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ABSTRACT

The relationship between test preparation and academic performance on a high school graduation test was studied using data from the 1995-96 Louisiana Graduation Exit Examination (GEE). Test preparation was measured based on students' responses concerning whether they prepared well for the test or not. Academic performance was measured through five subjects: English Language Arts, Mathematics, Written Composition, Science, and Social Studies. Each subject was examined based on two test uses: students' passing status and students' scaled scores. A series of chi square tests were used for each subject to examine the relationship between test preparation and passing status. In addition, Pearson correlation analysis was used for each subject to examine the relationship between test preparation and scaled scores. Results show that there is a significant relationship between preparation and academic performance, but that the magnitudes of the relationships are different across the five subjects. The strongest relationship was found for mathematics. The patterns of the relationships between test preparation and academic performance were generally consistent across subgroups with reference to gender and ethnicity. (Contains eight tables and seven references.) (SLD)

Relationships Between Test Preparation and Academic Performance on a Statewide High School Exit Examination

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Abstract

The purpose of this study was to determine the relationship between test preparation and academic performance on a high school graduation test. The study utilized data from the 1995-96 Louisiana Graduation Exit Examination (GEE). Test preparation was measured based on students' responses concerning whether they prepared well for the test or not. Academic performance was measured through five subjects: English Language Arts, Mathematics, Written Composition, Science, and Social Studies. Each subject was examined based on two usages of the test: students' passing status and students' scaled scores.

A series of chi-square (χ^2) tests were employed for each subject to examine the relationship between students' test preparation and passing status. Also, Pearson correlation analysis was employed for each subject to examine the relationship between test preparation and students' scaled scores. The results show that there is a significant relationship between students' preparation and academic performance. However, the magnitudes of the relationships were different across five subjects. In particular, the strongest relationship was found in Mathematics. The patterns of the relationships between test preparation and academic performance were generally consistent across subgroups related to gender and ethnicity.

Introduction

There is considerable interest within the education community about student achievement, as measured through large-scale standardized tests. Although student achievement has been highly studied, little research attempts to show the relationship between students' performance and their perception of their level of preparation. In particular, students can fall into four categories: (1) students who do well and think they are prepared, (2) students who do well and think they are unprepared, (3) students who do not do well and think they are prepared, and (4) students who do not do well and think they are unprepared. Of greatest interest to the practitioner should be those students in the third category -- those who indicate that they are prepared for the test, but in fact, are not.

As the trend toward large-scale assessment continues to grow, it becomes increasingly important to examine possible influences on achievement. This study focuses on two particular characteristics of the students: indication of test preparation and academic performance, as measured through the pass/fail status and scaled score on a Louisiana statewide assessment. The purpose of this study was to examine the relationships among these variables.

Statewide Criterion-Referenced Testing in Louisiana

Act 40 of the First Extraordinary Legislative Session of 1996 reenacted Revised Statute 17:24.4 of the 1986 regular session of the Louisiana Legislature. This legislation created the Louisiana Educational Assessment Program (LEAP), which includes criterion-referenced testing for grades 3, 5, 7, and the secondary level. The State Board of Elementary and Secondary Education (SBESE) has also mandated that

all high school students be tested under this program as a graduation requirement. Because the tests are used as a graduation requirement, they fall into the category of known as high-stakes tests (Louisiana Department of Education, 1996a).

The grades 10 and 11 components of the criterion-referenced testing program are known as the Graduation Exit Examination (or "Exit Exam"). In grade 10, Louisiana students first take tests in English Language Arts, Written Composition, and Mathematics. In grade 11, students first take tests in Science and Social Studies. In addition to earning 23 Carnegie units, passage of all five components is required to receive a high school diploma. Students who initially fail one or more of the tests receive remediation, and retest administrations are offered twice during the eleventh grade year and four times during the twelfth grade year (Louisiana Department of Education, 1996a).

Research Questions

Much of the research concerning large-scale assessment has focused on the overall influences on student achievement, or establishing causal-comparative between some characteristics and student achievement. Student characteristics and preparation have been highly studied, most particularly though the various NAEP assessments (e.g., National Assessment of Educational Progress, 1994a, 1994b, 1994c, 1996a, 1996b). However, less has been done in the area of examining the students' perception of their preparation. Do students believe that they are prepared? Do they have an understanding of the difficulty level of the test? This study provides information about the students' preparation as related to their overall abilities on the five parts of the GEE.

Based on this framework, this study was designed to address the following research questions:

1. Is there a relationship between the student's preparation and their passing status on the Graduation Exit Examination?

2. Is there a relationship between the student's preparation and their actual test performance on the Graduation Exit Examination?

Methodology

Sample

The sample consists of all tenth- and eleventh-grade students who participated in the Spring 1996 statewide administration of Louisiana Graduation Exit Examination. Students who responded to a sufficient number of items to be assigned a score and answered the survey question concerning test preparation were included in the sample. Because they make up over 97% of the public school population, the sample includes only African-American and White students. In grade 10, African-American students make up 42% of the sample, while White students comprise the remaining 58%. In grade 11, African-American students make up 41% of the sample, while White students comprise the remaining 59%. The grade 10 group is 47% male and 53% female; the grade 11 group is 46% male and 54% female. For each subject area test, the following numbers of students are included: English Language Arts, 43,194; Mathematics, 42,978; Written Composition, 34,988; Science, 37,969; and Social Studies, 37,957.

Instrument

The Graduation Exit Examination provides several different kinds of information to the test takers. For promotion and graduation decisions, pass/fail information is

provided. For diagnostic information, students are provided percent correct information (total and domain); scaled scores are also provided for each test taken. The English Language Arts, Mathematics, Science and Social Studies tests are traditional multiple-choice exams of approximately 60 questions each. The Written Composition Test is a performance assessment where students are asked to write an essay of no more than two pages on an assigned prompt. Each essay is scored on a four-point scale by two raters for each of five dimensions (Louisiana Department of Education, 1996a).

Variables

Independent variable. The students' *test preparation* was measured through the use of a survey question on each subject area test. After completing each test, students were instructed to respond to the following question:

> "Were you adequately prepared for this test? Think back over your entire school experience. In your classes, have you had the opportunity to learn the skills necessary to complete the (subject name) section of the examination successfully? Mark "Y" for "Yes" or "N" for "No" in the circle provided on the answer document. This question does not count towards your score on the test."

Dependent variables. Academic performance was examined through two measures: students' *passing status* (pass/fail) and *scaled score*. A passing score indicates that a student achieved the performance standard necessary to meet the minimum competency level for that test. The scaled score gives a standardized accounting of the student's actual performance on the test (Louisiana Department of Education, 1996b).

This study also uses several demographic characteristics of the students (gender and ethnicity). The students' *gender* (male, female) was recorded on the answer document by the student or the test administrator. The students' *ethnicity* (black, white) was also recorded on the answer document by the student or the test administrator.

Data Analysis

The data were analyzed using a two-part approach. First, a series of chi-square tests were employed to examine the relationship between test preparation and the students' passing status. In this analysis, students can fall into one of four categories: (1) students who *passed* and indicated they *were* prepared, (2) students who *passed* and indicated they were *not* prepared, (3) students who *failed* and indicated they *were* prepared, and (4) students who *failed* and indicated they were *not* prepared.

Secondly, Pearson correlation analysis was employed for the total group of test takers to examine the relationship between test preparation and students' scaled scores. This analysis was employed first for all students, then disaggregated by subgroup (African-American males, White males, African-American females, White females).

Results

Chi-Square Analysis

The results show that there is a statistically significant relationship ($p < .001$) between students' test preparation and academic performance for each subject area test on the Graduation Exit Examination. The chi-square (χ^2) tests indicate that the independent variable *test preparation* is significantly associated with the students'

passing status in all five subject areas, as shown in Tables 1 - 5. The significance of these associations are primarily a function of the large sample size; however, the phi (ϕ) values show the relative effect size, or magnitude of each association.

Table 1. Chi-Square Analysis, English Language Arts.

		Failing		Passing		Total	
		N	%	N	%	N	%
Test Preparation	"NO"	1108	2.6	2024	4.7	3132	7.3
	"YES"	4694	10.9	35368	81.9	40062	92.8
	Total	5802	13.4	37392	86.6	40062	
$\chi^2_{(1)} = 1398.45, p < .001, \phi = .18$							

Table 2. Chi-Square Analysis, Mathematics.

		Failing		Passing		Total	
		N	%	N	%	N	%
Test Preparation	"NO"	3804	8.9	4872	11.3	8676	20.2
	"YES"	5947	13.8	28355	66.0	34302	79.8
	Total	9751	22.7	33227	77.3	42978	
$\chi^2_{(1)} = 2773.93, p < .001, \phi = .25$							

Table 3. Chi-Square Analysis, Written Composition.

		Failing		Passing		Total	
		N	%	N	%	N	%
Test Preparation	"NO"	402	1.2	2430	7.0	2832	8.1
	"YES"	1401	4.0	30755	87.9	32156	91.9
	Total	1803	5.2	33185	94.9	34988	
$\chi^2_{(1)} = 515.41, p < .001, \phi = .12$							

Table 4. Chi-Square Analysis, Science.

		Failing		Passing		Total	
		N	%	N	%	N	%
Test Preparation	"NO"	3151	8.3	7896	20.8	11047	29.1
	"YES"	3846	10.1	23076	60.8	26922	70.9
	Total	6997	18.4	30972	81.6	37969	
$\chi^2_{(1)}=1056.31, p < .001, \phi = .17$							

Table 5. Chi-Square Analysis, Social Studies.

		Failing		Passing		Total	
		N	%	N	%	N	%
Test Preparation	"NO"	1627	4.3	8074	21.3	9701	25.6
	"YES"	2176	5.7	26080	68.7	28256	74.4
	Total	3803	10.0	34154	90.0	37957	
$\chi^2_{(1)}=659.04, p < .001, \phi = .13$							

As shown above, the students' *test preparation* is significantly associated with the students' *passing status* in all five subject areas. Because the significance of these associations are primarily a function of the large sample size, phi (ϕ) was used to show the relative effect size, or magnitude of each association.

The effect sizes for the subjects of English Language Arts, Written Composition, Science, and Social Studies are relatively low. However, the effect size for Mathematics, in comparison, is slightly higher ($\phi = .25$). This shows that the student's perception of Mathematics test preparation has a higher relationship to the passing status than in the other subjects. In other words, if all tests had an equal attainment rate (which they do not), students who answered "YES" to the test preparation question in Mathematics would be more likely to pass the test than students

who answered "YES" in the other four subject areas.

From a educational policy viewpoint, these data are useful to show whether students can effectively predict their performance on the Graduation Exit Examination. For example, students who pass the test would be expected to answer "YES" to the survey question; students who fail the test would be expected to answer "NO" to the survey question. Students who fail the test but answer "YES" (indicating that they were prepared), should be of concern to educators. Students who pass the test, but answer "NO" to the survey question misclassify themselves, but are not of as great concern due to their passing status. The following table shows the percentage of total test takers in each subject who misclassified their passing status.

Table 6. Percent of Students Misclassifying Their Passing Status.

Subject	Percent of Students Who *Failed* and Indicated They *Were* Prepared	Percent of Students Who *Passed* and Indicated They *Were Not* Prepared
English Language Arts	10.9	4.7
Mathematics	13.8	11.3
Written Composition	4.0	7.0
Science	10.1	20.8
Social Studies	5.7	21.3

As shown in Table 6, more than 10% of the test takers in English Language Arts, Mathematics, and Science all believed they were prepared for the test, but in fact, failed the test. These students either overestimate their ability or underestimate the difficulty of the test.

In the grade 11 tests of Science and Social Studies, more than 20% of the students believed that they were not prepared, but passed the test. These students either

underestimate their ability or overestimate the difficulty of the test.

Correlation Analysis

The results show that there is a statistically significant relationship ($p < .001$) between students' test preparation and their actual performance for each subject area test, as measured by the scaled score. The Pearson correlation coefficients indicate that the independent variable *test preparation* is significantly associated with the students' *scaled scores* in all five subject areas, as shown in Table 7. The significance of these associations are primarily a function of the large sample size.

Table 7. Correlation Analysis, Preparation and Actual Performance.

	r	r^2	$p <$
English Language Arts	.20	.04	.001
Mathematics	.32	.10	.001
Written Composition	.18	.03	.001
Science	.25	.06	.001
Social Studies	.22	.05	.001

The table above shows the magnitude of the association (r^2), or the proportion of the students' actual test performance (scaled score) that can be explained by the students' perception of their test preparation. For four subject areas, the r^2 value is low; however about 10% of the students Mathematics scores can be explained by their test preparation.

In some cases, disaggregation by subgroups such as gender and ethnicity reveals patterns which are not consistent with the overall findings. However, in this analysis, the disaggregated correlation analysis reveals generally the same patterns as the overall subject area correlation analysis. These results are shown below, in Table 8.

Table 8. Correlation Coefficients, Preparation and Actual Performance, By Ethnicity and Gender.

	Male		Female		Total
	African-American	White	African-American	White	
English Language Arts	.20	.18	.18	.16	.20
Mathematics	.27	.32	.30	.33	.32
Written Composition	.18	.17	.14	.12	.18
Science	.21	.25	.19	.21	.25
Social Studies	.21	.24	.20	.20	.22

Conclusions

In this study, the relationships between students' test preparation and academic ability were examined. While characteristics associated with student achievement have been highly studied, this paper attempts to examine the students' *perception* of their preparation as a predictor of their academic ability. In all subject areas, statistically significant associations were found; however, the magnitudes showed that the differences are too small to have practical meaning, with one exception. In Mathematics, the association was somewhat stronger than in the remaining four subject areas. The associations were consistent across two different ethnic groups and also between males and females.

Of more practical significance to the practitioner is the identification of a subgroup of students who believe that they are prepared for the Exit Exam, but in fact, fail the test. Varying among the different subject area tests, 4 - 14% of the students misclassified their passing status. Appropriate and targeted instruction could be provided if these students could be identified before the test were administered.

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