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ABSTRACT

This study examined the effects of high school course choices, grades, and Grade Ten Assessment Test scores (GTAT) in math and reading, along with race and gender, on student performance on a computerized placement test (CPT) administered upon entry to community colleges in Florida. The sample consisted of 19,736 African-American, white, and Hispanic high school graduates, who graduated in the spring of 1994, and took the CPT in the fall. A High School Performance (HSP) variable for math and English was constructed from the number of English and math courses taken, the difficulty level of the courses, and the grades achieved. Student scores on the three subsets of the CPT, in math, reading, and writing, composed the outcome variables. Results include the following: (1) Math HSP had a larger positive effect on passing the Math CPT than did high school GPA or scores on the GTAT; (2) GTAT scores had the largest effect on the Reading and Writing CPT scores, and the magnitude of English HSP and GPA was about equal; (3) Blacks, Hispanics, and women had significantly lower odds of passing the Math and Reading CPT than Whites and males; and (4) Whites and women demonstrated higher passing rates on the Reading CPT. Appended are HSP scenario examples and two graphs illustrating Math CPT scores for entering community college students. (Contains 13 references, 7 tables and 3 figures.) (CAK)

Running Head: HIGH SCHOOL COURSE-TAKING

Effect of High School Course-taking and Grades on Passing a College Placement Test

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Abstract

Transcripts of 19,736 students who consecutively attended Florida high schools for four years and graduated in the spring of 1994 were analyzed to determine how course choice, grades, tenth grade standardized test score results, race, and gender affected performance on a computerized placement test (CPT) administered upon entry to community college in the fall of 1994. A High School Performance (HSP) variable for math and English was constructed to account for differences in number of courses completed, degree of course difficulty, and course grade. Math and English HSP, 4-year cumulative grade point average (GPA), percentile rank on Grade Ten Assessment Test (GTAT) in math and reading, race and gender all had significant effects on the probability of passing the CPT. Math HSP had a larger positive effect on passing the Math CPT than GPA or GTAT. This was not the case for the Reading or Writing CPT subtests where GTAT had the larger effect and the magnitude of English HSP and GPA was about equal. Students can raise the probability of passing the Math CPT if they take more difficult math courses in high school, even at the expense of lowering their GPA.

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Introduction

The unpreparedness of recent high school graduates to do college-level work, as measured by high failure rates on placement tests given on entry to community college, has aroused the ire of many state legislators who are increasingly reluctant to allocate funds for remediation classes of any kind (Ignash, 1997). Critics of public education frequently interpret these high failure rates and the subsequent proliferation of post-secondary "developmental education" courses as further evidence that secondary school curricula and standards have become unacceptably diluted. A recent report by the National Center for Education Statistics estimated that 68% of 1992 high school graduates who enrolled in public 2-year institutions were not academically prepared (Berkner and Chavez, 1997). In Florida, 64% of the 1994-95 cohort of degree-seeking students who enrolled in the state's 28 community colleges through a policy of open-door admissions failed to pass all three sections (math, reading, and writing) of the computerized placement test (CPT). More than two years later (at the end of summer, 1996-97), 50% of the students who had been directed into remedial "college preparation" courses still had not successfully completed them (Florida State Board of Community Colleges, 1998). National longitudinal data show that at the end of five years, only 30% of community college students complete the associate degree (Cuccaro-Alamin, 1997)

This low completion rate has fueled critics' charges that unprepared high school students are not being effectively remediated in community college. They point out that the entry-level tests like the CPT benchmark the capacity to do first-year college work with acceptable performance on math, reading, and writing subtests set at the tenth grade level. In response, community college officials claim it is not feasible to correct major academic deficiencies within the time frame of one-semester developmental courses.

State departments of education have responded in several ways to make students and districts more accountable for the high percentage of high school graduates requiring post-secondary remediation courses. One strategy has been to raise the minimum GPA necessary to graduate high school. In Florida the minimum GPA necessary for earning the diploma has been raised from 1.5 to 2.0. Another policy change has been to increase the number of courses necessary to graduate. Florida now stipulates a minimum of 24 credits be accumulated before a high school diploma is issued, up from 20 credits 10 years ago. At the exit end of the pipeline, community college students are required to pass the CPT or complete their remediation courses before they can be awarded the two-year associate degree.

The explanation most commonly given by community college officials for the high failure rate on the CPT is that students' course-taking choices in high school did not equip them with the skills needed to do college-level work. For example, students who did not take Algebra 1 would not be able pass the math subtest of the CPT, even if they correctly answered all remaining items that did not require algebraic reasoning. Similarly, students selecting English courses in which regular testing of reading comprehension and writing mechanics was not part of the instructors' assessment scheme would most likely score below the cutpoints indicative of competency on the Reading and Writing CPT subtests.

This study analyzes the results of the CPT taken by students who graduated from Florida public high schools in 1994. To understand the extent of students' unpreparedness and what might be done about it, the course-taking patterns and achievement of recent high school graduates in Florida were explored in depth.

High school course-taking patterns have been the subject of a growing number studies over the last decade. The High School Transcript Study data set which is part of the 1994

National Assessment of Education Progress has been analyzed by several researchers (e.g., Lee, Croninger & Smith, 1997; Chaney, Burgdorf, & Atash, 1997) while others have confined themselves to students within a single school district (e.g., Guskey, 1997). These studies routinely use some marker of school wealth (e.g., percent of students participating in subsidized lunch program) to control for differences in students' achievement that may be due to differences in facilities and resources. However, placement procedures and course offerings are known to vary even in schools serving similar socioeconomic populations (Spade, Columba, & Vanfossen, 1997).

The analysis in the present paper focuses on student-level variables and does not include such school- and district-level characteristics as enrollment size, curriculum tracking policies, minority concentration, or urbanicity (Finn, 1998). Such contextual factors no doubt influence the probability of students enrolling in the kinds of challenging courses that would equip them to do well on a college placement test (Smittle, 1995). However, this study investigated the probability of passing a community college entrance exam using only those variables most directly influential and predictive of outcome, namely the individual student variables of gender and ethnicity, course-taking, course load, and grades in math and English, overall GPA, and tenth grade standardized test score results in math and reading.

Method

Sample

Table 1 supplies information on the number of 1994 Florida high school graduates who enrolled in community college in the fall of 1994 and took the CPT, and the percent who passed the entry level test. The sample was restricted to students who had consecutively attended a Florida high school during the preceding four years and were in their appropriate grade level, i.e., first year 1990-91, second year 1991-92, third year 1992-93, and fourth year 1993-94. This restriction was imposed to eliminate contamination of the sample by students who were retained in grade or who had incomplete records because they had attended high school in other states. The total number of students who received a standard high school diploma in 1994 was 91,489, with 81,495 having attended for four consecutive years. Of those, nearly 20,000 enrolled in a Florida community college in the fall of the same year.

Two exclusion criteria were used when constructing the study sample. The first is that only students of Black, White, and Hispanic ethnicity were studied. This criterion was set because the number of students in other ethnic categories was too low to perform statistical tests. The second criterion pertained to cumulative GPA. The Florida Department of Education requires that students have a minimum cumulative GPA of 1.5 in order to graduate; thus only those students whose cumulative high school GPA was at least 1.5 were included in this study.

Measures

Students' scores on the three subtests of the CPT served as the study's outcome variable. Definitions of outcome (response) and predictor variables are given in Table 2. The Math and English HSP variables deserve elaboration. They were constructed to serve as an index measuring students' degree of academic accomplishment. The variables combine number of math or English courses taken, the courses' difficulty level, and grades achieved. Appendix A contains eight scenarios which illustrate how variations in course load, course difficulty, and course performance produce different values for Math and English HSP. The GTAT consisted of subtests in reading comprehension and mathematics. The reading section sampled both textbook and everyday literacy. The math section covered computational, algebraic, geometric, and statistical concepts and problem-solving.

Data

Four separate statewide data sets maintained by the Florida Department of Education were merged for use in this study. A brief description of each data set is given in Table 3.

Details of data merging strategy. The final sample used for the analysis was formed by merging the four data sets described in Table 3. First, the CC data set was merged to the DOE data set by social security number and Florida student ID number, with a 99.9 percent match rate. Next, the data set resulting from the first merge was merged to the HS Transcript data set, with a 99 percent match rate. For the final merge to the GTAT data set, only those students who had attended a Florida high school for all four years were considered. This restriction was set for two reasons. First, it was necessary to ensure that each student was fairly represented with respect to HSP. Second, since the GTAT was administered in February 1992, students who left the Florida school system before their senior year would not be able to be matched. Clearly this attrition should not be represented as a problem with the merge rate, but simply that the student was no longer in the Florida school system and was not available to be matched. Therefore, before merging the GTAT data set to the previous data set (that resulting from the merge of the DOE, CC, and HS Transcript data sets), the previous data set was reduced to those students who were in Florida public high schools for four consecutive years prior to graduating in 1994. This resulting data set was merged to the statewide GTAT data set, and there was a 100 percent match rate.

Statistical Methods

The response variable CPT result was modeled as a function of race, gender, GPA, GTAT, and the HSP variable appropriate for the subtest being analyzed. The variable was analyzed for each of the three CPT subtests—Math, Reading, and Writing. Since CPT result is a dichotomous variable having the values Pass/Fail, it was appropriate to perform logistic regression analyses.

The effects of the qualitative variables of gender and ethnicity were measured using adjusted odds ratios. The estimates of these odds ratios and their respective confidence intervals were calculated using the parameter estimates and covariance matrix of the model.

The effects of the continuous variables GPA, GTAT, and Math and English HSP were measured as follows. For each of these variables, a low and high setting was determined as the 1st and 3rd quartiles respectively, for each gender and ethnicity subgroup. Henceforth, in this paper, the terms low and high refer to the group-specific 25th and 75th percentile values. Thus, the effect of a given factor for fixed levels of the other two factors was the difference in the estimated probability of passing the CPT as the given factor goes from its low to high level. There were four possible levels at which the other factors could be fixed, namely, all possible cross-classifications of low and high for each respective factor. All estimated probability calculations were determined from the model-based estimates.

These analyses were conducted using the LOGISTIC procedure of the Statistical Analysis System's software package. A backward selection stepwise method was employed starting from a model with all main effects and first order interactions. The significance level for deletion from the model was set at 0.05. Because standardized beta weights are scale-independent estimates of population parameters, they were used to make direct comparisons of effects among the continuous variables.

Results

Descriptive Statistics

Table 4 gives the percent pass rates, GPA, GTAT scores, and Math and English HSP values for the major cross-classifications of race and gender. Black and Hispanic students scored lower than Whites on both the GTAT and CPT, and males scored lower than females (with the exception of Math GTAT). The percentage of students passing the Math CPT appeared to be more related to Math GTAT and Math HSP than to GPA. Similarly but less emphatically, the percent of students passing the Reading CPT appeared to be more related to Reading GTAT than to English HSP or GPA. To verify the apparent relationships in Table 4, the data were formally analyzed with inferential statistical techniques to model CPT score as a function of HSP, GTAT, GPA, and two qualitative variables, race and gender.

CPT Math Subtest

Significant effects of race (p = .0013 for Hispanics and p =. 0001 for Blacks), gender (p = .0107), GTAT (p = .0001), Math HSP (p = .0001), and GPA (p = .0001) were observed for the CPT Math subtest. A GPA-by-Math HSP interaction was also significant (p = .0394).

Table 5 presents the standardized model parameter estimates (beta weights) for all CPT subtests. The Math column indicates that the effect of Math HSP was considerably higher than that of GPA or Math GTAT (2.32 vs. 0.159 for GPA and 0.465 for GTAT). Table 6 provides the adjusted odds ratios for the qualitative risk factors on all three CPT subtests. The estimates indicate that Blacks and Hispanics had significantly lower odds of passing the Math CPT than Whites and that males had significantly higher odds of passing than females.

Table 7 presents comparisons of the effects of GTAT, GPA, and Math HSP based on the difference in estimated probability of passing the Math CPT as a given factor goes from its low to high level, for fixed levels of the other two (e.g., fixing GPA and GTAT as Math HSP goes from low to high). The maximum and average difference between high and low pass rate probabilities are reported for each gender-by-ethnicity combination. To illustrate, consider the first row, Black females: The value .035 in the Maximum Difference GPA column (i.e., 3½ %) is the most that the Math CPT pass rate probability improves as GPA moves from low to high and GTAT and Math HSP vary over their possible values (i.e., low-low, low-high, high-low, and high-high). The next column value .25 is the maximum difference that Math CPT pass rate probability improves (i.e., 25%) as GTAT moves from low to high and GPA and Math HSP vary. The key finding in Table 7 is that the effect of Math HSP, considered either at maximum or average difference, was consistently higher than either GPA or GTAT across all race-by-gender combinations. This finding indicates an increase in Math HSP had a greater positive effect on their probability of passing the Math CPT than similar increases in either GPA or GTAT scores.

Figure 1 graphically represents the estimated probability of passing the Math CPT across combinations of students with high and low GPAs and GTATs. For all six race-by-gender groups, an increase in Math HSP dramatically increased the probability of passing the test. In fact, any student, regardless of race or gender, who achieved a value of 15 on Math HSP was virtually assured of passing the CPT.

CPT Reading Subtest

Significant race (p = .0001 for Blacks and Hispanics), gender (p = .0001), GTAT (p = .0001), English HSP (p = .0001), and GPA (p = .0001) effects were observed. Also, the standardized model parameter estimates given in Table 5 clearly indicate that GTAT reading score (.692) was greater than GPA (.076) and English HSP (.195). The odds ratios given in

Table 6 indicate that Blacks and Hispanics had significantly lower odds of passing the Reading CPT than Whites and that males had significantly higher odds of passing the Reading CPT than females.

The effects of the English HSP variable, GTAT score, and GPA can be seen in Table 7. Unlike the Math CPT, where the Math performance variable had the greatest impact on passing, Reading CPT success was primarily dependent on GTAT score. An increase in Reading GTAT score had a greater positive effect on the probability of passing the Reading CPT than similar increases in cumulative high school GPA or English HSP.

Figure 2 illustrates the estimated probability of passing the Reading CPT across combinations of high and low GPA and GTAT. The curves plotted for English HSP were noticeably different than those plotted for Math HSP in Figure 1: (a) the probability of passing the Reading CPT was considerably less steep as students raise their English HSP; (b) High GTAT was clearly associated with higher pass rates than low GTAT; and (c) the pass rates for Whites was considerably higher that those of Blacks and Hispanics.

CPT Writing Subtest

Significant race (p = .0001 for Blacks and p = .0320 for Hispanics), GTAT (p = .0001), English HSP (p = .0001), and GPA (p = .0224) effects were observed. Also, the standardized model parameter estimates given in Table 5 clearly indicate that GTAT reading score (.626) was greater than GPA (.038) and English HSP (.291). The odds ratios given in Table 6 indicate that Blacks and Hispanics had significantly lower odds of passing the Writing CPT than Whites.

The effects of the English HSP variable, GTAT score, and GPA can be seen in Table 7. Similar to the Reading CPT, success on the Writing CPT was primarily dependent on GTAT score. An increase in Reading GTAT had a greater positive effect on the probability of passing the Writing CPT than similar increases in cumulative high school GPA or English HSP.

Figure 3 illustrates the estimated probability of passing the Writing CPT across combinations of high and low GPA and GTAT. The curves plotted for English HSP for this subtest was similar to those for the Reading CPT. A major difference was that females of all three races consistently demonstrated higher pass rates than males.

Summary

The Math HSP variable had a larger positive effect on passing the CPT than the English HSP variable. Indeed, the graphs of the estimated CPT pass probabilities clearly showed that an increase in Math HSP had a dramatic effect on the estimated probability of passing the Math CPT. Math HSP had a larger effect on passing the CPT Math than either GPA or Math GTAT. Although the English HSP variable had a positive effect on the estimated probabilities of passing both the Reading and Writing CPT, it was not nearly as influential as the Math HSP variable. For the Reading and Writing CPT, Reading GTAT score was the dominant predictor of success or failure.

Discussion

Previous research has consistently shown that students who take more difficult courses in high school score higher on standardized achievement tests administered in high school (e.g., Lee, Burkam, Chow-Hoy, Smerdon & Geverdt; 1998; Rock & Pollack, 1998; Spade, Columba, & Vanfossen, 1997). None of these earlier studies, however, explored the connection between high school course-taking and performance on the College Board's CPT, an entry-level test which community colleges routinely use to determine readiness to do postsecondary academic work.

Taking more higher-level math courses in high school has long been known to be an accurate predictor of scoring well on aptitude tests commonly required for admission into four-year baccalaureate institutions (Noble & McNabb, 1989). That association also holds true for community college students. Appendix B contains a graph contrasting the Math CPT pass rates of students who completed Algebra 1 versus students who completed Algebra 2. The graph illustrates that even though only 49% of the students who enrolled in Florida community college in the fall of 1994 had taken Algebra 2 in high school, those who did far exceeded the average Math CPT pass rate of 50% achieved that year by all test takers. Even students who did very poorly in Algebra 2 (receiving a grade of D) achieved a pass rate of nearly 75%. This finding supports the increasingly mandated curriculum requirement that all students complete at least one year of algebra, and suggests that phasing in Algebra 2 as a requirement for high school graduation may be warranted. Even if the resultant knowledge is shaky, course exposure itself seems to assist students in passing the math portion of a college placement test.

The finding that Math HSP had a larger effect than GPA on the probability of passing the Math CPT suggests that taking more challenging math courses, even at the risk of lowering GPA, would benefit most students. This finding has important implications for counselors and parents advising students planning to pursue postsecondary education. Students with average grades who take challenging courses would be better prepared to do college level work than students who achieve high grades through taking undemanding courses. The first group of students would more likely *not* need placement in non-credit, remedial math classes when they matriculate to postsecondary education.

The finding that tenth grade scores on a standardized test (the GTAT) is the strongest predictor of success in passing the Reading and Writing portions of the CPT holds out promise that such a test can serve to detect college unpreparedness early, alerting students, parents, and counselors that closer monitoring of course selection and grades is needed. The diagnostic power of the test is evident in the graphs where a ranking in the 25th percentile (low GTAT) indicates almost no chance of passing the CPT whereas a ranking in the 75th percentile (high GTAT) virtually guarantees passing the CPT. Tracking tenth grade standardized test scores and math and English performance constitute a short–term, feasible strategy that school officials can implement to increase the readiness of students to do college-level work.

One troubling finding did emerge from this study. As Figures 2 and 3 indicated, Blacks and Hispanics did not pass the Reading and Writing CPT at the same rates as Whites, even when controlling for English HSP, GTAT and GPA. The finding implies that minority students at the same level of accomplishment as White students experienced more difficulty acquiring and demonstrating mastery in their high school English courses. This discrepancy was emphatically not the case for students passing the Math CPT where, for a given level of accomplishment, no race effect was noted.

What inference may be drawn from this finding? Curriculum specialists have consistently distinguished mathematics as the academic subject matter most sensitive to school instruction, in contrast to the language arts of reading and writing which are substantially influenced by and amenable to out-of-school experiences. Moreover, the internally structured and cumulative nature of mathematics lends itself to being taught outside the cultural parameters that mark the study of language and literature. The study finding suggests that minority students seem to encounter some sort of disadvantage in high school English classes; in mathematics, students at the same level of accomplishment, regardless of race, master its logical sequencing of topics. Clearly more research is needed to understand the etiology of these differences in math and English performance. What we can be sure of now, however, is that the poorer performance of minorities on the CPT Reading and Writing subtests has serious consequences as these students matriculate to community college.

In 1998 the state of Florida inaugurated a policy stipulating that students who failed to complete a community college remedial course on their first try would have to pay out-of-state tuition to enroll a second time and no student would be allowed to take a non-credit course more than three times. Since out-of-state tuition is four times higher than in-state tuition, it is anticipated that the financial burden of paying for courses that don't count toward the completing the associate degree will likely increase the attrition from community college especially by low-income minority students.

Community colleges can take several steps to counteract the threat of greater attrition which is not confined to Florida's system of higher education: (a) they can partner with feeder school districts and adjacent universities to analyze course-taking patterns of students currently in high school to estimate the number of incoming students who are likely to require remediation; (b) In collaboration with their state department of education, they can implement a system of evaluating high school students' performance in math and English, similar to the weighting system described in this study. This system of combining course load, course difficulty, and course grade would serve to alert students in the pipeline that performance in math and English will determine whether they spend their first year in college paying for non-credit remedial classes. Whether more precise information about the consequences of course-taking and grades will persuade high school students and their families to give the issue serious consideration remains an open question. However, not to make the information available would betray the spirit of cooperation that underlies the articulation agreement in place between secondary and tertiary educational institutions.

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Table 1.

Number and Percentage of 12th Grade Florida High School Students Taking and Passing Computerized Placement Test (CPT), Fall 1994

	CPT		
	Number took test	Number passed test	Percent passed test
Math	19457	12485	64.1
Reading	19736	14294	72.4
Writing	19637	14242	72.5

Table 2

Variable names and description

Variable Name	Description
Response	
CPT	Result on Computerized Placement Test (CPT). The CPT was developed by the College Board of Princeton, NJ to provide students with an individualized examination that adjusts to their skill levels. All entering community college students take the CPT as part of registration to ensure that their skill levels in math, reading, and writing are adequate. If they are not, students are placed in non-credit-accruing remediation classes. CPT scores are derived by comparing correct answers with the answers' difficulty rating. The CPT is an adaptive test meaning the computer continuously adjusts the difficulty level of successive questions based on the test taker's answers to previous questions.
Predictor	
GPA	Four-year cumulative high school grade point average (GPA).
GTAT	Grade Ten Achievement Test. GTAT is a standardized norm-referenced test that measures the performance of Florida tenth-grade students in math and reading comprehension. The test consists of two 40-minute multiple-choice subtests. Reading comprehension contains 58 items (covering facts, inferences, and generalizations). Mathematics contains 48 items (covering algebra, geometry, and statistics). Test scores are reported by national percentile rank (NPR). In 1994 the test was administered to approximately 100,000 tenth-grade students. The state median NRP was 47 in reading comprehension and 50 in math.

Table 2

Variable names and description (continued)

Variable Name	Description
High School Performance (HSP)	Based on the Florida Department of Education 1993-94 high school course code directory, a difficulty level was assigned to each math and English course available to students. Difficulty levels ranged from 0.5 to 5.0 in increments of 0.5 For example, a one semester basic algebra course received a difficulty level of 1.0, while a one semester of advanced placement calculus received a 4.5. Also, a number score was given for the grade received in the course. The scale used for grades was typical. For example, an A grade received a 4.0, a B 3.0, etc. For each math and English course these two values were multiplied together, and then for each student a Math and English High School Performance (HSP) variable was calculated by summing these products across all math and English courses, respectively. The calculation also took into account whether a particular course was assigned a value of one credit or a half credit. (See Appendix A for scenarios in which these different factors combine to form an index of academic accomplishment.)

Table 3

Description of data sets

Data Set	Description
DOE	A statewide data set maintained by the Florida Department of Education containing information on gender, ethnicity, and cumulative high school GPA.
CC	A community college data set containing results on the Math, Reading, and Writing CPT subtests.
GTAT	Results of Florida's Grade Ten Assessment Test in reading comprehension and math administered in February 1992, expressed as a national percentile rank. There was no writing subtest on the GTAT.
HS Transcript	The complete course selection and grades of the study sample of students who graduated from Florida high schools in June, 1994. This data set was used to calculate Math and English HSP.

Table 4

Percent Pass Rates, GPA, GTAT Scores, and Math and English High School Performance (HSP) by Race and Gender

Race	Gender	Percent	Percent Pass Math	Percent Pass Reading	Percent Pass Writing	GPA	GPA Interquartile Range	Math GTAT Perctl.	Math Interquartile Range	Reading GTAT Perctl.	Reading Interquartile Range	Math HSP	Math HSP Range	English HSP	English HSP Range
Black	Female	9.9	43.1	43.8	49.4	2.5	2.2-2.8	32.5	15-46	30.8	15-43	7.7	4.0-9.5	20.5	16.5-24.0
Black	Male	5.4	44.0	46.2	44.6	2.3	2.0-2.6	35.0	15-50	30.5	14-43	7.2	3.8-9.3	17.4	14.0-20.3
Hispanic	Female	9.5	54.3	56.7	66.1	2.6	2.2-2.9	40.9	21-55	39.0	20-57	9.5	4.5-11.5	21.0	16.5-25.0
Hispanic	Male	6.5	60.1	59.6	62.2	2.4	2.1-2.6	47.0	30-64	39.6	22-57	9.1	4.5-10.5	17.8	14.0-20.9
White	Female	39.4	70.2	82.7	84.0	2.8	2.5-3.1	54.4	40-73	56.6	38-73	11.5	5.8-14.0	24.0	19.3-28.3
White	Male	29.2	72.6	82.7	78.1	2.6	2.3-2.9	59.5	43-79	55.7	38-73	10.9	5.5-13.0	20.9	16.3-24.5

Table 5

Standardized Parameter Estimates (Beta Weights) for three CPT Subtests

Variable	Math	Reading	Writing
Hispanic	-0.040	-0.111	-0.025
Black	-0.061	-0.155	-0.122
GTAT	0.465	0.692	0.626
HSP	2.320	0.195	0.291
GPA	0.159	0.076	0.038
Gender	0.033	0.086	-0.024
GPA*HSP	-1.396		

Table 6

Adjusted Odds Ratios for Passing the Three CPT Subtests by Qualitative Risk Factors

Math CPT

Risk factor	Odds ratio	Estimate	95% C.I.
Race	Black/White	0.735	(0.650,0.833)
Race	Hispanic/White	0.820	(0.727,0.926)
Gender	Male/Female	1.129	(1.029,1.240)

Reading CPT

Risk factor	Odds ratio	Estimate	95% C.I.
Race	Black/White	0.458	(0.408,0.515)
Race	Hispanic/White	0.576	(0.515,0.646)
Gender	Male/Female	1.371	(1.248,1.505)

Writing CPT

Risk factor	Odds ratio	Estimate	95% C.I.
Race	Black/White	0.542	(0.483,0.608)
Race	Hispanic/White	0.882	(0.786,0.989)
Gender	Male/Female	0.915	(0.836,1.001)

Table 7

Difference in the Estimated Probability of Passing the CPT as a Given Factor goes from its Low to High Level, for Fixed Levels of the Other Two

Math Subtest

Race	Gender	Maximum Difference GPA	Maximum Difference GTAT	Maximum Difference Math HSP	Average Difference GPA	Average Difference GTAT	Average Difference Math HSP
B	F	0.035	0.252	0.430	0.028	0.211	0.363
B	M	0.033	0.275	0.443	0.026	0.237	0.381
H	F	0.032	0.248	0.513	0.035	0.213	0.448
H	M	0.036	0.273	0.472	0.026	0.221	0.394
W	F	0.040	0.263	0.455	0.021	0.151	0.331
W	M	0.032	0.275	0.425	0.019	0.170	0.300

Reading Subtest

Race	Gender	Maximum Difference GPA	Maximum Difference GTAT	Maximum Difference English HSP	Average Difference GPA	Average Difference GTAT	Average Difference English HSP
B	F	0.042	0.333	0.101	0.037	0.321	0.089
B	M	0.039	0.344	0.083	0.034	0.336	0.075
H	F	0.045	0.428	0.111	0.037	0.409	0.093
H	M	0.039	0.402	0.093	0.026	0.375	0.069
W	F	0.040	0.232	0.094	0.022	0.186	0.057
W	M	0.036	0.218	0.082	0.021	0.176	0.050

Table 7

Difference in the Estimated Probability of Passing the CPT as a Given Factor goes from its Low to High Level, for Fixed Levels of the Other Two (continued)

Writing Subtest

Race	Gender	Maximum Difference GPA	GTAT	English HSP	Average Difference GPA	GTAT	English HSP
B	F	0.018	0.299	0.140	0.017	0.297	0.138
B	M	0.017	0.313	0.125	0.015	0.299	0.111
H	F	0.019	0.367	0.171	0.015	0.273	0.129
H	M	0.016	0.366	0.139	0.014	0.340	0.114
W	F	0.028	0.208	0.124	0.014	0.160	0.079
W	M	0.019	0.257	0.138	0.011	0.207	0.091

Figure 1. Estimated Probability of Passing the Math CPT by Gender and Ethnicity

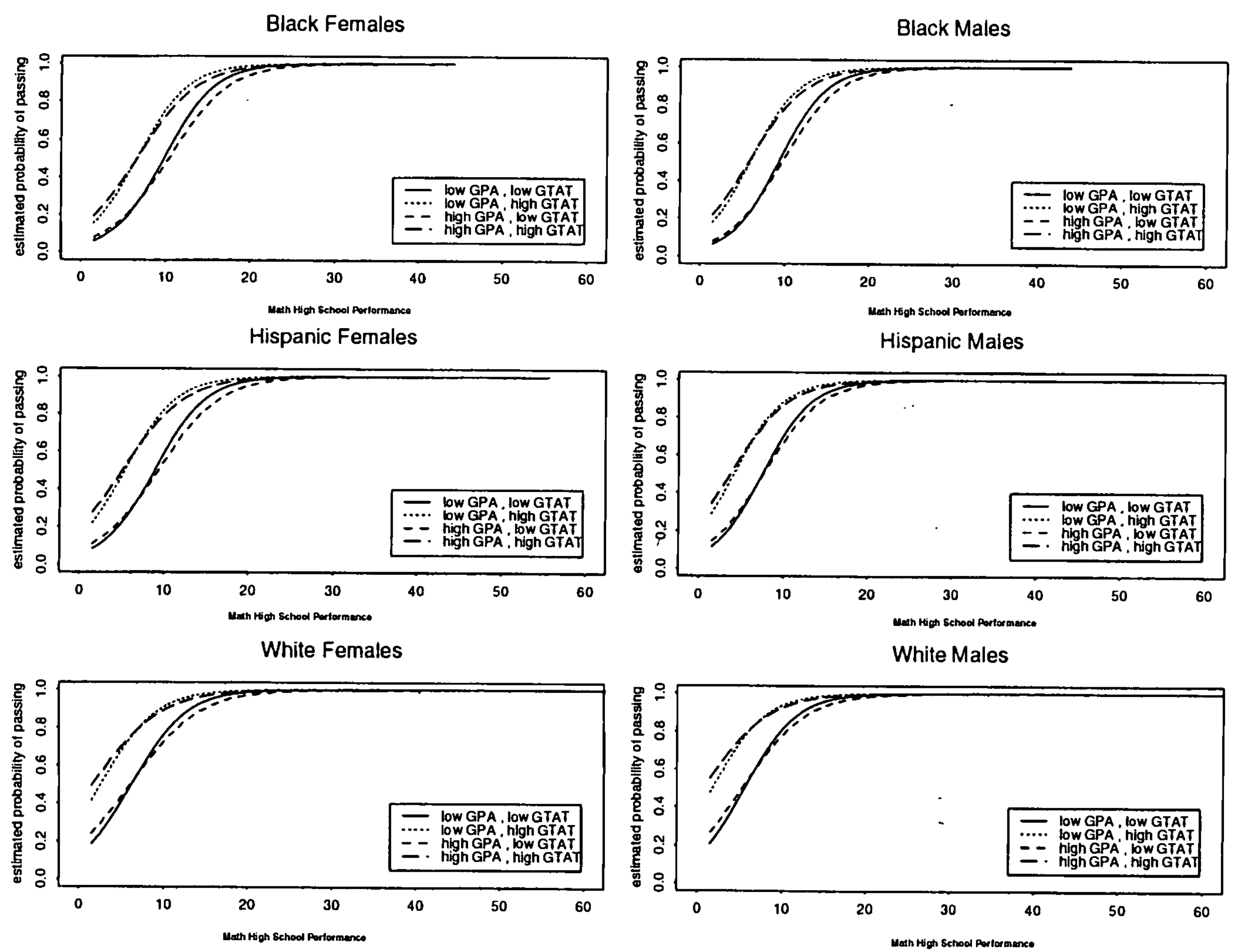

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Figure 2. Estimated Probability of Passing the Reading CPT by Gender and Ethnicity

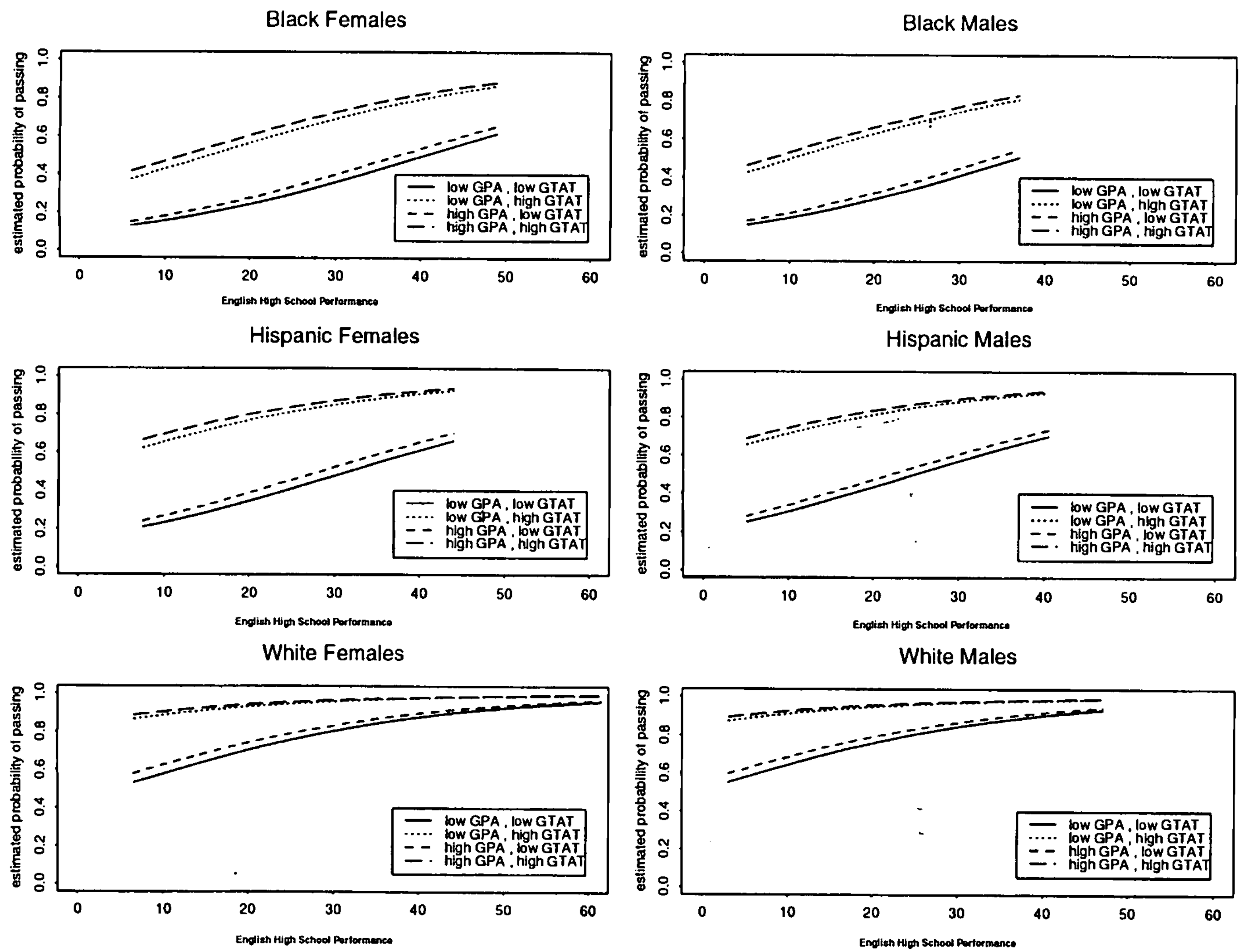

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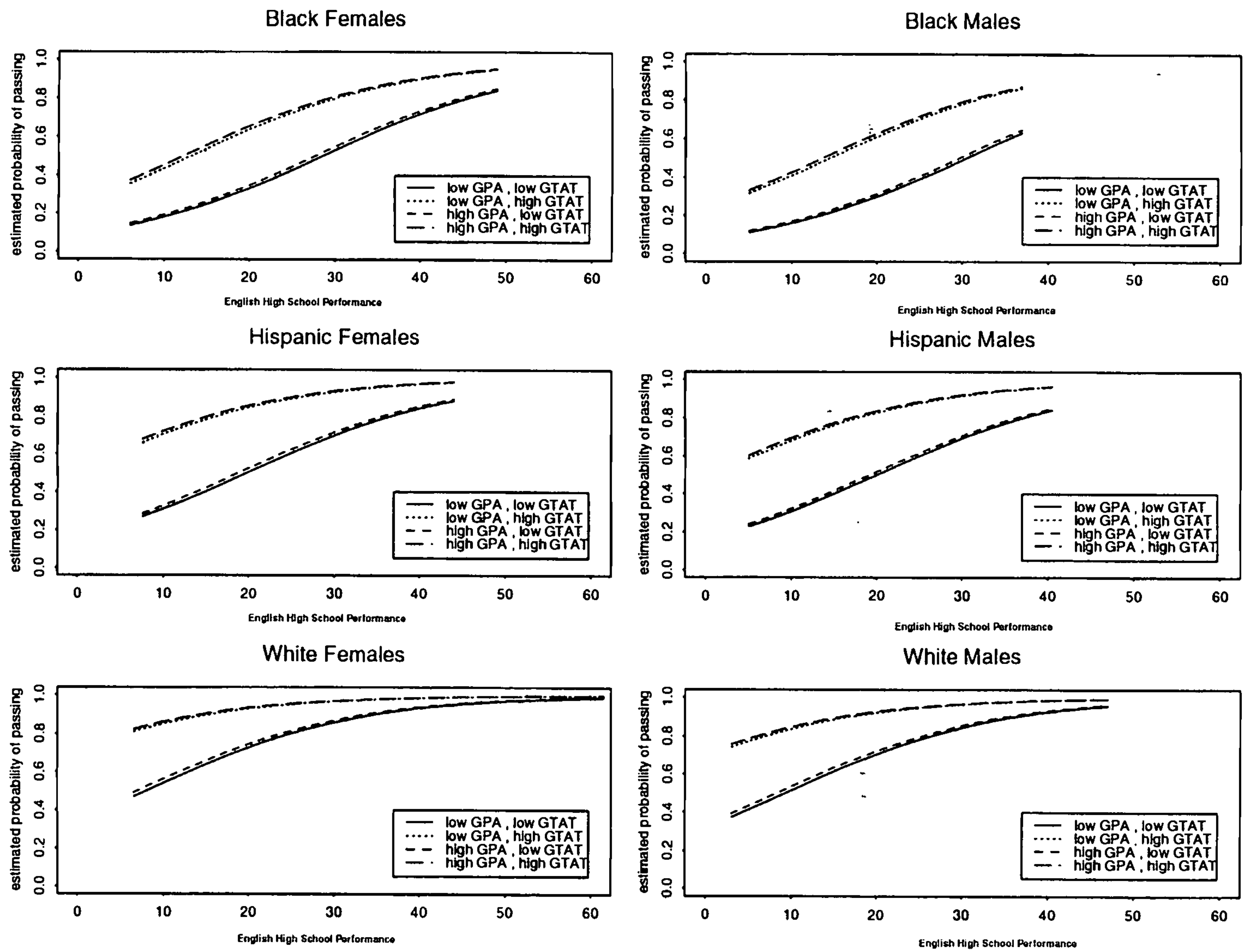
Figure 3. Estimated Probability of Passing the Writing CPT by Gender and Ethnicity



Appendix A

Examples of Math and English High School Performance (HSP)

1. Low Math HSP: Minimum course load, minimum course difficulty, and above average grades

Course number	Course name	Difficulty level	Grade	Grade score	Math HSP
1205310	Basic Math Skills	1.0	B	3.0	3.0
1205370	Consumer Math	1.0	B	3.0	3.0
1207310	Integrated Math I	1.0	C	2.0	2.0
1208300	Liberal Arts Math	1.0	C	2.0	2.0

Total Math HSP = 10.0

2. Average Math HSP: Minimum course load, average course difficulty, and above average grades

Course number	Course name	Difficulty level	Grade	Grade score	Math HSP
1200310	Algebra I	1.5	B	3.0	4.5
1200330	Algebra II	2.0	C	2.0	4.0
1206310	Geometry	1.5	B	3.0	4.5
1211300	Trigonometry	2.0	C	2.0	4.0

Total Math HSP = 17.0

3. Above average Math HSP: Minimum course load, average course difficulty, and high grades

Course number	Course name	Difficulty level	Grade	Grade score	Math HSP
1200310	Algebra I	1.5	A	4.0	6.0
1200330	Algebra II	2.0	A	4.0	8.0
1206310	Geometry	1.5	A	4.0	6.0
1211300	Trigonometry	2.0	B+	3.3	6.7

Total Math HSP = 26.7

Appendix A

Examples of HSP scenarios continued)

4. High Math HSP: Above average course load, high course difficulty, and high grades

Course number	Course name	Difficulty Level	Grade	Grade score	Math HSP
1200310	Algebra I	1.5	A	4.0	6.0
1200330	Algebra II	2.0	B	3.0	6.0
1206310	Geometry	1.5	A	4.0	6.0
1211300	Trigonometry	2.0	B	3.0	6.0
1202340	Pre-Calculus	3.0	A	4.0	12.0

Total Math HSP = 36.0

English

5. Low English HSP: Minimum course load, minimum course difficulty, and above average grades

Course number	Course name	Difficulty Level	Grade	Grade score	English HSP
1001300	English skills I	1.0	B	3.0	3.0
1000300	Func. Comm. I	1.0	B	3.0	3.0
1001460	App. Comm. I	1.0	C	2.0	2.0
1001470	App. Comm. II	1.0	C	2.0	2.0

Total Reading HSP = 10.0

6. Average English HSP: Minimum course load, moderate course difficulty, and high grades

Course number	Course name	Difficulty Level	Grade	Grade score	English HSP
1001300	English skills I	1.0	A	4.0	4.0
1000300	Func. Comm. I	1.0	A	4.0	4.0
1001460	English I	1.5	B	3.0	4.5
1001470	English II	2.0	B	3.0	6.0

Total English HSP = 18.5

Appendix A

Examples of HSP scenarios (continued)

7. Above average English HSP: Normal course load, average course difficulty, and above average grades

Course number	Course name	Difficulty Level	Grade	Grade score	English HSP
1001310	English I	1.5	B	3.0	4.5
1001340	English II	2.0	B	3.0	6.0
1001370	English III	2.5	B	3.0	7.5
1001400	English IV	3.0	B	3.0	9.0

Total English HSP = 26.5

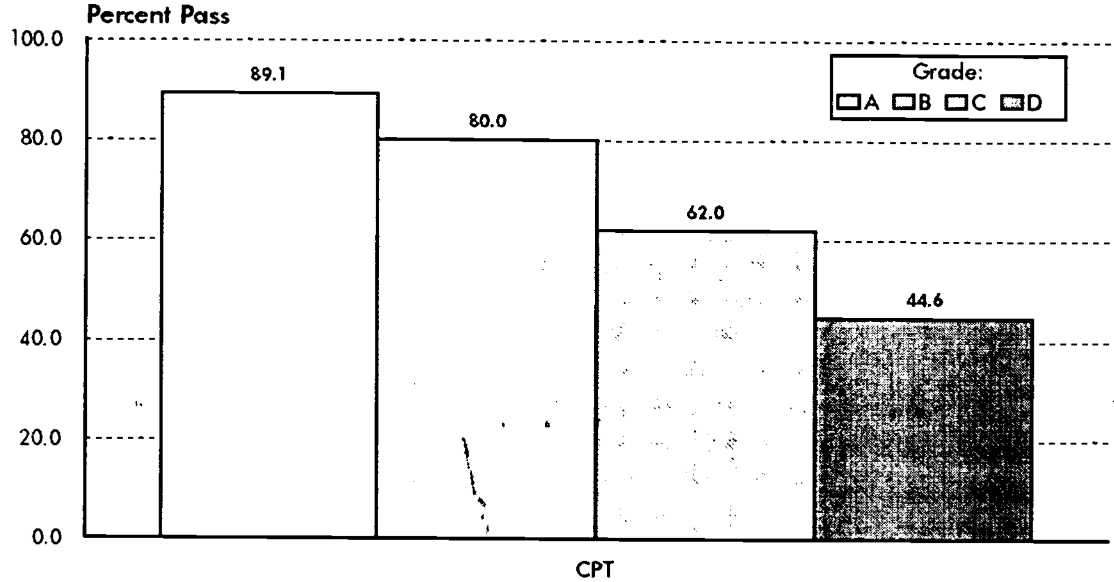
8. High English HSP: Extended course load, average course difficulty, and moderately high grades

Course number	Course name	Difficulty Level	Grade	Grade score	English HSP
1001310	English I	1.5	A	4.0	6.0
1001340	English II	2.0	A	4.0	8.0
1001370	English III	2.5	B	3.0	7.5
1001400	English IV	3.0	B	3.0	9.0
1005300	World Lit	2.5	B+	3.3	8.3
1005310	American Lit.	2.5	B+	3.3	8.3

Total English HSP = 47.1

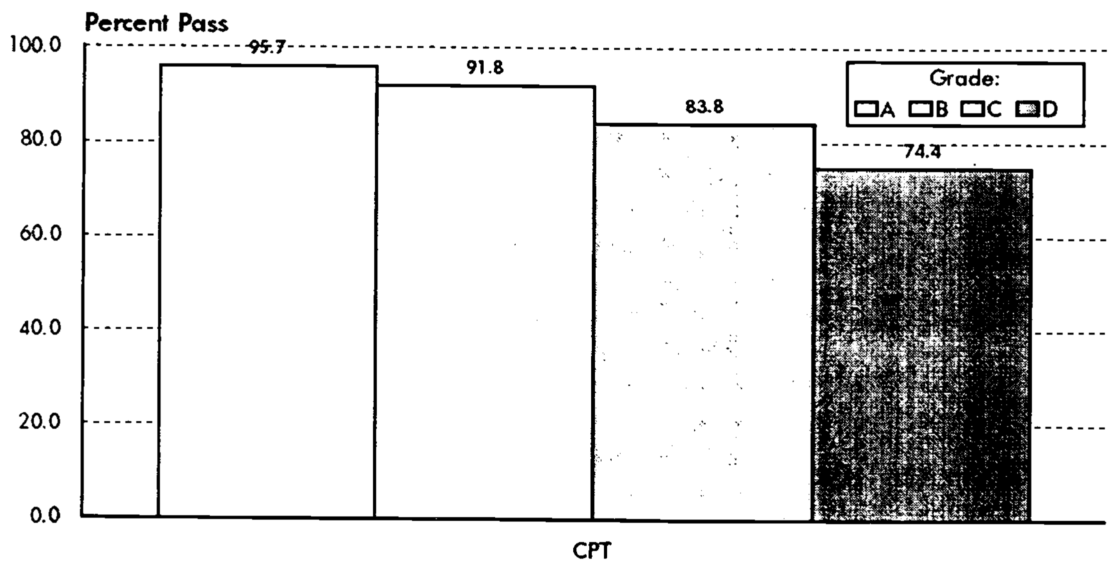
Appendix B

Percentage Passing Math CPT for Entering Community College Students Who Took Algebra 1 in High School



14,841 (77.6%) high school students attended four years of high school in Florida and graduated in 1993-94 took algebra 1 and entered Florida's community colleges in 1994 - 95

Percentage Passing Math CPT for Entering Community College Students Who Took Algebra 2 in High School



9,324 (48.8%) high school students attended four years of high school in Florida and graduated in 1993-94 took algebra 2 and entered Florida's community colleges in 1994 - 95

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