendon, Associate Director
Adult Education Service
Claiborne R. Leonard, Virginia's GED Administrator

SUBJECT: GED Research Study

In our memo of September 23, 1987, you were informed of a GED study in which Virginia will be participating this school year. We agreed to the study because it would not take a lot of extra time for the GED Chief Examiners. Data is to be collected from each GED examinee who takes the test in November and December, 1987. Enclosed you will find the following:

1. Specifications Sheet
2. Directions for completing Candidate Data Sheets
3. Candidate Data Sheets (if you have not received enough copies, please duplicate these so that all GED examinees will complete a form.)

When you send the answer sheets in each time, please return the Candidate Data Sheets for those examinees in the same package. We hope to have collected all of these by December 31, 1987.

We again appreciate your cooperation and participation in this study. Be looking for the research findings to be reported in the AEE Newsletter. Also, the results will be published as a GEDIS Research Brief, so we will be looking forward to receiving this as well.

We're very excited about being a part of this research study. We again thank you for your assistance, for you, as chief examiners, are the key resource person for securing information for this study.

Appendix B (continued)

SPECIFICATIONS SHEET

RATIONALE

As it is impossible for the researcher of this study to be present at all testing centers on all specified testing dates, the testing center director or testing administrator plays a very critical role in the implementation of this study. He/she can assure that testing procedures, as outlined by the General Educational Development Testing Service and the Virginia Department of Education, be followed to assure standardization of testing administration throughout the state of Virginia. This is of utmost importance due to its effect on the final study's findings.

Realizing the integrity of the GED Testing Program, as well as the dedicated and experienced professionals employed in Virginia to oversee this program, this Specifications Sheet may appear to be redundant and unnecessary. But, as this matter of testing administration is of dire importance as a control factor in this study, please review and/or take note of the following guidelines listed below so that the testing in November and December, 1987, is standardized throughout the state. The guidelines listed below are the same guidelines addressed and emphasized in the "Handbook for Administration of the Virginia Educational Development Testing Program."

REFERENCE: GED Examiner's Manual
January, 1987 Edition

Beginning on page 32 through page 39.

Section 6 Test Administration- Procedures under Standard Conditions

- 6.1 Admission to Testing
- 6.3 Test Environment
- 6.4 Special Note on Timing
- 6.5 INSTRUCTIONS FOR TEST ADMINISTRATION
 - 6.51 Preliminary Steps to be Taken Prior to Test Administration
(beginning with third paragraph)
 - 6.52 Administration Instructions
(In addition: Have Candidate Data Sheet completed)

For test sequencing, if at all possible (considering number of Test Formats available for number being tested), please follow the sequence as numbered in the Manual as follows:

- TEST 1 Writing Skills
- TEST 2 Social Studies
- TEST 3 Science
- TEST 4 Reading Skills
- TEST 5 Mathematics

Appendix C

CANDIDATE DATA SHEET

DATE:

LAST NAME:

TESTING CENTER CODE:

SOCIAL SECURITY NO.: - -

I. TESTING ADMINISTRATION

1. Please list the names of the tests in the order that you completed them:

1st Test

2nd Test

3rd Test

4th Test

5th Test

2. I am taking all five tests in: (please circle one answer)

One day

Two half days

Other arrangements were made

3. Test edition used: English

Spanish

French

Special edition (please specify)

II. DEMOGRAPHICS (please circle one answer)

1. Sex: Male

Female

2. Racial Background: White

Asian

Black

Other (please specify)

Hispanic

3. Highest Grade Completed in School: 5th or less

9th

6th

10th

7th

11th

8th

12th

4. Are you wearing glasses to take the GED tests? YES

NO

5. Age: (please write in number)

6. Geographical Location: Circle the best answer to describe the area in which you live:

Urban

Suburban

Rural

(Continued on back side of paper; please turn over and complete the second side.)

Appendix C (continued)

III. PREPARATION FOR THE GED TESTS

1. Below are listed three choices; place a check mark by the choice that best describes your method of preparing for the GED tests. Then answer any question that might follow.

Choice (a): I attended a review class

In this review class, I studied the following: (check as many as apply)

..... writing	..... social studies
..... science	..... reading
..... mathematics	..... test taking skills

Choice (b): I did not attend any review class, but studied on my own.

In studying on your own, which of the following did you use? (check as many choices as apply to your preparation)

..... studied from GED book or manual	..... worked with a tutor
..... took GED Practice tests	..... TV instruction
..... other means (please specify)	

Choice (c): I did nothing to prepare for the GED tests.

2. About how many total hours did you spend preparing for the GED tests?
(Estimate as closely as possible; check only ONE answer)

..... Over 100 hours	..... 20-30 hours
..... 76-100 hours	..... 11-19 hours
..... 50-75 hours	..... 1-10 hours
..... 31-49 hours	..... NONE

IV. REASONS FOR TAKING THE GED TESTS:

1. What is your MOST IMPORTANT reason for taking the GED Tests?
(check only one choice)

..... Present job requirement	..... Own personal enrichment or satisfaction
..... Future job requirement	..... Military requirement
..... Educational Admission requirement	..... Other (please specify)

NOTE OF THANKS: Thank you for answering these questions. Your cooperation and participation are greatly appreciated.

Appendix D

DIRECTIONS FOR COMPLETING THE
CANDIDATE DATA SHEETS

*****Please assure all GED examinees that this information will be held in the strictest of confidence and also the purpose of this sheet. Their cooperation in completing this form is greatly appreciated and their participation is of utmost importance not only to the Virginia Department of Education, but also to the GEDTS.

DIRECTIONS

If any of the GED examinees is currently serving in a full-time active military capacity, please ask them to put a "M" in the top right-hand corner of this form.

I. Testing Administration

1. Please direct the GED examinees to write the names of the tests in the order in which they will be administered.

Important

If all students are not taking them in the same sequence due to insufficient number of tests, please be sure that this question is completed accurately.

2. Test Administration Method: Direct students to circle only one.
3. (same)

II. DEMOGRAPHICS

Questions 1-6 are self-explanatory. If anyone needs clarification on the differences in the geographical locations, please help them on this one. Their name and social security number is needed only for score identification; it will not be utilized or written for any other reasons.

III. Preparation for Tests

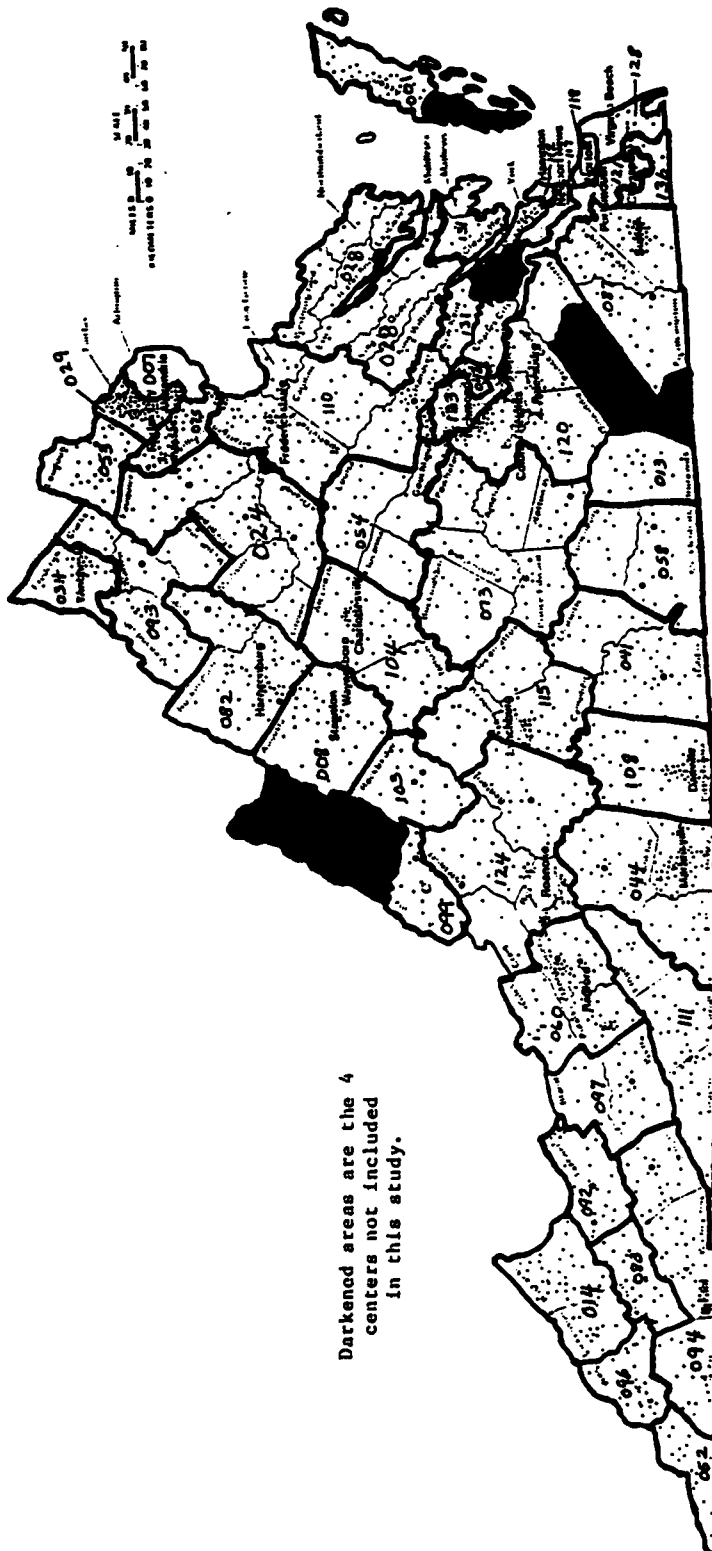
You notices that this question has three choices. Please only choose one choice, A, B, or C.

If you check Choice A or Choice B, please remember to answer the question that follows that choice as to what was studied.

2. An estimate is fine.

IV. Reasons for Taking the GED

Check only one answer. If you choose other, please specify the reason on the line provided.



Appendix F

Content of the GED Tests

Test 1 WRITING SKILLS TEST 80 items 75 minutes

The GED examinee will demonstrate the ability to use Standard Written English clearly and effectively.

<u>CONTENT</u>	<u>PERCENTAGE OF TEST</u>
Spelling	12.5%
Punctuation & Capitalization	12.5%
Usage	30.0%
Diction & Style	15.0%
Sentence Structure	15.0%
Logic & Organization	15.0%

Test 2 SOCIAL STUDIES TEST 60 items 90 minutes

"The [GED] examinee must demonstrate an understanding of basic principles and concepts in each area included, interpret written and graphical information, apply information and ideas, distinguish fact from opinion, draw conclusions, identify cause and effect relationships, and make judgments about information and methods."

<u>CONTENT</u>	<u>PERCENTAGE OF TEST</u>
U.S. History	25%
Economics	20%
Geography	15%
Political Science	20%
Behavioral Sciences	20%

Test 3 SCIENCE 60 items 90 minutes

"The [GED] examinee must demonstrate an understanding of basic principles and ideas, use the information presented in the reading passages or questions to analyze and solve problems, explain results, and interpret given information."

<u>CONTENT</u>	<u>PERCENTAGE OF TEST</u>
Biology	50%
Earth Science	20%
Chemistry	15%
Physics	15%

(continued)

Appendix F (continued)

Test 4	<u>READING SKILLS</u>	60 items	90 minutes
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"The [GED] examinee must demonstrate an understanding of what is read, interpret the meaning of the passage, and draw conclusions implied but not directly stated by the author."

<u>CONTENT</u>	<u>PERCENTAGE OF TEST</u>
Practical Reading	15.0%
General Reading	30.0%
Prose Literature	30.0%
Poetry	12.5%
Drama	12.5%

Test 5	<u>MATHEMATICS</u>	50 items	90 minutes
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"The [GED] examinee must determine which computations are required, perform these computations, and interpret and analyze information presented in graphs, charts, tables or diagrams. Most questions use a real-life situation for the problem."

<u>CONTENT</u>	<u>PERCENTAGE OF TEST</u>
Arithmetic	55%
Geometry	20%
Algebra	25%

Reference: GED Information Brochure (1986) & Patience & Whitney (1982, p. 4-52)

Appendix G

Frequency Distribution of Ages of GED Examinees

AGE	1-Day Frequency	% of 1 Day	2-1/2 Days Frequency	% of 2-1/2 Days	Total	% of Total Sample
16	16	1.73	9	1.32	25	1.56
17	56	6.05	35	5.14	91	5.67
18	165	17.84	106	15.57	271	16.87
19	88	9.51	64	9.40	152	9.46
20	56	6.05	40	5.87	96	5.98
21	46	4.97	29	4.26	75	4.67
22	22	2.38	31	4.55	53	3.30
23	33	3.57	12	1.76	45	2.80
24	26	2.81	27	3.96	53	3.30
25	22	2.38	18	2.64	40	2.49
26	21	2.27	22	3.23	43	2.68
27	32	3.46	15	2.20	47	2.93
28	12	1.30	13	1.91	25	1.56
29	20	2.16	18	2.64	38	2.37
30	22	2.38	17	2.50	39	2.43
31	22	2.38	19	2.79	41	2.55
32	18	1.95	10	1.47	28	1.74
33	23	2.49	13	1.91	36	2.24
34	28	3.03	12	1.76	40	2.49
35	16	1.73	9	1.32	25	1.56
36	15	1.62	13	1.91	28	1.74
37	8	.86	18	2.64	26	1.62
38	19	2.05	7	1.03	26	1.62
39	8	.86	9	1.32	17	1.06
40	20	2.16	17	2.50	37	2.30
41	15	1.62	8	1.17	23	1.43
42	7	.76	12	1.76	19	1.18
43	14	1.51	8	1.17	22	1.37
44	11	1.19	9	1.32	20	1.25
45	7	.76	9	1.32	16	1.00
46	2	.22	8	1.17	10	.62
47	10	1.08	9	1.32	19	1.18
48	4	.43	6	.88	10	.62
49	4	.43	4	.59	8	.50
50	3	.32	5	.73	8	.50
51	3	.32	4	.59	7	.44
52	7	.76	4	.59	11	.68
53	7	.76	0	0.00	7	.44
54	2	.22	3	.44	5	.31
55	2	.22	2	.29	4	.25

Appendix G (continued)

AGE	1-Day Frequency	% of 1 Day	2-1/2 Days Frequency	% of 2-1/2 Days	Total	% of Total Sample
56	1	.11	3	.44	4	.25
57	2	.22	1	.15	3	.19
58	2	.22	0	0.00	2	.12
59	—	—	—	—	—	—
60	2	.22	1	.15	3	.19
61	—	—	—	—	—	—
62	4	.43	2	.29	6	.37
63	—	—	—	—	—	—
64	1	.11	0	0.00	1	.06
65	—	—	—	—	—	—
66	1	.11	0	0.00	1	.06
TOTAL:	925 (57.60%)	100.00	681 (42.40%)	100.00	1,606	100.00

Appendix H

Frequency Distribution of Testing Sequence
(order in which the 5 subtests were taken)
for GED Examinees

AGE	1-Day Frequency	% of Day	2-1/2 Days Frequency	% of 2-1/2 Days	Total	% of Total Sample
1	129	13.95	37	5.43	166	10.34
2	16	1.73	4	.59	20	1.25
3	6	.65	6	.88	12	.75
4	39	4.22	4	.59	43	2.68
5	10	1.08	5	.73	15	.93
6	2	.22	9	1.32	11	.68
7	2	.22	2	.29	4	.25
8	5	.54	2	.29	7	.44
9	1	.11	2	.29	3	.19
10	2	.22	0	0.00	2	.12
11	19	2.05	2	.29	21	1.31
12	6	.65	65	9.54	71	4.42
13	22	2.38	2	.29	24	1.49
14	15	1.62	3	.44	18	1.12
15	41	4.43	38	5.58	79	4.92
16	18	1.95	0	0.00	18	1.12
17	6	.65	1	.15	7	.44
18	8	.86	0	0.00	8	.50
19	3	.32	16	2.35	19	1.19
20	11	1.19	15	2.20	26	1.62
21	1	.11	10	1.47	11	.68
22	16	1.73	17	2.50	33	2.05
23	14	1.51	7	1.03	21	1.31
24	2	.22	2	.29	4	.25
25	2	.22	4	.59	6	.37
26	1	.11	3	.44	4	.25
27	2	.22	1	.15	3	.19
28	0	0.00	1	.15	1	.06
29	3	.32	9	1.32	12	.75
30	0	0.00	26	3.82	26	1.62
31	1	.11	15	2.20	16	1.00
32	7	.76	16	2.35	23	1.43
33	13	1.41	0	0.00	13	.81
34	13	1.41	1	.15	14	.87
35	8	.86	9	1.32	17	1.06
36	8	.86	5	.73	13	.81
37	6	.65	2	.29	8	.50
38	10	1.08	3	.44	13	.81

Appendix H (continued)

AGE	1-Day Frequency	% of Day	2-1/2 Days Frequency	% of 2-1/2 Days	Total	% of Total Sample
39	1	.11	18	2.64	19	1.18
40	1	.11	2	.29	3	.19
41	2	.22	7	1.03	9	.56
42	118	12.76	32	4.70	115	9.34
43	2	.22	35	5.14	37	2.30
44	34	3.68	4	.59	38	2.37
45	2	.22	1	.15	3	.19
46	0	0.00	2	.29	2	.12
47	2	.22	6	.88	8	.50
48	1	.11	3	.44	4	.25
49	38	4.11	1	.15	39	2.43
50	19	2.05	4	.59	23	1.43
51	1	.11	2	.29	3	.19
52	2	.22	3	.44	5	.31
53	3	.32	1	.15	4	.25
54	5	.54	10	1.47	15	.93
55	12	1.30	0	0.00	12	.75
56	3	.32	1	.15	4	.25
57	1	.11	1	.15	2	.12
58	3	.32	1	.15	4	.25
59	2	.22	5	.73	7	.44
60	1	.11	2	.29	3	.19
61	4	.43	3	.44	7	.44
62	1	.11	2	.29	3	.19
63	1	.11	3	.44	4	.25
64	44	4.76	9	1.32	53	3.30
65	1	.11	0	0.00	1	.06
66	1	.11	0	0.00	1	.06
67	1	.11	1	.15	2	.12
68	1	.11	0	0.00	1	.06
69	2	.22	2	.29	4	.25
70	1	.11	1	.15	2	.12
71	10	1.08	1	.15	11	.68
72	1	.11	1	.15	2	.12
73	2	.22	0	0.00	2	.12
74	25	2.70	0	0.00	25	1.56
75	1	.11	1	.15	2	.12
76	0	0.00	1	.15	1	.06
77	1	.11	6	.88	7	.44
78	1	.11	4	.59	5	.31
79	2	.22	3	.44	5	.31
80	1	.11	1	.15	2	.12

Appendix H (continued)

AGE	1-Day Frequency	% of Day	2-1/2 Days Frequency	% of 2-1/2 Days	Total	% of Total Sample
81	4	.43	4	.59	8	.50
82	21	2.27	0	0.00	21	1.31
83	0	0.00	5	.73	5	.31
84	0	0.00	2	.29	2	.12
85	2	.22	2	.29	4	.25
86	1	.11	2	.29	3	.19
87	3	.32	4	.59	7	.44
88	1	.11	3	.44	4	.25
89	1	.11	0	0.00	1	.06
90	1	.11	0	0.00	1	.06
91	1	.11	1	.15	2	.12
92	1	.11	1	.15	2	.12
93	1	.11	1	.15	2	.12
94	4	.43	2	.29	6	.37
95	1	.11	1	.15	2	.12
96	2	.22	6	.88	8	.50
97	0	0.00	2	.29	2	.12
98	21	2.27	2	.29	23	1.43
99	2	.22	1	.15	3	.19
100	24	2.59	0	0.00	24	1.49
101	0	0.00	2	.29	2	.12
102	1	.11	1	.15	2	.12
103	0	0.00	1	.15	1	.06
104	1	.11	2	.29	3	.19
105	--	--	--	--	--	--
106	0	0.00	2	.29	2	.12
107	0	0.00	1	.15	1	.06
108	0	0.00	2	.29	2	.12
109	0	0.00	2	.29	2	.12
110	0	0.00	1	.15	1	.06
111	2	.22	4	.59	6	.37
112	1	.11	2	.29	3	.19
113	2	.22	1	.15	3	.19
114	1	.11	0	0.00	1	.06
115	0	0.00	2	.29	2	.12
116	0	0.00	1	.15	1	.06
117	0	0.00	1	.15	1	.06
118	4	.43	93	13.66	97	6.04

Appendix I

TEST SEQUENCING

001	Writing, S.S., Science, Reading, Math
002	Reading, Science, Writing, S.S., Math
003	Writing, S.S., Reading, Math, Science
004	S.S., Science, Reading, Math, Writing
005	Writing, Math, Reading, S.S., Science
006	Math, Writing, S.S., Science, Reading
007	Math, Writing, S.S., Reading, Science
008	Math, Writing, Reading, S.S., Science
009	S.S., Science, Math, Reading, Writing
010	S.S., Writing, Math, Reading, Science
011	S.S., Math, Writing, Science, Reading
012	S.S., Science, Writing, Math, Reading
013	S.S., Math, Science, Writing, Reading
014	Science, S.S., Math, Writing, Reading
015	Math, Science, S.S., Writing, Reading
016	S.S., Math, Science, Reading, Writing
017	Science, S.S., Math, Reading, Writing
018	Math, Science, S.S., Reading, Writing
019	Writing, Reading, Science, S.S., Math
020	Writing, Reading, S.S., Science, Math
021	Reading, Writing, Science, Math, S.S.
022	Writing, Reading, Math, S.S., Science
023	Writing, Reading, Math, Science, S.S.
024	Science, Writing, Reading, Math, S.S.
025	Writing, Science, Reading, Math, S.S.
026	Math, S.S., Reading, Writing, Science
027	Science, S.S., Writing, Reading, Math
028	S.S., Math, Reading, Science, Writing
029	Writing, Reading, S.S., Math, Science
030	Writing, Reading, Science, Math, S.S.
031	Reading, Writing, Science, Math, S.S.
032	Reading, Writing, Math, S.S., Science
033	Reading, Math, Writing, Science, S.S.
034	Reading, Writing, Science, S.S., Math
035	S.S., Writing, Science, Reading, Math
036	S.S., Science, Writing, Reading, Math
037	Reading, Math, Writing, S.S., Science
038	Reading, Writing, Math, Science, S.S.
039	Reading, Writing, S.S., Math, Science
040	Reading, Writing, Science, S.S., Math
041	Math, S.S., Science, Reading, Writing
042	S.S., Science, Math, Writing, Reading

Appendix I (continued)

043 Math, Reading, Writing, S.S., Science
044 S.S., Math, Reading, Writing, Science
045 Math, Reading, S.S., Science, Writing
046 Writing, Math, S.S., Reading, Science
047 Writing, Math, Reading, Science, S.S.
048 Writing, S.S., Math, Reading, Science
049 Math, S.S., Writing, Science, Reading
050 Science, Math, Writing, S.S., Reading
051 Math, Science, Reading, Writing, S.S.
052 Science, S.S., Reading, Math, Writing
053 Math, Reading, Science, S.S., Writing
054 Writing, Science, S.S., Reading, Math
055 Math, S.S., Science, Writing, Reading
056 S.S., Writing, Reading, Science, Math
057 Science, Writing, S.S., Math, Reading
058 Writing, Science, Math, S.S., Reading
059 Reading, Science, S.S., Math, Writing
060 Science, Writing, S.S., Reading, Math
061 Writing, Math, S.S., Science, Reading
062 S.S., Writing, Reading, Math, Science
063 Math, Writing, Reading, Science, S.S.
064 Writing, S.S., Science, Math, Reading
065 Science, Writing, Math, S.S., Reading
066 Math, Reading, S.S., Writing, Science
067 Reading, S.S., Math, Writing, Science
068 Reading, Science, Writing, Math, S.S.
069 Science, Writing, Math, Reading, S.S.
070 Reading, Math, S.S., Writing, Science
071 Writing, S.S., Math, Science, Reading
072 Reading, Math, Science, Writing, S.S.
073 Writing, Math, Science, S.S., Reading
074 Math, S.S., Writing, Reading, Science
075 Science, Math, Reading, Writing, S.S.
076 S.S., Writing, Math, Science, Reading
077 Writing, Science, S.S., Math, Reading
078 S.S., Reading, Math, Science, Writing
079 Math, S.S., Reading, Science, Writing
080 Reading, Science, Math, Writing, S.S.
081 Math, Science, Writing, S.S., Reading
082 Math, Science, Reading, S.S., Writing
083 S.S., Science, Reading, Writing, Math
084 S.S., Reading, Writing, Math, Science
085 Science, Math, Reading, S.S., Writing
086 Science, Reading, Writing, Math, S.S.
087 Reading, S.S., Writing, Science, Math
088 Math, Reading, Writing, Science, S.S.

Appendix I (continued)

089 Science, Reading, S.S., Math, Writing
090 Science, Reading, S.S., Writing, Math
091 Reading, S.S., Science, Math, Writing
092 Math, Reading, Science, Writing, S.S.
093 S.S., Reading, Writing, Science, Math
094 Science, S.S., Writing, Math, Reading
095 Science, Reading, Math, Writing, S.S.
096 S.S., Writing, Science, Math, Reading
097 Writing, Science, Math, Reading, S.S.
098 Science, Math, S.S., Writing, Reading
099 Science, Math, S.S., Reading, Writing
100 Science, Math, Writing, Reading, S.S.
101 S.S., Reading, Science, Math, Writing
102 S.S., Reading, Math, Writing, Science
103 S.S., Math, Writing, Reading, Science
104 S.S., Reading, Science, Writing, Math
105 Science, Reading, Writing, S.S., Math
106 Reading, S.S., Writing, Math, Science
107 Reading, Science, Math, S.S., Writing
108 Reading, S.S., Math, Science, Writing
109 Reading, Math, Science, S.S., Writing
110 Math, Writing, Science, Reading, S.S.
111 Science, Writing, Reading, S.S., Math
112 Science, Reading, Math, S.S., Writing
113 Science, S.S., Reading, Writing, Math
114 Reading, S.S., Science, Writing, Math
115 Reading, Science, S.S., Writing, Math
116 Math, Writing, Science, S.S., Reading
117 Writing, Science, Reading, S.S., Math
118 Writing, S.S., Reading, Science, Math

Appendix J

Frequency Distribution of Total Test Scores
Received on GED Tests According to
Method of Testing Administration

Score	1 Day Frequency	% of 1 Day	2-1/2 Days Frequency	% of 2-1/2 Days	Total Frequency	% of Total Sample
123	1	.08	--	--	1	.05
137	--	--	1	.13	1	.05
139	1	.08	--	--	1	.05
142	1	.08	--	--	1	.05
146	--	--	1	.13	1	.05
150	1	.08	--	--	1	.05
153	--	--	2	.25	2	.10
154	2	.16	--	--	2	.10
155	1	.08	2	.25	3	.14
156	--	--	1	.13	1	.05
158	1	.08	--	--	1	.05
161	1	.08	--	--	1	.05
163	4	.31	--	--	4	.20
164	--	--	1	.13	1	.05
165	1	.08	1	.13	2	.10
166	--	--	1	.13	1	.05
167	3	.23	1	.13	4	.20
168	--	--	2	.25	2	.10
169	1	.08	--	--	1	.05
170	1	.08	1	.13	2	.10
171	3	.23	--	--	3	.14
172	3	.23	1	.13	4	.19
173	1	.08	3	.38	4	.19
174	4	.31	--	--	4	.19
175	4	.31	1	.13	5	.24
177	6	.46	2	.25	8	.38
178	4	.31	3	.38	7	.34
179	1	.08	2	.25	3	.14
180	1	.08	1	.13	2	.10
181	3	.23	2	.25	5	.24
182	4	.31	3	.38	7	.34
183	--	--	2	.25	2	.10
184	4	.31	3	.38	7	.34
185	2	.16	1	.13	3	.14
186	1	.08	4	.50	5	.24
187	7	.54	2	.25	9	.42
188	6	.46	--	--	6	.29
189	7	.54	4	.50	11	.53

Appendix J (continued)

Score	1 Day Frequency	% of 1 Day	2-1/2 Days Frequency	% of 2-1/2 Days	Total Frequency	% of Total Sample
190	5	.39	2	.25	7	.34
191	8	.60	1	.13	9	.42
192	5	.39	9	1.13	14	.67
193	7	.54	—	—	7	.34
194	4	.31	3	.38	7	.34
195	5	.39	4	.50	9	.42
196	7	.54	2	.25	9	.42
197	9	.70	3	.38	12	.56
198	5	.39	5	.63	10	.48
199	7	.54	4	.50	11	.53
200	11	.85	7	.88	18	.86
201	8	.62	6	.75	14	.67
202	9	.70	9	1.13	18	.86
203	8	.62	3	.38	11	.53
204	4	.31	7	.88	11	.53
205	1	.08	6	.75	7	.34
206	13	1.01	5	.63	18	.86
207	5	.39	5	.63	10	.48
208	6	.46	5	.63	11	.53
209	15	1.16	3	.38	18	.86
210	13	1.01	7	.88	20	.96
211	16	1.24	9	1.13	25	1.20
212	10	.77	3	.38	13	.62
213	7	.54	3	.38	10	.48
214	11	.85	3	.38	14	.67
215	14	1.08	12	1.50	26	1.25
216	10	.77	10	1.26	20	.96
217	21	1.63	8	1.01	29	1.39
218	18	1.39	4	.50	22	1.05
219	16	1.24	8	1.01	24	1.15
220	6	.46	9	1.13	15	.72
221	14	1.08	8	1.01	22	1.05
222	12	.93	13	1.63	25	1.20
223	11	.85	10	1.26	21	1.01
224	19	1.47	12	1.50	31	1.49
225	14	1.08	9	1.13	23	1.10
226	15	1.16	5	.63	20	.96
227	15	1.16	9	1.13	24	1.15
228	9	.70	15	1.88	24	1.15
229	9	.70	7	.88	16	.77
230	13	1.01	8	1.01	21	1.01
231	15	1.16	9	1.13	24	1.15

Appendix J (continued)

Score	1 Day Frequency	% of 1 Day	2-1/2 Days Frequency	% of 2-1/2 Days	Total Frequency	% of Total Sample
232	14	1.08	9	1.13	23	1.10
233	16	1.24	10	1.26	26	1.25
234	6	.46	6	.75	12	.56
235	12	.93	7	.88	19	.91
236	18	1.39	12	1.50	30	1.44
237	11	.85	4	.50	15	.72
238	25	1.95	4	.50	29	1.39
239	17	1.32	6	.75	23	1.10
240	14	1.08	5	.63	19	.91
241	15	1.16	8	1.01	23	1.01
242	12	.93	9	1.13	21	1.01
243	10	.77	8	1.01	18	.86
244	10	.77	6	.75	16	.77
245	12	.93	8	1.01	20	.96
246	25	1.95	8	1.01	33	1.58
247	5	.39	13	1.63	18	.86
248	9	.70	10	1.26	19	.91
249	20	1.55	11	1.38	31	1.49
250	11	.85	12	1.50	23	1.10
251	18	1.39	13	1.63	31	1.49
252	12	.93	6	.75	18	.86
253	8	.62	8	1.01	16	.77
254	22	1.70	10	1.26	32	1.53
255	10	.77	18	2.26	28	1.34
256	10	.77	11	1.38	21	1.01
257	10	.77	10	1.26	20	.96
258	16	1.24	9	1.13	20	1.20
259	18	1.39	7	.88	25	1.20
260	14	1.08	6	.75	20	.96
261	7	.54	8	1.01	15	.72
262	9	.70	7	.88	16	.77
263	17	1.32	5	.63	22	1.05
264	13	1.01	10	1.26	23	1.10
265	15	1.16	4	.50	19	.91
266	7	.54	4	.50	11	.53
267	12	.93	6	.75	18	.86
268	7	.54	9	1.13	16	.77
269	16	1.24	4	.50	20	.96
270	12	.93	7	.88	19	.91
271	8	.62	8	1.01	16	.77
272	6	.46	4	.50	10	.48
273	9	.70	6	.75	15	.72

Appendix J (continued)

Score	1 Day Frequency	% of 1 Day	2-1/2 Days Frequency	% of 2-1/2 Days	Total Frequency	% of Total Sample
274	10	.77	6	.75	16	.77
275	5	.39	7	.88	12	.56
276	4	.31	5	.63	9	.42
277	12	.93	1	.13	13	.62
278	7	.54	8	1.01	15	.72
279	7	.54	4	.50	11	.53
280	4	.31	8	1.01	12	.56
281	11	.85	1	.13	12	.56
282	10	.77	4	.50	14	.67
283	10	.77	1	.13	11	.53
284	9	.70	2	.25	11	.53
285	4	.31	6	.75	10	.48
286	7	.54	2	.25	9	.42
287	7	.54	1	.13	8	.38
288	2	.16	2	.25	4	.19
289	14	1.08	5	.63	19	.91
290	3	.23	5	.63	8	.38
291	4	.31	4	.50	8	.38
292	7	.54	4	.50	11	.53
293	6	.46	1	.13	7	.34
294	—	—	2	.25	2	.10
295	3	.23	6	.75	9	.42
296	4	.31	2	.25	6	.29
297	2	.16	5	.63	7	.34
298	7	.54	1	.13	8	.38
299	3	.23	3	.38	6	.29
300	6	.46	5	.63	11	.53
301	4	.31	2	.25	6	.29
302	5	.39	1	.13	6	.29
303	5	.39	3	.38	8	.38
304	2	.16	3	.38	5	.24
305	4	.31	3	.38	7	.34
306	4	.31	4	.50	8	.38
307	1	.08	1	.13	2	.10
308	4	.31	—	—	4	.20
309	5	.39	1	.13	6	.29
310	4	.31	1	.13	5	.24
311	—	—	3	.38	3	.14
312	3	.23	2	.25	5	.24
313	1	.08	2	.25	3	.14
314	1	.08	1	.13	2	.10
315	—	—	2	.25	2	.10

Appendix J (continued)

Score	1 Day Frequency	% of 1 Day	2-1/2 Days Frequency	% of 2-1/2 Days	Total Frequency	% of Total Sample
316	5	.39	--	--	5	.24
317	1	.08	--	--	1	.05
318	--	--	2	.25	2	.10
319	2	.16	1	.13	3	.14
320	1	.08	1	.13	2	.10
321	2	.16	1	.13	3	.14
322	1	.08	1	.13	2	.10
323	1	.08	1	.13	2	.10
324	1	.08	--	--	1	.05
325	3	.23	--	--	3	.14
326	2	.16	1	.13	3	.14
327	--	--	1	.13	1	.05
328	3	.23	--	--	3	.14
331	1	.08	1	.13	2	.10
332	1	.08	--	--	1	.05
333	1	.08	--	--	1	.05
334	1	.08	--	--	1	.05
339	1	.08	--	--	1	.05
340	1	.08	--	--	1	.05
341	1	.08	--	--	1	.05
348	1	.08	--	--	1	.05
349	--	--	1	.13	1	.05
352	1	.08	--	--	1	.05
383	1	.08	--	--	1	.05

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